CIENA CORP
Form 10-K
December 21, 2016
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UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549
FORM 10-K

(Mark One)
þ ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d)OF THE SECURITIES EXCHANGE ACT OF 1934
For the fiscal year ended October 31, 2016
OR
o TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d)OF THE SECURITIES EXCHANGE ACT OF 1934
For the transition period from to
Commission file number 001-36250
Ciena Corporation
(Exact name of registrant as specified in its charter)

Delaware	23-2725311
(State or other jurisdiction of Incorporation or organization)	(I.R.S. Employer Identification No.)

7035 Ridge Road, Hanover, MD	21076
(Address of principal executive offices)	(Zip Code)

(410) 694-5700
(Registrant's telephone number, including area code)
Securities registered pursuant to Section 12(b) of the Act:

Title of Each Class	Name of Each Exchange on Which Registered
Common Stock, $0.01 par value	New York Stock Exchange

Securities registered pursuant to Section 12(g) of the Act: None
Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. YES þ NO o
Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. YES o NO þ
Indicate by check mark whether the registrant: (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. YES þ NO o
Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§232.4-5 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). YES þ NO o
Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. o
Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a smaller reporting company. See the definitions of "large accelerated filer," "accelerated filer" and "smaller reporting company" in Rule 12b-2 of the Act. (Check one):

Large accelerated filer þ	Accelerated filer o	Non-accelerated filer o (Do not check if a smaller reporting company)	Smaller reporting company o

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act) YES o NO þ

The aggregate market value of the Registrant's Common Stock held by non-affiliates of the Registrant was approximately $2.3 billion based on the closing price of the Common Stock on the New York Stock Exchange on April 29, 2016.

The number of shares of Registrant's Common Stock outstanding as of December 16, 2016 was 140,379,744.

DOCUMENTS INCORPORATED BY REFERENCE

Part III of the Form 10-K incorporates by reference certain portions of the Registrant's definitive proxy statement for its 2017 Annual Meeting of Stockholders to be filed with the Commission not later than 120 days after the end of the fiscal year covered by this report.

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CIENA CORPORATION
ANNUAL REPORT ON FORM 10-K
FOR FISCAL YEAR ENDED OCTOBER 31, 2016
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PART I

This annual report contains statements that discuss future events or expectations, projections of results of operations or financial condition, changes in the markets for our products and services, trends in our business, business prospects and strategies and other "forward-looking" information. In some cases, you can identify "forward-looking statements" by words like "may," "will," "should," "expects," "plans," "anticipates," "believes," "estimates," "predicts," "intends," "potential," "continue" or the negative of those words and other comparable words. These statements may relate to, among other things, adoption of next-generation network technology and software programmability and control of networks; our competitive landscape; factors impacting our industry; factors impacting the businesses of network operators and their network architectures; our corporate strategy, including our research and development, supply chain and go-to-market initiatives; efforts to increase application of our solutions in customer networks and to increase the reach of our business into new or growing customer and geographic markets; our backlog and seasonality in our business; our acquisition of Cyan, Inc. and its impact on our business and results of operations; expectations for our financial results, revenue, gross margin, operating expense and key operating measures in future periods; the adequacy of our sources of liquidity to satisfy our working capital needs, capital expenditures, and other liquidity requirements; business initiatives including real estate and IT transitions or initiatives; and market risks associated with financial instruments and foreign currency exchange rates. These statements are subject to known and unknown risks, uncertainties and other factors, and actual events or results may differ materially due to factors such as:

- our ability to execute our business and growth strategies;
- fluctuations in our revenue and operating results and our financial results generally;
- the loss of any of our large customers, a significant reduction in their spending, or a material change in their networking or procurement strategies;
- the competitive environment in which we operate;
- market acceptance of products and services currently under development and delays in product or software development;
- lengthy sales cycles and onerous contract terms with communications service providers, Web-scale providers and other large customers;
- product performance problems and undetected errors;
- our ability to diversify our customer base beyond our traditional customers and broaden the application for our solutions in communications networks;
- the international scale of our operations and fluctuations in currency exchange rates;
- our ability to forecast accurately demand for our products for purposes of inventory purchase practices;
- the impact of pricing pressure and price erosion that we regularly encounter in our markets;
- our ability to enforce our intellectual property rights, and costs we may incur in response to intellectual property right infringement claims made against us;
- the continued availability on commercially reasonable terms of software and other technology under third party licenses;
- failure to maintain the security of confidential, proprietary or otherwise sensitive business information or systems or to protect against cyber security attacks;
- the performance of our third party contract manufacturers;
- changes or disruption in components or supplies provided by third parties, including sole and limited source suppliers;
- our ability to manage effectively our relationships with third party service partners and distributors;
- unanticipated risks and additional obligations in connection with our resale of complementary products or technology of other companies;
- our exposure to the credit risks of our customers and our ability to collect receivables;
- modification or disruption of our internal business processes and information systems;
- the effect of our outstanding indebtedness on our liquidity and business;
- fluctuations in our stock price and our ability to access the capital markets to raise capital;
- unanticipated expenses or disruptions to our operations caused by facilities transitions or restructuring activities;

- inability to attract and retain experienced and qualified personnel;
- disruptions to our operations caused by strategic acquisitions and investments or the inability to achieve the expected benefits and synergies of newly-acquired businesses;
- our ability to grow our software business and address networking strategies, including software-defined networking and network function virtualization;
- changes in, and the impact of, government regulations, including with respect to: the communications industry generally; the business of our customers; the use, import or export of products; and the environment, potential climate change and other social initiatives;

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- impairment charges caused by the write-down of goodwill or long-lived assets;
- our ability to maintain effective internal controls over financial reporting and liabilities that result from the inability to comply with corporate governance requirements; and
- adverse results in litigation matters.

These are only some of the factors that may affect the forward-looking statements contained in this annual report. For a discussion identifying additional important factors that could cause actual results to vary materially from those anticipated in the forward-looking statements, see “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and “Risk Factors” in this annual report. You should review these risk factors for a more complete understanding of the risks associated with an investment in our securities. However, we operate in a very competitive and rapidly changing environment and new risks and uncertainties emerge, are identified or become apparent from time to time. It is not possible for us to predict all risks and uncertainties that could have an impact on the forward-looking statements contained in this annual report. You should be aware that the forward-looking statements contained in this annual report are based on our current views and assumptions. We undertake no obligation to revise or update any forward-looking statements made in this annual report to reflect events or circumstances after the date hereof or to reflect new information or the occurrence of unanticipated events, except as required by law. The forward-looking statements in this annual report are intended to be subject to protection afforded by the safe harbor for forward-looking statements contained in the Private Securities Litigation Reform Act of 1995.

Item 1. Business

Overview

We are a network strategy and technology company, providing solutions that enable a wide range of network operators to adopt next-generation communication architectures and to deliver a broad array of services relied upon by enterprise and consumer end users. We provide equipment, software and services that support the transport, switching, aggregation, service delivery and management of voice, video and data traffic on communications networks. Our high-capacity hardware and network management and control software solutions enable open, multi-vendor, programmable networks that improve automation, reduce network complexity and flexibly support changing service requirements. Our solutions yield business and operational value for our customers by enabling them to support new applications, introduce new revenue-generating services and reduce network complexity and expense.

Our Converged Packet Optical, Packet Networking and Optical Transport products are used by a diverse set of customers and market segments including communications service providers, cable and multiservice operators, Web-scale providers, submarine network operators, governments, enterprises, research and education (R&E) institutions, and other emerging network operators. These products, which can be applied from the network core to network access points, allow network operators to scale capacity, increase transmission speeds, allocate traffic and adapt dynamically to changing end-user service demands. In addition to our portfolio of high-capacity hardware platforms, we offer network management and control software platforms designed to simplify the creation, automation and delivery of services across multi-vendor and multi-domain network environments. Our software solutions are oriented around our modular Blue Planet software platform for multi-domain service orchestration, network function virtualization, and network management and control. To complement our hardware and software solutions, we offer a broad range of transformation and automation services that help our customers design, optimize, integrate, deploy, manage and maintain their networks.

Certain Financial Information and Segment Data

During the first quarter of fiscal 2016, we reorganized our internal organizational structure, the management of our business, and the reporting of our operating segments. This reorganization resulted in three new operating segments: Networking Platforms, Software and Software-Related Services, and Global Services. Our previous Converged

Packet-Optical, Packet Networking and Optical Transport segments were realigned to form the Networking Platforms segment under a single operating segment manager. Our previous Software and Services operating segment was reorganized into two separate operating segments: Software and Software-Related Services, and Global Services. Segment revenue and segment profit for fiscal 2015 and fiscal 2014 have been restated to reflect the new operating segments adopted in fiscal 2016. See Note 22 to our Consolidated Financial Statements included in Item 8 of Part II of this annual report.

We generated revenue of $2.6 billion in fiscal 2016, as compared to $2.4 billion in fiscal 2015. Sales to AT&T were $479.1 million, or 18.4% of total revenue in fiscal 2016, and $487.8 million, or 19.9% of total revenue in fiscal 2015. No other customer accounted for greater than 10% of our revenue in fiscal 2016 or fiscal 2015. For more information regarding our

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results of operations, see “Management’s Discussion and Analysis of Financial Condition and Results of Operations” in Item 7 of Part II of this annual report.

The matters discussed in this “Business” section should be read in conjunction with the Consolidated Financial Statements found in Item 8 of Part II of this annual report, which include additional financial information about our operating segments, total assets, revenue, measures of profit and loss, and financial information about geographic areas and customers representing greater than 10% of revenue.

Corporate Information and Access to SEC Reports

We were incorporated in Delaware in November 1992 and completed our initial public offering on February 7, 1997. Our principal executive offices are located at 7035 Ridge Road, Hanover, Maryland 21076. Our telephone number is (410) 694-5700, and our website address is www.ciena.com. We make our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, and amendments to those reports, available free of charge in the “Investors” section of our website as soon as reasonably practicable after we file these reports with the Securities and Exchange Commission (the “SEC”). We routinely post the reports above, recent news and announcements, financial results and other important information about our business on our website at www.ciena.com. Information contained on our website is not a part of this annual report.

Industry Background

Network Traffic Growth and Increased Capacity Requirements

The markets in which we sell our communications networking solutions have been subject to significant changes in recent years. In particular, optical networks — which carry voice, video and data traffic using multiple wavelengths of light across fiber optic cables — have experienced a multi-year period of strong traffic growth. This growth in network traffic, and the resulting requirements for increased network capacity, is being driven by the rapid proliferation and increased reliance upon a diverse set of communications services and applications. These services and applications, including those set forth below, have fundamentally affected and are redefining the bandwidth and service demands placed upon networks, and are challenging the business models of network operators.

- Cloud-Based Services. Enterprises and consumers are continuing to adopt a broad array of innovative cloud-based service offerings that host key applications, store data, enable the viewing and downloading of content, and utilize on-demand computing resources. Through cloud-based service models such as Platform as a Service (PaaS), Software as a Service (SaaS) and Infrastructure as a Service (IaaS), smaller enterprises and consumers can subscribe to an expanding range of services to replace locally-housed computing and storage requirements. Larger enterprises and data center operators can use private clouds to consolidate their own resources and public clouds to accommodate peak demand situations, sometimes in combination. Today, infrastructures exist to allocate centralized network storage and computing resources dynamically from the cloud to end users. As a result, networks must be capable of adapting in real time to changing demands, capacity requirements and locations.

- Over-the-Top (OTT) Services and Video Streaming. OTT content refers to video, multimedia and other applications provided directly from the content provider to the viewer or end user. Traffic from streaming and OTT services, including high definition and ultra-high definition video, has expanded with the increased availability of and end user demand for video content accessible through a variety of devices and media. The growth in bandwidth-intensive traffic associated with streaming and OTT content, and the required quality of experience for such services, are imposing significant demands upon the infrastructures of communications service providers and multi-service operators.

- On-Demand Services. Users of communications services are increasingly requiring an on-demand service level that allows them to be connected to content and bandwidth wherever they desire. Businesses rely upon enterprise services and data center connectivity that facilitate global operations, employee mobility and access to critical business applications and data. Consumers expect broadband technologies, including peer-to-peer internet applications, augmented reality applications and multimedia streaming and downloads, to be available on-demand. The on-demand nature of an application-centric, cloud-driven world is changing user bandwidth consumption patterns, leading to less predictable traffic patterns and usage.

- Mobile Devices and Applications. Traffic from mobile applications, including internet, video and data services, has expanded with the proliferation of smartphones, tablets and other wireless devices. Because wireless traffic ultimately travels over a wireline network in order to reach its destination, growth in mobile communications continues to place demands upon wireline networks, including backhaul and fronthaul networks emanating from cell sites.

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In addition, emerging services and applications are likely to present further challenges for and place significant service, capacity and automation demands upon network infrastructures. These include:

- Internet of Things. As the number of networked connections between devices and servers grows, machine-to-machine-related traffic (M2M) is expected to represent an increasing portion of traffic in what some refer to as the “Internet of Things” (IoT). These connections can provide value-added services and allow sharing of data that can be monitored and analyzed. We expect network traffic relating to the interconnection of devices to grow as internet and cloud-based content delivery, smartgrid applications, health care and safety monitoring, resource and inventory management, home entertainment, consumer appliances, connected transportation, and other M2M data applications become more widely adopted.

- Fifth-Generation Wireless Broadband Technology (5G). Wireless network operators will be required to deliver greater capacity and to adopt next-generation mobile network standards in order to cost-effectively accommodate increased bandwidth and service demands. 5G is expected to enable significant increases in data consumption by a growing number of users and devices, thereby better supporting IoT and other emerging applications. 5G mobile networks will significantly affect both wireless and wireline networks, requiring improvements in mobile backhaul and access networks.

- Ultra-High Definition TV and Virtual and Augmented Reality. Ultra-high definition TV and the advent of immersive technologies like 360° video, virtual reality, and augmented reality are likely to place meaningful capacity and capability demands on networks as adoption of these technologies grows. The television, internet and consumer electronics industries are rapidly advancing these innovations and making them more widely available and affordable to consumers. As these services become more prevalent and are connected over networks, network operators will need to accommodate resulting additional bandwidth requirements.

We believe that increased traffic from these services and applications, along with the desire to provide content and service delivery closer to the end user for an improved quality of experience, will require network operators to adopt higher capacity networks with increased transmission speeds, particularly in regional and metropolitan networks.

Network Transition to Open, Programmable Networks

The dynamics discussed above, together with ongoing efforts to reduce network costs and promote flexibility, are causing our customers to evaluate and adopt next-generation infrastructures that are more open, programmable and automated. Network operators are increasingly leveraging information technology strategies that emphasize software capability, virtualization and standardized network solutions where possible. By leveraging software programmability, network operators can adapt more quickly to changing end-user demands, provide network functions virtually and on demand, and more efficiently deliver a wider range of revenue-generating services. We expect network operators increasingly to look to adopt networking strategies that enable more open and programmable networks, including one or more of the following:

- Software-Defined Networking (SDN). Network resources have been traditionally managed on an individual network element basis. SDN seeks to separate or abstract that control from individual elements, enabling them to be directly programmable by standards-based software control. The result of this enhanced programmability provides end-to-end visibility of network flows, enabling the ability to optimize traffic paths and control data flows through a network. SDN seeks to simplify networks, which creates more open environments that ease management, support automation, and more quickly deliver customized services to end users.

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Network Function Virtualization (NFV). Virtualization is the decoupling of physical IT or communications assets from the services or capabilities they can provide. These virtualization principles — previously applied to computing and storage resources — are now being applied to communications networks. Through NFV, network operators can eliminate costly, single-function or dedicated network appliances, such as firewalls and wide area network (WAN) accelerators, enabling their functions via software and general computing hardware and servers. We believe that NFV can decrease power and space requirements, reduce cost, and improve network flexibility and agility.

Orchestration and Evolution of Operations Support Systems and Business Support Systems (OSS/BSS). Historically, many network operators have relied upon OSS/BSS systems to support network management functions such as inventory, service provisioning, network configuration and fault management. These platforms are often complicated, inflexible, proprietary environments that struggle to keep pace with the change required to meet today's network demands. We believe that network virtualization and operational transformation may be better achieved through an

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orchestration and control platform that is open, extensible, and vendor-agnostic as to the equipment and software it controls. Because orchestration simplifies the end-to-end creation, automation and deployment of services across multiple physical and virtual domains, we believe it presents an opportunity to reduce network complexity and may provide an alternative to elements of traditional OSS/BSS systems.

We believe that network operator adoption of these strategies will require them, and their network solutions vendors, to increasingly look to utilize an ecosystem of physical and virtual network resources provided by multiple third parties. We expect that these network architectural approaches, in turn, will drive increased openness and interoperability of multi-vendor, multi-domain network environments, requiring an increased degree of cooperation, collaboration and interoperability among us and other solutions providers, including our competitors.

Different Approaches to Procurement of Network Infrastructure

These industry dynamics — including increased network traffic, changing services demands, efforts to reduce network costs, and the transition to more open and programmable networks — are causing network operators to consider a diverse range of approaches to the design and procurement of their network infrastructure. We refer to these different approaches as “consumption models.” These consumption models can include: the traditional systems procurement of fully integrated solutions including hardware, software and services from the same vendor; the procurement of a fully integrated hardware solution from one vendor with the separate use of a network operator’s own SDN-based control; the procurement of an integrated photonic line system with open interfaces from one vendor and the separate or “disaggregated” procurement of modem technology from a different vendor; or the use of published reference designs and open source specifications for the procurement of off-the-shelf or commoditized hardware (often referred to as “white box” hardware) to be used with open source software. In parallel, network operators are also exploring procurement alternatives for software solutions, ranging from integrated and proprietary software platforms to fully open source software.

We believe that network operators will continue to consider a variety of different consumption models. Many of these approaches are in their very early stages of development and evaluation, and the types of models and levels of adoption will depend in significant part on the nature of the operator and its particular network and network applications. We also believe that broader adoption of the consumption models involving greater disaggregation in procurement remains uncertain, particularly with those network operators for whom it would result in increased operational complexity, higher operating expense, and additional integration and support obligations. In any case, we expect that the potential for different approaches to procurement of network infrastructure will require network operators and vendors alike to assess, and possibly, broaden their existing commercial models over time. This dynamic will also place a premium on a vendor’s ability to accommodate multiple consumption models and to balance the provision of commercially robust network solutions with the maximum amount of flexibility and choice.

Strategy

Our corporate strategy to capitalize on the evolving market dynamics described above to drive the profitable growth of our business includes the following initiatives:

Promote Choice and Openness through our OP^n philosophy. Five years ago, we introduced our OP^n Architecture, a focused approach to next-generation networks through scalability, programmability and network level applications. Today, OP^n has evolved and expanded from an architecture into our governing philosophy and broader belief system, which is rooted in enabling choice in the market through openness. Choice is an increasingly important element of our customers’ efforts to keep pace with bandwidth demands and emerging service offerings, the shift to more automated and programmable networks, and the need to manage network costs. We believe that the best way to enable choice for our customers is by developing and providing network technologies and strategies that facilitate openness through

innovation, virtualization, automation and collaboration, and that we are well-positioned in this regard to offer an expansive range of choice to the market. Our OP^n belief system shapes the operation of our business in a number of ways. It guides our research and development strategy and solutions offerings, including our focus on coherent modem leadership, packet-optical convergence, and on multi-vendor network orchestration, management and control through our Blue Planet software platform. By embracing design principles that leverage open application programming interfaces (APIs), including those found in our Waveserver platform, we believe we facilitate openness and choice. By offering collaborative tools and environments, including our Emulation Cloud and DevOps Toolkit, we enable the development, testing and customization of services and applications. Our OP^n belief system also influences our go-to-market approach, as we expect to increasingly partner with an ecosystem of solutions vendors and virtual network function providers, and to integrate services and applications across multi-vendor and multi-domain networks. We

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intend to offer solutions and pursue opportunities across a range of customer consumption models in order to drive the evolution of next-generation network infrastructures and accelerate the realization of our OP^n philosophy.

Extend Technology Leadership and Expand Application of Our Solutions. Our product development strategy is focused on maintaining our leading technology offerings and expanding our role and the application of our solutions in customer networks. Our research and development efforts seek to advance and extend our coherent modem technology leadership, including our WaveLogic coherent optical processor and high-speed indium phosphide and silicon photonics technologies acquired from TeraXion during fiscal 2016, to address network operator requirements for performance, power and cost. We are also focused on introducing terabit per second and greater transmission speeds, and expanding the high-capacity and operationally-efficient service delivery capabilities in our Packet Networking and Converged Packet Optical products for access and metro networks, data center interconnect, submarine networks, and other WAN applications. In addition, we are seeking to increase software programmability of networks and to enable network operators to automate and accelerate the creation and delivery of new, cloud-based services. These efforts include investments in our Blue Planet software platform — which is designed to automate, orchestrate, and manage physical network resources and virtualized services across data centers and the WAN — and its integration across our portfolio and with additional third party network resources.

Increase Diversification of our Business. Another key element of our strategy, which is designed to address the dynamic industry environment, to continue our growth and to better withstand potential slowdowns adversely affecting particular geographies, markets, customer segments and applications, is the continued diversification of our business. We intend to pursue initiatives that broaden sales to existing customers across our solutions portfolio and secure additional relationships with a diverse set of network operators in high-growth customer segments and geographies.

Our sales and marketing efforts seek to promote increased sales to existing customers, particularly through opportunities that expand our role or the application of our solutions within their network and business. We are pursuing opportunities to increase adoption of our packet access and aggregation solutions, and to secure market share of our Blue Planet software platform, including within our existing customer base. We are also focused on opportunities to support metro aggregation, data center interconnect, managed services offerings, cloud-based services, submarine networks, business Ethernet services and mobile backhaul. We intend to leverage our existing customer relationships to increase sales and promote the adoption of our solutions as our customers scale and evolve their networks.

We also intend to target important growth markets, including key customer market segments and geographies. Our go-to-market strategy is focused on further diversifying our customer base by penetrating additional internet content providers, data center operators and other emerging network operators that form the “Web-scale” marketplace. We are also focused on securing additional customers within our traditional base of communications service providers, particularly in higher growth markets, in the Asia-Pacific region, including India. We intend to use our direct and indirect sales channels to target, and to expand our sales with, several other market verticals, including cable and multiservice operators, submarine network operators, enterprise customers and in the government and R&E markets. For example, we intend to gain greater reach providing network solutions to submarine network operators, particularly in the new cable build market, in part through our recently announced supply partnership with TE SubCom. To leverage the geographic reach of our direct sales resources and expand sales into key geographies, we have pursued channel and distribution opportunities, including our strategic relationship with Ericsson, that enable sales through third parties, including service providers, systems integrators and value-added resellers.

Optimize Business to Yield Operating Leverage. We regularly pursue initiatives to improve our operating margin, constrain operating expense and promote efficiency of our business processes and systems. These initiatives include portfolio optimization and engineering efforts to drive improved efficiencies in the design and development of our

solutions and supply chain initiatives to ensure that our product cost model remains ahead of the price erosion that we regularly encounter in our markets. We are also focused on ensuring an efficient supply chain, including efforts to vertically integrate where prudent, reduce our material and overhead costs and improve inventory management and logistics. Our initiatives also include the recent upgrade of our company-wide enterprise resource planning platform, as well as contemporaneous efforts to improve automation of key business processes and systems. We seek to leverage these initiatives to promote the profitable growth of our business and to drive additional operating leverage.

Customers and Markets

We sell our product and service solutions through direct and indirect sales channels to network operators in the following customer and market segments:

Communications Service Providers

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Our service provider customers include regional, national and international wireline and wireless carriers. Communications service providers are our historical customer base and represent a majority of our revenue. We provide service providers with products from the wireline network core to its edge, where end users gain access. Our service provider solutions address growing bandwidth demand from multiservice traffic growth and support key service provider offerings, including carrier-managed services, WAN consolidation, data center and inter-site connectivity, wireless backhaul and business Ethernet services.

Web-scale Providers

Our customers include a diverse range of internet content providers focused on applications such as search, social media, video, real-time communications and cloud-based service offerings to consumers and enterprises. Customers within this segment also include data center operators and other emerging network operators that are often focused on virtualized infrastructure and Ethernet exchanges. These customers are sometimes collectively included in a customer segment referred to as “Web-scale” providers or “Web 2.0.” These customers often require massive scale, low latency, reliability and performance to interconnect critical data centers and connect end users to network resources and content. Some of the demand for network capacity from this set of customers continues to be purchased as services from communications service providers.

Cable & Multiservice Operators (MSO)

Our customers include leading cable and multiservice operators in the United States and internationally. Our cable and multiservice operator customers rely upon us for carrier-grade Ethernet transport and switching products, as well as high-capacity coherent optical transport. Our platforms allow cable operators to integrate voice, video and data applications over a converged infrastructure and to scale their networking infrastructure to keep ahead of the bandwidth and application demands of their subscribers. Our products support key cable applications, including business Ethernet services, wireless backhaul, broadcast and digital video, voice over IP, and video on demand.

Submarine Network Operators

Our customers include service providers and consortia operators of submarine communications networks across the globe. Our submarine line terminal equipment (SLTE) helps submarine network operators build new networks and upgrade submarine networks to increase transmission speeds and capacity as they address rapid traffic growth, including from Web-scale providers. In recent years, we have had market success in enabling operators to upgrade terrestrial equipment located at the end of submarine networks, extending the value and life of their existing, submerged plant infrastructure. As traffic growth continues globally, we believe that the same trends impacting the terrestrial market will impact the submarine market, requiring further investment and the adoption of network approaches that improve economies of scale, cost per bit and end-to-end latency.

Enterprises

Our enterprise customers include large, multi-site commercial organizations, including participants in the financial, health care, transportation, utilities, energy and retail industries. Our products enable inter-site connectivity between data centers, sales offices, manufacturing plants, retail stores and research and development centers, using an owned or leased private fiber network or a carrier-managed service. Our products facilitate key enterprise applications including IT virtualization, cloud computing, business Ethernet services, business continuity, online collaboration, video conferencing, low latency networking and WAN encryption. Our products also enable our enterprise customers to prevent unexpected network downtime and ensure the safety, security and availability of their data.

Government, Research and Education (R&E)

Our government customers include federal and state agencies in the United States as well as international government entities. Our R&E customers include research and education institutions in the United States and abroad, as well as communities or consortia including leaders in research, academia, industry and government. Customers in this segment seek to take advantage of technology innovation, improve their information infrastructure and facilitate increased collaboration. Our solutions feature ultra-high capacity required to meet the requirements of supercomputing systems, as well as network assurance and security features required by customers in this space.

Products and Services

Networking Platforms

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Our Networking Platforms segment consists of our Converged Packet Optical, Packet Networking and Optical Transport product portfolios.

Converged Packet Optical. Our Converged Packet Optical portfolio includes a range of hardware networking solutions optimized for the convergence of coherent optical transport, optical transport network (OTN) switching and packet switching.

Using our coherent optical transport technology, our 6500 Packet-Optical Platform provides a flexible and scalable dense wavelength division multiplexing (DWDM) solution that adds capacity to core, regional, metro, and submarine networks and enables efficient transport at high transmission speeds. Our 6500 Packet-Optical Platform provides leading 10G, 40G, and 100G coherent and control plane capabilities for scale and service differentiation, and it utilizes hybrid OTN and packet switching technologies for efficient use of network resources, minimizing amplifiers, regenerators and dispersion compensation devices. Our 6500 Packet-Optical Platform also includes certain integrated switching elements, addressing market demand for converged network features, functions and layers to drive more robust and cost-effective network infrastructures. This platform, which includes several chassis sizes and a comprehensive set of line cards optimized for individual services or applications, can be used throughout the network, from customer premises to metropolitan networks, to the regional core, where the need for high capacity and carrier-class performance is essential.

Our Waveserver product is a stackable data center interconnect (DCI) platform that allows network operators, including Web-scale providers and data center operators, to scale bandwidth quickly and to support high-speed data transfer, virtual machine migration and disaster recovery/backup between data centers. Waveserver is a specialized platform, purpose-built for connecting data centers within a single metro area. It combines our leading coherent chipset with an operations model optimized for the capacity, speed, space and power requirements of data center environments. Waveserver is designed to leverage the data server user experience, with open application programming interfaces (APIs) and server-like deployment, provisioning and programmability via smart devices.

Our Converged Packet Optical portfolio also includes products that provide packet switching capability to allocate network capacity efficiently and to enable rapid service delivery. Our 5430 Reconfigurable Switching System includes a family of multi-terabit reconfigurable switching systems that utilize intelligent mesh networking to provide resiliency, and it features an integrated optical control plane to automate the provisioning and bandwidth control of high-capacity services. Our CoreDirector® Multiservice Optical Switch and 5430 Reconfigurable Switching System offer multiservice, multi-protocol switching systems that consolidate the functionality of an add/drop multiplexer, digital cross-connect and packet switch into a single, high-capacity intelligent switching system. These products address both core and metro segments of communications networks and support key managed services, including Ethernet/TDM Private Line and IP services.

Our Converged Packet Optical solutions also include our family of Z-Series high-capacity, multi-layer switching and transport platforms acquired from Cyan. Our Z-Series family is used in regional and metro networks and it is designed to support a variety of use cases including increasing capacity for optical transport, traffic aggregation at the network edge and switching optimized for handoff at the network core.

Packet Networking. Our Packet Networking products allow customers to simplify the deployment and delivery of new, revenue-generating services to consumer and enterprise end users. These products have applications from the edge of metro and core networks, where they aggregate traffic, to the access tiers of networks where they can be deployed to support wireless backhaul infrastructures and to deliver business data services. Our Packet Networking products facilitate network simplicity and cost effectiveness, including reduced costs associated with power and space, as compared to traditional IP routing network designs.

Our Packet Networking portfolio includes our 8700 Packetwave platform, a multi-terabit packet switching platform for high-density metro networks and inter-data center wide area networks. The 8700 combines high-capacity Ethernet switching and optical transport technologies for both data center networks and metro networks, to help network operators rapidly deliver cloud-based services, streaming video, and internet content distribution, efficiently aggregate users, and provide express connections to data centers. By increasing the traffic density while reducing power and space requirements, the 8700 also enables network operators to reduce capital and operating expense associated with

their networks and to simplify service management and enablement.

To date, revenue from our Packet Networking segment has been primarily related to our 3000 family of service delivery switches and service aggregation switches, and our 5000 family of service aggregation switches. Our 3000 and 5000 families support the access and aggregation tiers of communications networks and have principally been deployed to support business data services and wireless backhaul infrastructures. Our 3000 family of service delivery switches are purpose-built to fit small, medium, and large customer sites as well as multi-tenant office and residential buildings. Our 5000 family of service aggregation switches provide aggregation to fill higher capacity links efficiently within both the metro access and aggregation tiers of networks, minimizing the number of router assets required in the core.

Optical Transport. Our Optical Transport products include stand-alone WDM and SONET/SDH-based optical transport solutions that add capacity to core, regional, metro, and submarine networks and enable cost-effective and efficient transport of

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voice, video and data traffic at high transmission speeds. The products in this segment principally include the 4200 Advanced Services Platform, Corestream® Agility Optical Transport System, 5100/5200 Advanced Services Platform, Common Photonic Layer (CPL) and 6100 Multiservice Optical Platform. Our Optical Transport portfolio includes our traditional SONET/SDH transport and data networking products, as well as certain enterprise-oriented transport solutions that support storage and LAN extension, interconnection of data centers, and virtual private networks. Our Optical Transport products have either been previously discontinued, or are expected to be discontinued, reflecting network operators' transition toward next-generation converged network architectures addressed by solutions within our Converged Packet Optical product line.

Software and Software-Related Services

Our software business has principally consisted of the development and licensing of element and network management software and software-related services that support our hardware offerings. In connection with our acquisition of Cyan during the fourth quarter of fiscal 2015, we unified the software resources and activities of both companies with a focus on providing next-generation, multi-vendor network virtualization, service orchestration and management solutions oriented around our Blue Planet platform. During fiscal 2016, our software revenue was principally derived from our element and network management solutions related to our hardware sales. The market relating to the SDN, NFV and orchestration use cases for our Blue Planet software platform is in the early stages. As such, revenue from our Blue Planet software has been immaterial to date.

Blue Planet Software Platform. Our Blue Planet software platform is a modular, network virtualization, service orchestration and network management software platform that simplifies the creation, automation and delivery of services across multi-vendor and multi-domain network environments. Blue Planet is multi-functional in that it is designed to simplify the management, deployment and orchestration of hardware and software elements and services, from us or third-party vendors, based on the requirements of a network operator. Blue Planet utilizes a container-based, micro-services software architecture that provides flexibility to support the following use cases from a unified software platform:

WAN Automation. Multi-layer WANs have historically operated using vendor-specific management systems, with limited awareness of adjacent layers or network resources, resulting in additional complexity and cost, and challenging network management. Through its automation, management and control of multi-vendor and multi-layer network infrastructures, our SDN-based WAN automation solution eliminates this complexity. Our WAN automation solution enables network operators to visualize and control these disparate network elements through a unified solution that incorporates open APIs and resource adapters to control a range of third-party network elements. We believe this solution can enable network operators to simplify their network environments and accelerate end-to-end service delivery.

Multi-Domain Service Orchestration (MDSO). Network infrastructures are comprised of multiple technology layers and domains — such as the data center, cloud, metro, access and core networks — and it is often complex for network operators to offer services end-to-end in this environment. Blue Planet enables service orchestration across multiple network (physical and virtual) domains and multiple hardware and software vendors. By using open APIs and model-driven templates, Blue Planet integrates with third-party SDN controllers, element and network management systems, and orchestration platforms. We believe our MDSO solution can enable network operators to minimize vendor-specific management silos, reduce network complexity and enhance service management.

NFV Orchestration (NFVO). To reduce their dependence upon single-purpose hardware platforms and accelerate the time to market for new revenue-generating services, network operators are increasingly looking for solutions that enable network functions through software that runs on industry-standard servers, network and storage platforms. Blue Planet provides network operators with carrier-grade, NFV management and orchestration capabilities for instantiating and managing virtualized network functions and data center resources. Blue Planet uses an open,

vendor-agnostic approach that allows network operators to select and scale those virtual network functions (VNFs) they wish to offer to their end customers. We believe that our NFVO solution can enable network operators to increase network programmability, reduce complexity and cost, and reduce time-to-market with new, revenue-generating services.

SD-WAN Service Orchestration. This overlay technology allows service providers and enterprises to create low cost, secure virtual connections between branch offices and cloud or corporate data centers. Unlike traditional dedicated IP services, SD-WANs run “over the top” of the public internet, leveraging available broadband access links provided by physical or virtual customer premises equipment (CPE). Our flexible, open orchestration framework helps service providers overcome a number of key challenges and avoid the creation of vendor-specific operational silos. By serving as a vendor-agnostic abstraction layer, our SD-WAN orchestration solution enables integration with an existing OSS platforms and a highly differentiated services offering that combines cloud, NFV, and WAN resources.

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Our software portfolio also includes our Navigate path computation engine and network-level software applications that enable WAN services over an open network ecosystem. Our Blue Planet V-WAN application provides service providers the tools to offer enterprise, content, and cloud services to end users in a more automated and self-service oriented manner. We also offer network-level software applications, including Protect and Optimize, that enable network operators to improve reliability, to allow for more rapid network restoration, and to better monetize cloud-based services.

Element and Network Management Solutions and Software. Our software offerings also include our OneControl Unified Management System used by network operators in connection with our networking platforms. This integrated network and service management solution supports our Converged Packet Optical, Packet Networking and Optical Transport product lines from a single platform. OneControl offers end-to-end service creation, activation, and assurance to enable rapid deployment of next-generation wavelength, OTN and packet services. It also provides visualization of fault and performance information for network health status and it enables management functions, including network inventory, network element configuration backup, network element software delivery and security administration.

Our element and network management software offering also includes a number of software solutions that support our installed base of network solutions. These include:

- ON-Center® Network & Service Management Suite, which provides network and service management for our installed base of 4200 Advanced Services Platform and Corestream products;
- Optical Suite Release, which provides network and service management for our installed base of traditional SONET/SDH transport Optical Transport products;
- Ethernet Services Manager, which provides network and service management for our installed base of Packet Networking products; and
- Planet Operate, which provides network and service management for our installed base of Z-Series products acquired from Cyan.

As we seek adoption of our Blue Planet software platform and transition certain existing features, functionality and customers to this platform, including our next-generation network management software to be based on the Blue Planet platform, we expect revenues from our existing element and network management solutions to decline.

Our software suite also includes Ciena OnePlanner, a suite of planning tools for advanced, multi-layer network design. OnePlanner correlates data from different network layers, allowing the network planner to easily see the association between services, facilities, and equipment.

Software-Related Services. Software-related services include software subscription services, consulting, network migration and integration, installation and upgrade support services, and technical support relating to our software offerings.

Global Services

To complement our product portfolio, we offer a broad suite of consulting and support services that help our customers to design, optimize, deploy, integrate, manage and maintain their communications networks. We believe that our broad set of service offerings is a significant differentiator from our competitors. We believe that our services offering and our close collaborative engagement with customers provide us with valued insight into network and business challenges faced by our customers, enabling them to modernize and gain value from their network infrastructures. Our services offerings enable us to work closely with our customers in the assessment, planning, deployment, and transformation of their networks. We believe that our customers place significant value on the strategic, consultative engagements afforded by our services offering and on our ability to partner with them through

services-oriented solutions that address their network and business needs on an individualized basis. As we promote our OP^n philosophy, we expect to expand our service offering to include services focused on enhancing network automation, multivendor integration and implementation of programmable multi-domain next-generation networks.

Our services and support portfolio includes the following offerings:

- Deployment services, including turn-key installation and turn-up and test services;
- Maintenance and support services, including:
  - helpdesk and technical support assistance;
  - spares and logistics management;
  - engineering dispatch and on-site professional services; and
  - equipment repair and replacement.

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- Network management and monitoring through network operations center (NOC) services; and
- Project management services, including staging, site preparation and installation support activities.

We also provide training services to educate our customers and sales channels on the implementation, use, functionality and support of our solutions. We provide the services above using a combination of Ciena technical support engineers and qualified and authorized third party service partners.

Product Development

Our industry is subject to rapid technological developments, emerging service delivery requirements and shifts in customer and end-user network demand. To remain competitive, we must continually enhance our product platforms and add new features and functionality to ensure alignment with these changing dynamics. Our OP^n philosophy, which underpins our solutions offering and guides our research and development strategy, emphasizes software-enabled programmability, automation and open interfaces. Our product development initiatives include design and development work intended to address growing opportunities for the application of our solutions, such as metropolitan networks, data center interconnect, enterprise networking, and packet-based infrastructure solutions for high-capacity cloud-based service delivery. To address these opportunities and promote our OP^n belief system, our current development efforts are focused upon:

- Developing products that enhance software-based network management and control, service orchestration and network function virtualization, including:
  - Investments in our Blue Planet software platform to integrate across our portfolio and enhance orchestration across multi-vendor and multi-domain network environments;
  - Extension of the NFV capabilities of Blue Planet to enable virtualization of additional network features or functions traditionally supported by hardware elements;
  - SDN multi-layer WAN automation and service orchestration capabilities; and
  - Transitioning network-management, control and planning solutions to our Blue Planet architecture.
- Enhancing and extending our Packet-Optical and Packet Networking solutions, including:
  - Extending our leadership in coherent transport platforms, at 100G, 200G, 400G, and beyond;
  - Extending our coherent modem leadership and continued development of our WaveLogic optical processor to advance transmission speed, spectral efficiency, power usage and reach;
  - Accelerating packet feature development and technology convergence upon our Converged Packet Optical platforms; and
  - Expanding packet networking capabilities and features for our high-capacity Ethernet aggregation switches, for metro and service aggregation applications, data center interconnect, cloud-service delivery, mobile backhaul and business Ethernet services;
- Designing products that enable network operators to achieve improved economics and efficiency, including with respect to power, space and cost per bit.

Our research and development efforts are also geared toward portfolio optimization and engineering changes intended to drive cost reductions across our platforms.

We regularly review our existing solution offering and prospective development of new components, features or products, to determine their fit within our portfolio and broader corporate strategy. We also assess the market demand, technology evolution, prospective return on investment and growth opportunities, as well as the costs and resources necessary to develop and support these products. To ensure that our product development investments and solutions offerings are closely aligned with market demand, we continually seek input from customers and promote collaboration among our product development, marketing and global field organizations. In some cases, where we seek to utilize or gain access to complementary or emerging technologies or solutions, we may obtain such technology

through an acquisition or, alternatively, through initiatives with third parties pursuant to technology licenses, original equipment manufacturer (OEM) arrangements and other strategic technology relationships or investments. In addition, we participate in industry and standards organizations, and, where appropriate, incorporate information from these affiliations throughout the product development process.

Our research and development expense was $451.8 million, $414.2 million and $401.2 million for fiscal 2016, 2015 and 2014, respectively. For more information regarding our research and development expense, see “Management’s Discussion and Analysis of Financial Condition and Results of Operations” in Item 7 of Part II of this annual report.

Sales and Marketing

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Within our global field organization, we maintain a direct sales presence that is organized geographically around the following markets: (i) United States and Canada; (ii) Caribbean and Latin America; (iii) Europe, Middle East and Africa; and (iv) Asia-Pacific. Within each geographic area, we maintain specific teams or personnel that focus on a particular region, country, customer or market vertical. These teams include sales management, account salespersons, and systems engineers, as well as services professionals and commercial management personnel, who ensure that we operate closely with and provide a high level of support to our customers.

We also maintain a global channel program that works with resellers, systems integrators, service providers, and other third party distributors who market and sell our products and services. Our third party channel partners include our strategic distribution relationships with Ericsson and TE SubCom. We intend to pursue and foster targeted strategic channel relationships in an effort to enable us to sell our products as a complement to the broader offering of these vendors or integrators, including, in particular, in support of enterprise-oriented applications and cloud-based services. We see opportunities to leverage our strategic channel relationships to address additional customer market segments, additional applications for our solutions and growth geographies. We believe this strategy and our use of third party channels afford us expanded market opportunities and reduce the financial and operational risk of entering these additional markets.

To support our sales efforts, we engage in marketing activities intended to promote our brand, increase customer awareness of our product, software and service offerings and drive demand generation. Our marketing strategy is highly focused on building our brand, promoting our OP^n philosophy and increasing customer adoption of our solutions, particularly our Blue Planet software platform. Our marketing team supports our sales efforts through a variety of marketing vehicles, including direct customer interaction, portfolio marketing, industry events, public relations, industry analysts, social media, trade shows, our website and other marketing channels for our customers and channel partners.

Operations and Supply Chain Management

Our operations personnel manage our relationships with our third party manufacturers and global supply chain, addressing component sourcing, manufacturing, product testing and quality, and fulfillment and logistics relating to the distribution and support of our products.

We utilize a global sourcing strategy that emphasizes procurement of materials and product manufacturing in lower cost regions. We rely upon third party contract manufacturers, with facilities in Canada, Mexico, Thailand and the United States, to manufacture, support and ship our products, and therefore are exposed to risks associated with their businesses, financial condition and the geographies in which they operate. We also rely upon these contract manufacturers and other third parties to perform design and prototype development, component procurement, full production, final assembly, testing and customer order fulfillment. Our manufacturers procure components necessary for assembly and manufacture of our products based on our specifications, approved vendor lists, bills of materials and testing and quality standards. Our manufacturers' activity is based on rolling forecasts that we provide to them to estimate demand for our products. This build-to-forecast purchase model exposes us to the risk that our customers will not order those products for which we have forecast sales, or will purchase less than we have forecast. As a result, we may incur carrying charges or obsolete material charges for components purchased by our manufacturers that are not ultimately used. We work closely with our manufacturers to manage material, quality, cost and delivery times, and we continually evaluate their services to ensure performance on a reliable and cost-effective basis.

We are currently using a direct order fulfillment model for the sale of our products. This model allows us to rely on our third party contract manufacturers to perform final system integration and testing prior to shipment of products from their facilities directly to our customers. We believe that our sourcing and manufacturing strategy allows us to conserve capital, lower costs of product sales, adjust quickly to changes in market demand, and operate without

dedicating significant resources to manufacturing-related plant and equipment.

Shortages or lack of availability of components that we rely upon have occurred and are possible. Our products include some components that are proprietary in nature and only available from one or a small number of suppliers. Significant time would be required to establish relationships with alternate suppliers or providers of such components. We generally do not have long-term contracts with suppliers or contract manufacturers that guarantee supply of components or manufacturing services. If component supplies become limited, production at a contract manufacturer is disrupted, or if we experience difficulty in our relationship with a key supplier or contract manufacturer, we may encounter manufacturing delays that could adversely affect our business and result of operations.

As part of our effort to optimize our operations, we continue to focus on driving cost reductions through sourcing, rationalizing our supply chain, outsourcing or virtualizing certain activities, and consolidating distribution sites and service

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logistics partners. These efforts also include process optimization initiatives, such as vendor-managed inventory, and other operational models and strategies designed to drive improved efficiencies in our sourcing, production, logistics and fulfillment.

Backlog

Generally, we make sales pursuant to purchase orders placed by customers under framework agreements that govern the general commercial terms and conditions of the sale of our products and services. These agreements do not obligate customers to purchase any minimum or guaranteed order quantities. Moreover, we are periodically awarded business for new network opportunities or network upgrades following a selection process. In calculating backlog, we only include (i) customer purchase orders for products that have not been shipped and for services that have not yet been performed; and (ii) customer orders relating to products that have been delivered and services that have been performed, but are awaiting customer acceptance under the applicable contract terms. Generally, our customers may cancel or change their orders with limited advance notice, or they may decide not to accept our products and services, although both cancellation and non-acceptance are infrequent. Backlog may be fulfilled several quarters following receipt of a purchase order, or in the case of certain service obligations, may relate to multi-year support period. As a result, backlog should not necessarily be viewed as an accurate indicator of future revenue for any particular period.

Our backlog increased from $1.06 billion as of October 31, 2015 to $1.15 billion as of October 31, 2016. Backlog includes product and service orders from commercial and government customers combined. Backlog at October 31, 2016, includes approximately $292.6 million primarily related to orders for products and maintenance and support services that are not expected to be filled or performed within fiscal 2017. Because backlog can be defined in different ways by different companies, our presentation of backlog may not be comparable with figures presented by other companies in our industry.

Seasonality

Like other companies in our industry, we have experienced quarterly fluctuations in customer activity due to seasonal considerations. We typically experience reductions in order volume toward the end of the calendar year, as the procurement cycles of some of our customers slow and network deployment activity by service providers is curtailed. This period coincides with the first quarter of our fiscal year. This seasonality in our order flows can result in somewhat weaker revenue results in the first quarter of our fiscal year. These seasonal effects may not apply consistently in future periods and may not be a reliable indicator of our future revenue or results of operations.

Competition

Competition among communications network solution vendors remains intense. The markets in which we compete are characterized by rapidly advancing technologies, frequent introduction of new networking solutions and aggressive selling efforts to displace incumbent vendors and capture market share. Competition for sales of communications networking solutions is dominated by a small number of very large, multi-national companies. Our competitors include Cisco, Fujitsu, Huawei, Juniper Networks, Nokia and ZTE. As compared to us, many of these competitors have substantially greater financial, operational and marketing resources, and significantly broader product offerings. Because of their scale and resources, they may be perceived to be a better fit for the procurement or network strategies of large service providers. We also continue to compete with several smaller, but established, companies that offer one or more products that compete directly or indirectly with our offerings or whose products address specific niches within the markets and customer segments we address. These competitors include ADVA, Coriant, ECI and Infinera. We also compete with a number of smaller companies that provide significant competition for a specific product, application, customer segment or geographic market. Some of the foregoing competitors, both large and small, are not vertically integrated in their packet-optical supply chain and therefore sell a set of networking solutions that rely upon

coherent modem technology developed by and procured from third party “merchant” providers. In connection with certain consumption models involving greater disaggregation in the procurement of network infrastructure, the continued use of such third party modem technology by these competitors and/or the availability of such technology in the market may increase overall pricing pressure in this space and may negatively impact our ability to derive higher gross margins for Converged Packet Optical solutions.

The principal competitive factors applicable to our markets include:

- product functionality, speed, capacity, scalability and performance;
- price, cost per bit and total cost of ownership of our solutions;
- incumbency and strength of existing business relationships;
- ability to offer comprehensive networking solutions, consisting of hardware, software and services;
- product development that satisfies customers’ immediate and future network requirements;

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- flexibility and openness of platforms, including ease of integration, interoperability and integrated management;
- ability to offer solutions that accommodate a range of different consumption models;
- space and power considerations;
- manufacturing and lead-time capability; and
- services and support capabilities.

As a result of the intense and fragmented environment in which we compete, winning new opportunities can require that we agree to unfavorable commercial terms or pricing, and certain other onerous contractual commitments. These terms can adversely affect our results of operations. These terms can also lengthen our revenue recognition or cash collection cycles, add start-up costs to initial sales or deployment of our solutions, require financial commitments or performance bonds, and place a disproportionate allocation of risk upon us.

We expect the competitive landscape in which we operate to continue to broaden and to increase as network operators pursue a diverse range of network strategies that seek to emphasize unified software management, orchestration and control. Specifically, we expect that our business will overlap more directly with additional networking solution suppliers, including IP router vendors, data center switch providers and other suppliers or integrators of networking technology traditionally geared toward different network applications, layers or functions. In addition, as we seek increased customer adoption of our Blue Planet software platform, and network operator demands for software programmability, management and control increase, we expect to compete more directly with software vendors and information technology vendors or system integrators. We may also face competition from system and component vendors, including those in our supply chain, who develop networking products based on off-the-shelf or commoditized hardware technology, particularly where a customer's network strategy seeks to emphasize deployment of such product offerings or to adopt a disaggregated approach to the procurement of hardware and software.

Patents, Trademarks and Other Intellectual Property Rights

The success of our business and technology leadership is significantly dependent upon our proprietary and internally developed technology. We rely upon the intellectual property protections afforded by patents, copyrights, trademarks, and trade secret laws to establish, maintain and enforce rights in our proprietary technologies and product branding. We maintain an invention-incentive program that seeks to reward innovation and an internal invention review board that selects appropriate protection mechanisms for our technology. We regularly file applications for patents and have a significant number of patents in the United States and other countries where we do business. As of December 1, 2016, we had 1,588 issued U.S. patents, 284 pending U.S. patent applications, 444 issued non-U.S. patents, and 170 pending non-U.S. patent applications.

We also rely on non-disclosure agreements and other contracts and policies regarding confidentiality with employees, contractors and customers to establish proprietary rights and to protect trade secrets and confidential information. Our practice is to require employees and relevant consultants to execute non-disclosure and proprietary rights agreements upon commencement of their employment or consulting arrangements with us. These agreements acknowledge our ownership of intellectual property developed by the individual during the course of his or her work with us. The agreements also require that these persons maintain the confidentiality of all proprietary information disclosed to them.

Enforcing proprietary rights, especially patents, can be costly, and we cannot be certain that the steps that we are taking will detect or prevent all unauthorized use. The industry in which we compete is characterized by rapidly changing technology, a large number of patents, and frequent claims and related litigation regarding patent and other intellectual property rights. We have been subject to several claims related to patent infringement, including by competitors and also by non-practicing patent assertion entities, and we have been requested to indemnify customers

pursuant to contractual indemnity obligations relating to infringement claims made by third parties. Intellectual property infringement assertions could cause us to incur substantial costs, including settlement costs and legal fees in the defense of related actions. If we are not successful in defending these claims, our business could be adversely affected. For example, we may be required to enter into a license agreement requiring us to make ongoing royalty payments; we may be required to redesign our products; or we may be prohibited from selling infringing technology in certain jurisdictions.

Our operating system, element management and network virtualization, management, and orchestration software and other solutions incorporate software and components under licenses from third parties, including software subject to various open source software licenses. As network operators seek to adopt network infrastructures with increased software control and programmability and to utilize an open ecosystem of physical and virtual network resources provided by multiple third parties, and as we invest in our Blue Planet software platform, we expect to incorporate into our solutions additional elements of open source software or license additional software or technology from third parties. We expect that these network architectural approaches will require increased openness and interoperability of multi-vendor, multi-domain network environments,

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requiring an increased degree of cooperation among solutions providers. Failure to obtain or maintain such licenses or other third party intellectual property rights could affect our development efforts and market opportunities, or could require us to re-engineer our products or to obtain alternate technologies. Moreover, there is a risk that open source and other technology licenses could be construed in a manner that could impose unanticipated conditions or restrictions on our ability to commercialize our products.

Environmental Matters

Our business and operations are subject to environmental laws in various jurisdictions around the world, including the Waste Electrical and Electronic Equipment (WEEE) and Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) regulations adopted by the European Union. We are also subject to disclosure and related requirements that apply to the presence of “conflict minerals” in our products or supply chain. We seek to operate our business in compliance with such laws relating to the materials and content of our products and product takeback and recycling. Environmental regulation is increasing, particularly outside of the United States, and we expect that our domestic and international operations may be subject to additional environmental compliance requirements, which could expose us to additional costs. To date, our compliance costs relating to environmental regulations have not resulted in a material cost or effect on our business, results of operations or financial condition.

Employees

As of October 31, 2016, we had a global workforce consisting of 5,555 employees. We have not experienced any work stoppages, and we consider the relationships with our employees to be good. While we have been able to recruit and retain key personnel with the capabilities required by our business and markets, competition for highly skilled technical, engineering and other personnel with experience in our industry is intense. We believe that our future success depends in critical part on our continued ability to recruit, motivate and retain such qualified personnel.

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Directors and Executive Officers

The table below sets forth certain information concerning our directors and executive officers:

Name	Age	Position
Patrick H. Nettles, Ph.D.	73	Executive Chairman of the Board of Directors
Gary B. Smith	56	President, Chief Executive Officer and Director
Stephen B. Alexander	57	Senior Vice President and Chief Technology Officer
James A. Frodsham	50	Senior Vice President and Chief Strategy Officer
François Locoh-Donou	45	Senior Vice President and Chief Operating Officer
James E. Moylan, Jr.	65	Senior Vice President and Chief Financial Officer
Andrew C. Petrik	53	Vice President and Controller
David M. Rothenstein	48	Senior Vice President, General Counsel and Secretary
Marcus Starke	55	Senior Vice President and Chief Marketing Officer
Harvey B. Cash (1)(3)	78	Director
Bruce L. Claflin (1)(2)	65	Director
Lawton W. Fitt (2)	63	Director
Patrick T. Gallagher (1)(3)	61	Director
T. Michael Nevens (2)	67	Director
Judith M. O'Brien (1)(3)	66	Director
Michael J. Rowny (2)	66	Director

(1) Member of the Compensation Committee

(2) Member of the Audit Committee

(3) Member of the Governance and Nominations Committee

Our Directors hold staggered terms of office, expiring as follows: Ms. O'Brien and Messrs. Cash and Smith in 2017; Messrs. Claflin, Nevens and Gallagher in 2018; and Ms. Fitt, Dr. Nettles and Mr. Rowny in 2019.

Patrick H. Nettles, Ph.D. has served as a Director of Ciena since April 1994 and as Executive Chairman of the Board of Directors since May 2001. From October 2000 to May 2001, Dr. Nettles was Chairman of the Board of Directors and Chief Executive Officer of Ciena, and he was President and Chief Executive Officer from April 1994 to October 2000. Dr. Nettles serves as a Trustee for the California Institute of Technology and the Georgia Tech Foundation, Inc. Dr. Nettles also serves on the board of directors of The Progressive Corporation and Axcelis Technologies, Inc., where he is independent chairman of the board. Dr. Nettles has previously served on the boards of directors of Apptrigger, Inc., formerly known as Carrius Technologies, Inc., and Optiwind Corp, a privately held company.

Gary B. Smith joined Ciena in 1997 and has served as President and Chief Executive Officer since May 2001. Mr. Smith has served on Ciena's Board of Directors since October 2000. Prior to his current role, his positions with Ciena included Chief Operating Officer and Senior Vice President, Worldwide Sales. Mr. Smith previously served as Vice President of Sales and Marketing for INTELSAT and Cray Communications, Inc. Mr. Smith also serves on the boards of directors of Avaya Inc. and CommVault Systems, Inc. Mr. Smith is a member of the President's National Security Telecommunications Advisory Committee, the Global Information Infrastructure Commission and the Center for Corporate Innovation (CCI).

Stephen B. Alexander joined Ciena in 1994 and has served as Chief Technology Officer since September 1998 and as a Senior Vice President since January 2000. Mr. Alexander has previously served as General Manager of Products & Technology and General Manager of Transport and Switching & Data Networking.

James A. Frodsham joined Ciena in May 2004 and has served as Senior Vice President and Chief Strategy Officer since March 2010 with responsibility for our strategic planning and corporate development activities. Mr. Frodsham previously served as General Manager of Ciena's former Broadband Access Group and Metro and Enterprise Solutions Group. Prior to joining Ciena, Mr. Frodsham served as chief operating officer of Innovance Networks. Prior to that, Mr. Frodsham was employed in senior level positions with Nortel Networks in product development and marketing

strategy. Mr. Frodsham serves on the board of directors of Innovance Networks.

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François Locoh-Donou has served as Ciena's Senior Vice President and Chief Operating Officer since November 2015. In this capacity, Mr. Locoh-Donou leads Ciena's global sales organization and its services and automation functions, as well as Ciena's networking platforms and software business, including responsibility for engineering, supply chain, and product line management on a global basis. Mr. Locoh-Donou previously served as Ciena's Senior Vice President, Global Products Group from August 2011 to October 2015. Mr. Locoh-Donou joined Ciena in August 2002 and served as Ciena's Vice President and General Manager, EMEA from June 2005 to August 2011.

James E. Moylan, Jr. has served as Senior Vice President and Chief Financial Officer since December 2007.

Andrew C. Petrik joined Ciena in 1996 and has served as Vice President, Controller since August 1997 and served as Treasurer from August 1997 to October 2008.

David M. Rothenstein joined Ciena in January 2001 and has served as Senior Vice President, General Counsel and Secretary since November 2008. Mr. Rothenstein served as Vice President and Associate General Counsel from July 2004 to October 2008 and previously as Assistant General Counsel.

Marcus Starke joined Ciena in February 2015, and currently serves as Senior Vice President and Chief Marketing Officer where he oversees all global marketing and external communications activities. Effective in January 2017, Mr. Starke will separate his employment with Ciena. From May 2014 to January 2015, Mr. Starke served as Chief Marketing Officer at MicroStrategy, a leading global provider of enterprise-ready platforms for business analytics and mobile analytics. From November 2009 to April 2014, Mr. Starke was Senior Vice President, Worldwide Marketing and Communications at SAP, the global market leader in enterprise application software. Prior to that, he was President and CEO (Europe, Middle East and Africa) for Wunderman, as well as Chairman and CEO of the German arm of Publicis Worldwide.

Harvey B. Cash has served as a Director of Ciena since April 1994. Mr. Cash is a general partner of InterWest Partners, a venture capital firm in Menlo Park, California, which he joined in 1985. Mr. Cash serves on the boards of directors of First Acceptance Corp., Silicon Laboratories, Inc. and Argonaut Group, Inc. and has previously served on the boards of directors of i2 Technologies, Inc., Voyence, Inc. and Staktek Holdings, Inc.

Bruce L. Claflin has served as a Director of Ciena since August 2006. Mr. Claflin served as President and Chief Executive Officer of 3Com Corporation from January 2001 until his retirement in February 2006. Mr. Claflin joined 3Com as President and Chief Operating Officer in August 1998. Prior to 3Com, Mr. Claflin served as Senior Vice President and General Manager, Sales and Marketing, for Digital Equipment Corporation. Mr. Claflin also worked for 22 years at IBM, where he held various sales, marketing and management positions, including general manager of IBM PC Company's worldwide research and development, product and brand management, as well as president of IBM PC Company Americas. Mr. Claflin serves on the boards of directors of Advanced Micro Devices (AMD) and IDEXX Laboratories, Inc., where he is the Chairman of the Nominating and Governance Committee.

Lawton W. Fitt has served as a Director of Ciena since November 2000. From October 2002 to March 2005, Ms. Fitt served as Director of the Royal Academy of Arts in London. From 1979 to October 2002, Ms. Fitt was an investment banker with Goldman Sachs & Co., where she was a partner from 1994 to October 2002. In addition to her service as a director of non-profit organizations, Ms. Fitt currently serves on the boards of directors of The Carlyle Group LP and The Progressive Corporation, and she has previously served on the boards of directors of ARM Holdings PLC and Thomson Reuters Corporation. She also serves as a director or trustee of several non-profit organizations.

Patrick T. Gallagher has served as a Director of Ciena since May 2009. Mr. Gallagher currently serves as Chairman of Harmonic Inc, a global provider of high-performance video solutions to the broadcast, cable, telecommunications and managed service provider sectors. From March 2008 until April 2012, Mr. Gallagher was Chairman of Ubiquisys Ltd., a leading developer and supplier of femtocells for the global 3G mobile wireless market. From January 2008 until February 2009, Mr. Gallagher was Chairman of Macro 4 plc, a global software solutions company, and from May 2006 until March 2008, served as Vice Chairman of Golden Telecom Inc., a leading facilities-based provider of integrated communications in Russia and the CIS. From 2003 until 2006, Mr. Gallagher was Executive Vice Chairman and served as Chief Executive Officer of FLAG Telecom Group and, prior to that role, held various senior management positions at British Telecom. Mr. Gallagher is also Chairman of Intercloud SAS, a Paris-headquartered provider of global private cloud connectivity services. Mr. Gallagher previously served on the board of directors of

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T. Michael Nevens has served as a Director of Ciena since February 2014. Since 2006, Mr. Nevens has served as senior adviser to Permira Advisers, LLC, an international private equity fund. From 1980 to 2002, Mr. Nevens held various leadership positions at McKinsey & Co., most recently as a director (senior partner) and as managing partner of the firm's Global Technology Practice. He also served on the board of the McKinsey Global Institute, which conducts research on economic and policy issues. Mr. Nevens has been an adjunct professor of Corporate Governance and Strategy at the Mendoza College of Business at the University of Notre Dame. Mr. Nevens also serves as the Chairman of the board of directors of NetApp, Inc. Mr. Nevens previously served on the board of directors of Altera Corporation.

Judith M. O'Brien has served as a Director of Ciena since July 2000. Since November 2012, Ms. O'Brien has served as a partner and head of the Emerging Company Practice Group at the law firm of King & Spalding. Ms. O'Brien served as Executive Vice President and General Counsel of Obopay, Inc., a provider of mobile payment services, from November 2006 through December 2010. From February 2001 until October 2006, Ms. O'Brien served as a Managing Director at Incubic Venture Fund, a venture capital firm. From August 1980 until February 2001, Ms. O'Brien was a lawyer with Wilson Sonsini Goodrich & Rosati, where, from February 1984 to February 2001, she was a partner specializing in corporate finance, mergers and acquisitions and general corporate matters. Ms. O'Brien serves on the board of directors of privately-held companies, Theatro Labs, Inc. and Inform, Inc., and has previously served on the board of directors of Adaptec, Inc.

Michael J. Rowny has served as a Director of Ciena since August 2004. Mr. Rowny has been Chairman of Rowny Capital, a private equity firm, since 1999. From 1994 to 1999, and previously from 1983 to 1986, Mr. Rowny was with MCI Communications in positions including President and Chief Executive Officer of MCI's International Ventures, Alliances and Correspondent group, acting Chief Financial Officer, Senior Vice President of Finance, and Treasurer. Mr. Rowny's career in business and government has also included positions as Chairman and Chief Executive Officer of the Ransohoff Company, Chief Executive Officer of Hermitage Holding Company, Executive Vice President and Chief Financial Officer of ICF Kaiser International, Inc., Vice President of the Bendix Corporation, and Deputy Staff Director of the White House. Mr. Rowny serves on the board of directors of Neustar, Inc.

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Item 1A. Risk Factors

Investing in our securities involves a high degree of risk. In addition to the other information contained in this report, you should consider the following risk factors before investing in our securities.

Our revenue and operating results can fluctuate significantly and unpredictably from quarter to quarter.
Our revenue and results of operations can fluctuate significantly and unpredictably from quarter to quarter. Our budgeted expense levels are based on our visibility into customer spending plans and our projections of future revenue and gross margin. Customer spending levels are uncertain and subject to change, and reductions in our expense levels can take significant time to implement. A significant portion of our quarterly revenue is generated from customer orders received in that same quarter (which we refer to as "book to revenue"). Accordingly, our revenue for a particular quarter is difficult to predict, and a shortfall in expected orders in a given quarter can materially adversely affect our revenue and results of operations for that quarter or future quarterly periods. Additional factors that contribute to fluctuations in our revenue and operating results include:

- broader macroeconomic conditions, including weakness and volatility in global markets, that affect our customers;
- changes in capital spending by customers, in particular our large communications service provider customers;
- changes in networking strategies;
- order timing, volume and cancellations;
- backlog levels;
- the level of competition and pricing pressure in our industry;
- the impact of commercial concessions or unfavorable commercial terms required to maintain incumbency or secure new opportunities with key customers;
- our level of success in achieving cost reductions and improved efficiencies in our supply chain;
- the pace and impact of price erosion that we regularly encounter in our markets;
- our incurrence of start-up costs, including lower margin phases of projects required to support initial deployments, gain new customers or enter new markets;
- the timing of revenue recognition on sales, particularly relating to large orders;
- the mix of revenue by product segment, geography and customer in any particular quarter;
- installation service availability and readiness of customer sites;
- availability of components and manufacturing capacity;
- adverse impact of foreign exchange; and
- seasonal effects in our business.

Quarterly fluctuations from these and other factors may also cause our results of operations to fall short of or to exceed significantly the expectations of securities analysts or investors, which may cause volatility in our stock price.

A small number of customers, including large communications service providers, account for a significant portion of our revenue. The loss of any of these customers or a significant reduction in their spending could have a material adverse effect on our business and results of operations.

While our customer base has diversified in recent years to include network operators in additional customer segments and geographies, a significant portion of our revenue remains concentrated among a small number of customers, including large communications service providers. For example, AT&T accounted for approximately 18.4% of fiscal 2016 revenue, and our ten largest customers contributed 51.1% of fiscal 2016 revenue. Consequently, our financial results are closely correlated with the spending of a relatively small number of customers. Our business and results of operations can be materially adversely impacted by reductions in spending or capital expenditure budgets by our

largest customers. A number of our large service provider customers, including AT&T, with whom we experienced a decline in annual revenue during fiscal 2016, have announced various procurement initiatives or efforts to reduce capital expenditures on network infrastructure in future periods. Moreover, because we do not have long-term contracts that obligate AT&T or our other customers to purchase any minimum or guaranteed order volumes, and customers often have the right to modify or cancel orders, there can be no assurance as to customer spending levels, which can be unpredictable, and sales to any customer could cease at any time.

Because a number of our largest customers are communications service providers, our business and results of operations can be significantly affected by market, industry or competitive dynamics adversely affecting this segment. Our communications service provider customers face a rapidly shifting competitive landscape as cloud service operators, OTT providers and other content providers challenge their traditional business models and network infrastructures. Moreover, a number of our communications service provider customers, including AT&T, Verizon and Centurylink, have recently announced significant

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acquisition transactions. Such transactions have in the past, and may in the future, result in spending delays or deferrals, or changes in preferred vendors, as the integration of combined network infrastructures proceed and procurement strategies are determined. There can be no assurance that we will be able to maintain the revenue levels we have previously achieved with customers, including our communications service provider customers. The loss of any of our largest customers, or a significant reduction in their spending, could have a material adverse effect on our business and results of operations.

We face intense competition that could hurt our sales and results of operations, and we expect the competitive landscape in which we operate to continue to broaden to include additional solutions providers.

We face an intense competitive market for sales of communications networking equipment, software and services. Competition is intense on a global basis, as we and our competitors aggressively seek to capture market share and displace incumbent equipment vendors. A small number of very large companies have historically dominated our industry, many of which have substantially greater financial and marketing resources, broader product offerings, and more established relationships with service providers and other customer segments than we do. Because of their scale and resources, they may be perceived to be a better fit for the procurement or network operating and management strategies of large service providers. Moreover, there has been a trend toward consolidation in our markets, which we believe may bolster the resources and advantages of certain competitors. We also compete with a number of smaller companies that provide significant competition for a specific product, application, customer segment or geographic market. Due to the narrower focus of their efforts, these competitors may achieve commercial availability of their products more quickly or may be more attractive to customers in a particular product niche.

Generally, competition in our markets is based on any one or a combination of the following factors:

- product functionality, speed, capacity, scalability and performance;
- price and total cost of ownership of our solutions;
- incumbency and strength of existing business relationships;
- ability to offer comprehensive networking solutions, consisting of equipment, software and network consulting services;
- ability to adapt to customer needs and accommodate different consumption models;
- product development plans and the ability to meet customers' immediate and future network requirements;
- flexibility and openness of platforms, including ease of integration, interoperability and integrated software programmability and management;
- space and power considerations;
- manufacturing and lead-time capability; and
- services and support capabilities.

In an effort to maintain our incumbency or secure new customer opportunities, we have in the past, and may in the future, agree to aggressive pricing, commercial concessions and other unfavorable terms that result in low or negative gross margins on a particular order or group of orders. Competition can also result in commercial and legal terms and conditions that place a disproportionate amount of risk on us.

We expect the competitive landscape in which we operate to continue to broaden and to increase, as network operators pursue a diverse range of consumption models and network strategies. As these changes occur, we expect that our business will compete more directly with additional networking solution suppliers, including IP router vendors, data center switch providers and other suppliers or integrators of networking technology. In addition, as we seek increased customer adoption of our Blue Planet software platform, and network operator demands for software programmability, management and control increase, we expect to compete more directly with software vendors and information technology vendors or integrators of these solutions. We may also face competition from system and

component vendors, including those in our supply chain, who develop networking products based on off-the-shelf or commoditized hardware technology, referred to as “white box” hardware; particularly where a customer's network strategy seeks to emphasize deployment of such product offerings or adopt a disaggregated approach to the procurement of hardware and software. The expansion of our competitive landscape, and entry of new competitors into our markets and customers, may adversely impact our business and results of operations. If competitive pressures increase, or if we fail to compete successfully in our markets, our business and results of operations could suffer.

Our business and operating results could be adversely affected by unfavorable changes in macroeconomic and market conditions and reductions in the level of spending by customers in response to these conditions.

Our business and operating results, which depend significantly on general economic conditions and demand for our products and services, could be materially adversely affected by unfavorable or uncertain macroeconomic and market conditions, globally or with respect to a particular region or country where we operate. Global financial markets experienced

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periods of significant volatility and instability during fiscal 2016. Broad macroeconomic weakness and market volatility have previously resulted in sustained periods of decreased demand for our products and services, which has adversely affected our operating results. Macroeconomic and market conditions could be adversely affected by a variety of political, economic or other factors in the United States and international markets, that could in turn adversely affect spending levels of our customers and their end users, and could create volatility or deteriorating conditions in the markets in which we operate. Macroeconomic uncertainty or weakness could result in:

- reductions in customer spending and delay, deferral or cancellation of network infrastructure initiatives;
- increased competition for fewer network projects and sales opportunities;
- increased pricing pressure that may adversely affect revenue, gross margin and profitability;
- difficulty forecasting operating results and making decisions about budgeting, planning and future investments;
- increased overhead and production costs as a percentage of revenue;
- tightening of credit markets needed to fund capital expenditures by us or our customers;
- customer financial difficulty, including longer collection cycles and difficulties collecting accounts receivable or write-offs of receivables; and
- increased risk of charges relating to excess and obsolete inventories and the write-off of other intangible assets.

Reductions in customer spending in response to unfavorable or uncertain macroeconomic and market conditions, globally or with respect to a particular region where we operate, would adversely affect our business, results of operations and financial condition.

Our reliance upon third party component suppliers, including sole and limited source suppliers, exposes our business to additional risk and could limit our sales, increase our costs and harm our customer relationships.

We maintain a global sourcing strategy and depend on third party suppliers for support in our product design and development, and in the sourcing of key product components and subsystems. Our products include optical and electronic components for which reliable, high-volume supply is often available only from sole or limited sources. Increases in market demand or scarcity of resources or manufacturing capability have resulted, and may in the future result, in shortages in availability of important components for our solutions, product allocation challenges, deployment delays and increased lead times. We are exposed to risks relating to unfavorable economic conditions or other similar challenges affecting the businesses and results of operations of our component providers that can affect their liquidity levels, ability to continue investing in their businesses, ability to meet development commitments and manufacturing capability. These and other challenges affecting our suppliers could expose our business to increased costs, loss or lack of supply, or discontinuation of components that can result in lost revenue, additional product costs, increased lead times and deployment delays that could harm our business and customer relationships. We do not have any guarantees of supply from these third parties, and in certain cases are relying upon temporary commercial arrangements or standard purchase orders. As a result, there is no assurance that we will be able to secure the components or subsystems that we require, in sufficient quantity and quality, and on reasonable terms. Moreover, our access to necessary components could be adversely impacted by competition from component vendors, including those in our supply chain, who develop competing networking products based on off-the-shelf or commoditized hardware technology, referred to as “white box” hardware. The loss of a source of supply, or lack of sufficient availability of key components, could require that we locate an alternate source or redesign our products, either of which could result in business interruption, increased costs and negatively affect our product gross margin and results of operations. Our business and results of operations would be negatively affected if we were to experience any significant disruption or difficulties with key suppliers affecting the price, quality, availability or timely delivery of required components.

Investment of research and development resources in communications networking technologies for which there is not a matching market opportunity, or failure to sufficiently or timely invest in technologies for which there is market

demand, would adversely affect our revenue and profitability.

The market for communications networking hardware and software solutions is characterized by rapidly evolving technologies, changes in market demand and increasing adoption of software-based networking solutions. We continually invest in research and development to sustain or enhance our existing hardware and software solutions and to develop or acquire new technologies including new software platforms. There is often a lengthy period between commencing these development initiatives and bringing new or improved solutions to market. During this time, technology preferences, customer demand and the markets for our solutions, or those introduced by our competitors, may move in directions that we had not anticipated. There is no guarantee that our new products, including our Blue Planet software platform, or enhancements to other solutions will achieve market acceptance or that the timing of market adoption will be as predicted. As a result, there is a significant possibility that some of our development decisions, including significant expenditures on acquisitions, research and development

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costs, or investments in technologies, will not meet our expectations, and that our investment in some projects will be unprofitable. There is also a possibility that we may miss a market opportunity because we failed to invest, or invested too late, in a technology, product or enhancement sought by our customers. Changes in market demand or investment priorities may also cause us to discontinue existing or planned development for new products or features, which can have a disruptive effect on our relationships with customers. If we fail to make the right investments or fail to make them at the right time, our competitive position may suffer, and our revenue and profitability could be adversely affected.

Network equipment sales to communications service providers, Web-scale providers and other large customers often involve lengthy sales cycles and protracted contract negotiations that may require us to agree to commercial terms or conditions that negatively affect pricing, risk allocation, payment and the timing of revenue recognition.

Our sales initiatives, particularly with communications service providers, Web-scale providers and other large customers, often involve lengthy sales cycles. These selling efforts often involve a significant commitment of time and resources by us and our customers that may include extensive product testing, laboratory or network certification, network or region-specific product certification and homologation requirements for deployment in networks. Even after a customer awards its business to us or decides to purchase our solutions, the length of deployment time can vary depending upon the customer's schedule, site readiness, the size of the network deployment, the degree of custom configuration required and other factors. Additionally, these sales also often involve protracted and sometimes difficult contract negotiations in which we may deem it necessary to agree to unfavorable contractual or commercial terms that adversely affect pricing, expose us to penalties for delays or non-performance, and require us to assume a disproportionate amount of risk. To maintain incumbency with key customers for existing and future business opportunities, we may be required to offer discounted pricing, make commercial concessions or offer less favorable terms as compared to our historical business arrangements with these customers. We may also be requested to provide deferred payment terms, vendor or third-party financing or other alternative purchase structures that extend the timing of payment and revenue recognition. Alternatively, customers may insist upon terms and conditions that we deem too onerous or not in our best interest, and we may be unable to reach a commercial agreement. As a result, we may incur substantial expense and devote time and resources to potential sales opportunities that never materialize or result in lower than anticipated sales.

If the market for software solutions does not evolve in the way we anticipate or if customers do not adopt our Blue Planet solutions, we may not be able to realize a key part of our business strategy and the intended benefits of our acquisition of Cyan.

A key part of our business strategy and ability to derive the anticipated benefits of our acquisition of Cyan will depend on our ability to gain market adoption for our Blue Planet software platform. If the markets relating to software solutions, including SDN, NFV, service orchestration and software management and control, do not develop as we anticipate, or if we are unable to increase market awareness and adoption of our Blue Planet solutions as the preferred solution within those markets, demand for our Blue Planet solutions may not grow. As a result, the success of our Cyan acquisition and our long-term success in the software market will depend to a significant extent on potential customers recognizing the benefits of our next-generation Blue Planet software solutions, and the willingness of service providers and high-performance data center and other network operators to increase their use of SDN and NFV solutions in their networks. The market for these solutions is at an early stage, and it is difficult to predict important trends, including the potential growth, if any, of this market. If the market for these software solutions does not evolve in the way we anticipate or if customers do not adopt our solutions, we may not to be able to increase sales of our Blue Planet platform, and our revenue and profitability would be adversely affected. If we are not able to successfully achieve these objectives, certain of the anticipated benefits of the merger may not be realized fully, or may take longer to realize than expected.

Changes in networking or procurement strategies among our customers could adversely affect our business, competitive position and results of operations.

Growing bandwidth demands, network operator efforts to reduce costs and requirements for enhanced network programmability and automation are causing network operators to consider a diverse range of approaches to the design and procurement of network infrastructure. We refer to these different approaches as “consumption models.” These consumption models can include: the traditional systems procurement of fully integrated solutions including hardware, software and services from the same vendor; the procurement of a fully integrated hardware solution from one vendor with the separate use of a network operator’s own SDN-based control; the procurement of an integrated photonic line system with open interfaces from one vendor and the separate or “disaggregated” procurement of modem technology from a different vendor; or the use of published reference designs and open source specifications for the procurement of off-the-shelf or commoditized hardware (often referred to as “white box” hardware) to be used with open source software. We believe that network operators will continue to consider a variety of different consumption models. Many of these approaches are in their very early stages of development and evaluation, and the types of models and their levels of adoption will depend in significant part on the nature of

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the operator and its particular network and network applications. Among our customers, AT&T is pursuing network strategies that emphasize enhanced software programmability, management and control of networks, and deployment of “white box” hardware. Other network operator customers, including Web-scale providers, are playing a leading role in the transition to software-defined networking or the standardization of communications network solutions. The potential for different approaches to the procurement of networking infrastructure will require network operators and vendors to assess and possibly broaden their existing commercial models over time. Adoption of a range of consumption models may alter and broaden our competitive landscape to include other technology vendors, including component vendors and software vendors. If we are unable to offer attractive solutions that accommodate the range of consumption models ultimately adopted by our customers or within our markets, or if we are unable to modify or existing commercial model accordingly, our business, competitive position and results of operations could be adversely affected.

We may experience delays in the development and production of our products that may negatively affect our competitive position and business.

Our hardware and software networking solutions, including our Blue Planet software platform, are based on complex technology, and we can experience unanticipated delays in developing, manufacturing and introducing these solutions to market. Delays in product development efforts by us or our supply chain may affect our reputation with customers, affect our ability to seize market opportunities and impact the timing and level of demand for our products. The development of new technologies may increase the complexity of supply chain management or require the acquisition, licensing or interworking with the technology of third parties. As a result, each step in the development cycle of our products presents serious risks of failure, rework or delay, any one of which could adversely affect the cost-effectiveness and timely development of our products. We may encounter delays relating to engineering development activities and software, design, sourcing and manufacture of critical components, and the development of prototypes. In addition, intellectual property disputes, failure of critical design elements, and other execution risks may delay or even prevent the release of these products. If we do not successfully develop or produce products in a timely manner, our competitive position may suffer, and our business, financial condition and results of operations could be harmed.

Product performance problems and undetected errors affecting the performance, reliability or security of our products could damage our business reputation and negatively affect our results of operations.

The development and production of sophisticated hardware and software for communications network equipment is highly complex. Some of our products can be fully tested only when deployed in communications networks or when carrying traffic with other equipment, and software products may contain bugs that can interfere with expected performance. As a result, undetected defects or errors, and product quality, interoperability, reliability and performance problems are often more acute for initial deployments of new products and product enhancements. We have recently launched, and are in the process of launching, a number of new hardware and software platforms, including our Blue Planet software platform, and other solutions targeting metro network applications and data center interconnect. Unanticipated product performance problems can relate to the design, manufacturing, installation, operation and interoperability of our products. Undetected errors can also arise as a result of defects in components, software or manufacturing, installation or maintenance services supplied by third parties, and technology acquired from or licensed by third parties. From time to time we have had to replace certain components, provide software remedies or other remediation in response to defects or bugs, and we may have to do so again in the future. There can be no assurance that such remediation would not have a material impact on our business and results of operations. In addition, unanticipated security vulnerabilities relating to our products or the activities of our supply chain, including any actual or perceived exposure of our solutions to malicious software or cyber-attacks, could adversely affect our business and reputation. Product performance, reliability, security and quality problems can negatively affect our business, and may result in some or all of the following effects:

- damage to our reputation, declining sales and order cancellations;
- increased costs to remediate defects or replace products;
- payment of liquidated damages, contractual or similar penalties, or other claims for performance failures or delays;
- increased warranty expense or estimates resulting from higher failure rates, additional field service obligations or other rework costs related to defects;
- increased inventory obsolescence;
- costs and claims that may not be covered by liability insurance coverage or recoverable from third parties; and
- delays in recognizing revenue or collecting accounts receivable.

These and other consequences relating to undetected errors affecting the quality, reliability and security of our products could negatively affect our business and results of operations.

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Direct or indirect efforts to increase our sales and market share in targeted international markets and customer segments may be unsuccessful.

Part of our business and growth strategy is to expand our geographic reach and increase market share in international markets. The diversification of our business and customer base, to include additional service provider customers in Asia-Pacific and India, has been a significant component of our growth. Our efforts to continue to increase our sales and market share in international markets may ultimately be unsuccessful, and failure to do so could limit our growth and could harm our results of operations.

In addition, in order to sell our products into new geographic markets, diversify our customer base and broaden the application for our solutions in communications networks, we continue to promote sales initiatives and foster strategic channel sales relationships. Specifically, we are targeting sales opportunities around the world with Web-scale providers, cloud infrastructure providers, communications service providers, enterprises, wireless operators, cable and multiservice operators, submarine network operators, research and education institutions, and federal, state and local governments. To succeed in some of these geographic markets and customer segments, we often need to leverage strategic sales channels and distribution arrangements, and we expect these relationships to be an important part of our business. There can be no assurance we will realize the expected benefits of these third party sales relationships. We compete in certain business areas with our third party channel partners or may have divergent interests. Our efforts to manage and drive the intended benefits of such sales relationships may ultimately be unsuccessful, and difficulties selling through third party channels could limit our growth and could harm our results of operations.

The international scale of our sales and operations exposes us to additional risk and expense that could adversely affect our results of operations.

We market, sell and service our products globally, maintain personnel in numerous countries, and rely upon a global supply chain for sourcing important components and manufacturing our products. Our international sales and operations are subject to inherent risks, including:

- the impact of economic conditions in countries outside the United States;
- effects of adverse changes in currency exchange rates;
- greater difficulty in collecting accounts receivable and longer collection periods;
- difficulty and cost of staffing and managing foreign operations;
- less protection for intellectual property rights in some countries;
- adverse tax and customs consequences, particularly as related to transfer-pricing issues;
- social, political and economic instability;
- compliance with certain testing, homologation or customization of products to conform to local standards;
- higher incidence of corruption or unethical business practices that could expose us to liability or damage our reputation;
- significant changes to free trade agreements, trade protection measures, tariffs, export compliance, domestic preference procurement requirements, qualification to transact business and additional regulatory requirements; and
- natural disasters, epidemics and acts of war or terrorism.

Our international operations are also subject to complex foreign and U.S. laws and regulations, including anti-corruption laws, antitrust or competition laws, environmental regulations, and data privacy laws, among others. Violations of these laws and regulations could result in fines and penalties, criminal sanctions against us or our employees, prohibitions on the conduct of our business and on our ability to offer our products and services in certain geographies, and significant harm to our business reputation. There can be no assurance that any individual employee, contractor, agent or other business partner will not violate these legal requirements or our policies to mitigate these risks. Additionally, the costs of complying with these laws (including the costs of investigations, auditing and monitoring) could also adversely affect our current or future business.

The success of our international sales and operations will depend, in large part, on our ability to anticipate and manage effectively these risks. Our failure to manage any of these risks could harm our international operations, reduce our international sales, and could give rise to liabilities, costs or other business difficulties that could adversely affect our operations and financial results.

We may be required to write off significant amounts of inventory as a result of our inventory purchase practices, the obsolescence of product lines or unfavorable market conditions.

To avoid delays and meet customer demand for shorter delivery terms, we place orders with our contract manufacturers and component suppliers based on forecasts of customer demand. In a number of cases these suppliers may require longer lead times for fulfillment than we have with our customers. Thus, our practice of buying inventory based on forecasted demand exposes us

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to the risk that our customers ultimately may not order the products we have forecast or will purchase fewer products than forecast. As a result, we may purchase inventory in anticipation of sales that ultimately do not occur. Market uncertainty can also limit our visibility into customer spending plans and compound the difficulty of forecasting inventory at appropriate levels. Moreover, our customer purchase agreements generally do not include any minimum purchase commitment. Also, customers often have the right to modify, reduce or cancel purchase quantities, and spending levels can be uncertain and subject to significant fluctuation. Our products are highly configurable, and certain new products have overlapping feature sets or application as existing products. Accordingly, it is increasingly possible that customers may forgo purchases of certain products we have inventoried in favor of a similar product. We may also be exposed to the risk of inventory write-offs as a result of certain supply chain initiatives, including consolidation and transfer of key manufacturing activities. If we are required to write off or write down a significant amount of inventory, our results of operations for the applicable period would be materially adversely affected.

Our intellectual property rights may be difficult and costly to enforce.

We generally rely on a combination of patents, copyrights, trademarks and trade secret laws to establish and maintain proprietary rights in our products and technology. Although we have been issued numerous patents and other patent applications are currently pending, there can be no assurance that any of these patents or other proprietary rights will not be challenged, invalidated or circumvented, or that our rights will provide us with any competitive advantage. In addition, there can be no assurance that patents will be issued from pending applications or that claims allowed on any patents will be sufficiently broad to protect our technology. Further, the laws of some foreign countries may not protect our proprietary rights to the same extent as do the laws of the United States.

We are subject to the risk that third parties may attempt to access, divert or use our intellectual property without authorization. Protecting against the unauthorized use of our products, technology and other proprietary rights is difficult, time-consuming and expensive, and we cannot be certain that the steps that we are taking will prevent or minimize the risks of such unauthorized use. In addition, our intellectual property strategy must continually evolve to protect our proprietary rights in new solutions, including our software solutions. Litigation may be necessary to enforce or defend our intellectual property rights or to determine the validity or scope of the proprietary rights of others. Such litigation could result in substantial cost and diversion of management time and resources, and there can be no assurance that we will obtain a successful result. Any inability to protect and enforce our intellectual property rights could harm our ability to compete effectively.

We may incur significant costs in response to claims by others that we infringe their intellectual property rights.

From time to time third parties may assert claims or initiate litigation or other proceedings related to patent, copyright, trademark and other intellectual property rights to technologies and related standards that are relevant to our business. The rate of infringement assertions by patent assertion entities is increasing, particularly in the United States. Generally, these patent owners neither manufacture nor use the patented invention directly, and they seek solely to derive value from their ownership through royalties from patent licensing programs.

We could be adversely affected by litigation, other proceedings or claims against us, as well as claims against our manufacturers, suppliers or customers, alleging infringement of third party proprietary rights by our products and technology, or components thereof. Regardless of the merit of these claims, they can be time-consuming, divert the time and attention of our technical and management personnel, and result in costly litigation. These claims, if successful, could require us to:

- pay substantial damages or royalties;
- comply with an injunction or other court order that could prevent us from offering certain of our products;
- seek a license for the use of certain intellectual property, which may not be available on commercially reasonable terms or at all;
- develop non-infringing technology, which could require significant effort and expense and ultimately may not be successful; and
- indemnify our customers or other third parties pursuant to contractual obligations to hold them harmless or pay expenses or damages on their behalf.

Any of these events could adversely affect our business, results of operations and financial condition. Our exposure to risks associated with the use of intellectual property may increase as a result of acquisitions, as we have a lower level of visibility into the development process with respect to such technology and the steps taken to safeguard against the risks of infringing the rights of third parties.

Our products incorporate software and other technology under license from third parties, and our business would be adversely affected if this technology were no longer available to us on commercially reasonable terms.

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We integrate third party software and other technology into our operating system, network management and control platforms and other products. As network operators adopt software management and control and virtualized network functions, we believe that we will be increasingly required to work with third party technology providers. As a result, we may be required to license certain software or technology from third parties, including competitors. Licenses for software or other technology may not be available or may not continue to be available to us on commercially reasonable terms. Third party licensors may insist on unreasonable financial or other terms in connection with our use of such technology. Our failure to comply with the terms of any license may result in our inability to continue to use such license, which may result in significant costs, harm our market opportunities and require us to obtain or develop a substitute technology.

Our solutions, including our Blue Planet software platform, utilize elements of open source or publicly available software. As network operators seek to enhance programmability of networks, we expect that we and other communications networking solutions vendors will increasingly contribute to and use technology or open source software developed by standards settings bodies or other industry forums that seek to promote the integration of network layers and functions. The terms of such licenses could be construed in a manner that could impose unanticipated conditions or restrictions on our ability to commercialize our products. This increases our risks associated with our use of such software and may require us to seek licenses from third parties, to re-engineer our products or to discontinue the sale of such solutions. Difficulty obtaining and maintaining technology licenses with third parties may disrupt development of our products, increase our costs and adversely affect our business.

We rely upon third party contract manufacturers and our business and results of operations may be adversely affected by risks associated with their businesses, financial condition and the geographies in which they operate.

We rely upon third party contract manufacturers with facilities in Canada, Mexico, Thailand and the United States to perform substantially all of the manufacturing of our products. There are a number of risks associated with our dependence on contract manufacturers, including:

- reduced control over delivery schedules and planning;
- reliance on the quality assurance procedures of third parties;
- potential uncertainty regarding manufacturing yields and costs;
- availability of manufacturing capability and capacity, particularly during periods of high demand;
- risks and uncertainties associated with the locations or countries where our products are manufactured, including potential manufacturing disruptions caused by social, geopolitical or environmental factors;
- changes in U.S. law or policy governing foreign trade, manufacturing, development and investment in the countries where we currently manufacture our products, including the World Trade Organization Information Technology Agreement or other free trade agreements;
- limited warranties provided to us; and
- potential misappropriation of our intellectual property.

These and other risks could impair our ability to fulfill orders, harm our sales and impact our reputation with customers. If our contract manufacturers are unable or unwilling to continue manufacturing our products or components of our products, or if our contract manufacturers discontinue operations, we would be required to identify and qualify alternative manufacturers, which could cause us to be unable to meet our supply requirements to our customers and result in the breach of our customer agreements. The process of qualifying a new contract manufacturer and commencing volume production is expensive and time-consuming, and if we are required to change or qualify a new contract manufacturer, we would likely lose sales revenue and damage our existing customer relationships.

Data security breaches and cyber-attacks could compromise our intellectual property or other sensitive information and cause significant damage to our business and reputation.

In the ordinary course of our business, we maintain on our network systems, and the networks of third party providers, certain information that is confidential, proprietary or otherwise sensitive in nature. This information includes intellectual property, financial information and confidential business information relating to us and our customers, suppliers and other business partners. We also produce networking equipment solutions and software used by network operators to ensure security and reliability in their management and transmission of data. Our customers, particularly those in regulated industries, are increasingly focused on the security features of our technology solutions, and maintaining the security of information sensitive to us and our business partners is critical to our business and reputation. Companies in the technology industry have been increasingly subject to a wide variety of security incidents, cyber-attacks and other attempts to gain unauthorized access to networks or sensitive information. Our network systems and storage applications, and those systems and storage applications maintained by our third party providers, may be subject to unauthorized access by hackers or breached due to operator error, malfeasance or other system disruptions. The network solutions we sell to end customers may be exposed to similar risks. In

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some cases, it is difficult to anticipate or to detect immediately such incidents and the damage caused thereby. If an actual or perceived breach of network security occurs in our network or in the network of a business partner, the market perception of our products could be harmed. While we continually work to safeguard our products and internal network systems to mitigate these potential risks, there is no assurance that such actions will be sufficient to prevent cyber-attacks or security breaches. Security incidents involving access or improper use of our systems, networks or products could compromise confidential or otherwise protected information, destroy or corrupt data, or otherwise disrupt our operations. These security events could also negatively impact our reputation and our competitive position and could result in litigation with third parties, regulatory action, loss of business, potential liability and increased remediation costs, any of which could have a material adverse effect on our financial condition and results of operations.

Our failure to manage our relationships with third party service partners effectively could adversely impact our financial results and relationship with customers.

We rely on a number of third party service partners, both domestic and international, to complement our global service and support resources. We rely upon these partners for certain installation, maintenance and support functions. In addition, as network operators increasingly seek to rely on vendors to perform additional services relating to the design, construction and operation of their networks, the scope of work performed by our support partners is likely to increase and may include areas where we have less experience providing or managing such services. We must successfully identify, assess, train and certify qualified service partners in order to ensure the proper installation, deployment and maintenance of our products, as well as to ensure the skillful performance of other services associated with expanded solutions offerings, including site assessment and construction-related services. Vetting and certification of these partners can be costly and time-consuming, and certain partners may not have the same operational history, financial resources and scale as us. Moreover, certain service partners may provide similar services for other companies, including our competitors. We may not be able to manage our relationships with our service partners effectively, and we cannot be certain that they will be able to deliver services in the manner or time required or that we will be able to maintain the continuity of their services. We may also be exposed to a number of risks or challenges relating to the performance of our service partners, including:

- delays in recognizing revenue;
- liability for injuries to persons, damage to property or other claims relating to the actions or omissions of our service partners;
- our services revenue and gross margin may be adversely affected; and
- our relationships with customers could suffer.

As our service offering expands and customers look to identify vendors capable of managing, integrating and optimizing multi-domain, multi-vendor networks with unified software, our relationships with third party service partners will become increasingly important. If we do not manage effectively our relationships with third party service partners, or if they fail to perform these services in the manner or time required, our financial results and relationships with customers could be adversely affected.

We may be adversely affected by fluctuations in currency exchange rates.

As a company with global operations, we face exposure to adverse movements in foreign currency exchange rates. For example, the announcement of Brexit and the outcome of the U.S. presidential election each have caused, and may continue to cause, significant volatility in currency exchange rate fluctuations. Due to our global presence, a significant percentage of our revenue, operating expense and assets and liabilities are non-U.S. Dollar denominated and therefore subject to foreign currency fluctuation. We face exposure to currency exchange rates as a result of the growth in our non-U.S. Dollar denominated operating expense in Canada, Europe, Asia and Latin America. An increase in the value of the U.S. Dollar could increase the real cost to our customers of our products in those markets

outside the United States where we sell in dollars, and a weakened dollar could increase the cost of local operating expenses and procurement of materials or service that we purchase in foreign currencies. From time to time, we may hedge against currency exposure associated with anticipated foreign currency cash flows or assets and liabilities denominated in foreign currency. Such attempts to offset the impact of currency fluctuations are costly, and no amount of hedging can be effective against all circumstances. Losses associated with these hedging instruments and the adverse effect of foreign currency exchange rate fluctuation may negatively affect our results of operations.

We may be exposed to unanticipated risks and additional obligations in connection with our resale of complementary products or technology of other companies.

We have entered into agreements with strategic supply partners that permit us to distribute their products or technology. We may rely upon these relationships to add complementary products or technologies, diversify our product portfolio, or address a

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particular customer or geographic market. We may enter into additional original equipment manufacturer (OEM), resale or similar strategic arrangements in the future. We may incur unanticipated costs or difficulties relating to our resale of third party products. Our third party relationships could expose us to risks associated with the business, financial condition, intellectual property rights and supply chain continuity of such partners, as well as delays in their development, manufacturing or delivery of products or technology. We may also be required by customers to assume warranty, indemnity, service and other commercial obligations, including potential liability to customers, greater than the commitments, if any, made to us by our technology partners. Some of our strategic supply partners are relatively small companies with limited financial resources. If they are unable to satisfy their obligations to us or our customers, we may have to expend our own resources to satisfy these obligations. Exposure to these risks could harm our reputation with key customers and could negatively affect our business and our results of operations.

Our exposure to the credit risks of our customers and resellers may make it difficult to collect receivables and could adversely affect our revenue and operating results.

In the course of our sales to customers and resale channel partners, we may have difficulty collecting receivables, and our business and results of operations could be exposed to risks associated with uncollectible accounts. Lack of liquidity in the capital markets, macroeconomic weakness and market volatility may increase our exposure to these credit risks. Our attempts to monitor customer payment capability and to take appropriate measures to protect ourselves may not be sufficient, and it is possible that we may have to write down or write off accounts receivable. Such write-downs or write-offs could negatively affect our operating results for the period in which they occur, and, if large, could have a material adverse effect on our revenue and operating results.

Our business is dependent upon the proper functioning of our internal business processes and information systems, and modification or interruption of such systems or external factors may disrupt our business, processes and internal controls.

We rely upon a number of internal business processes and information systems to support key business functions, and the efficient operation of these processes and systems is critical to managing our business. Our business processes and information systems must be sufficiently scalable to support the growth of our business and may require modifications or upgrades that expose us to a number of operational risks. During the first quarter of fiscal 2017, we undertook a significant upgrade of our company-wide enterprise resource planning platform that will impact multiple locations, functions and processes. We are also currently pursuing initiatives to transform and optimize our business operations through the reengineering of certain other processes, investment in automation, and engagement of strategic partners or resources to assist with certain business functions. These changes require a significant investment of capital and human resources and may be costly and disruptive to our operations, and they could impose substantial demands on management time. These changes may also require changes in our information systems, modification of internal control procedures and significant training of employees or third party resources. There can be no assurance that our business and operations will not experience disruption in connection with our current system upgrade or other initiatives. Even if we do not encounter these adverse effects or disruption in our business, the design and implementation of these new systems may be more costly than anticipated.

Our information technology systems, and those of third party information technology providers or business partners, may also be vulnerable to damage or disruption caused by circumstances beyond our control, including catastrophic events, power anomalies or outages, natural disasters, viruses or malware, and computer system or network failures. We may also be exposed to cyber-security related incidents, including unauthorized access of information systems and disclosure or diversion of intellectual property or confidential data. There can be no assurance that our business systems or those of our third party business partners would not be subject to similar incidents, exposing us to significant cost, reputational harm and disruption or damage to our business.

Outstanding indebtedness under our convertible notes and senior secured credit facilities may adversely affect our liquidity and results of operations and could limit our business.

As of the date of this report, we had approximately $752.4 million in indebtedness repayable at maturity under our outstanding convertible notes. In the event that some or all of these notes are converted into common stock, the ownership interests of our existing stockholders will be diluted, and any sales of such shares in the public market following conversion may adversely affect the market price for our common stock. We are also a party to credit agreements relating to a $250 million senior secured asset-based revolving credit facility and outstanding senior secured term loans with approximately $493.1 million repayable at maturity. The agreements governing these credit facilities contain certain covenants that limit our ability, among other things, to incur additional debt, create liens and encumbrances, pay cash dividends, redeem or repurchase stock, enter into certain acquisition transactions or transactions with affiliates, repay certain indebtedness, make investments or dispose of

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assets. The agreements also include customary remedies, including the right of the lenders to take action with respect to the collateral securing the loans, that would apply should we default or otherwise be unable to satisfy our debt obligations.

Our indebtedness could have important negative consequences, including:

- increasing our vulnerability to adverse economic and industry conditions;
- limiting our ability to obtain additional financing, particularly in unfavorable capital and credit market conditions;
- debt service and repayment obligations that may adversely impact our results of operations and reduce the availability of cash resources for other business purposes;
- limiting our flexibility in planning for, or reacting to, changes in our business and the markets; and
- placing us at a possible competitive disadvantage to competitors that have better access to capital resources.

We may also enter into additional transactions or credit facilities, including equipment loans, working capital lines of credit and other long-term debt, which may increase our indebtedness and result in additional restrictions upon our business. In addition, major debt rating agencies regularly evaluate our debt based on a number of factors. There can be no assurance that we will be able to maintain our existing debt ratings, and failure to do so could adversely affect our cost of funds, liquidity and access to capital markets.

Significant volatility and uncertainty in the capital markets may limit our access to funding on favorable terms or at all.

The operation of our business requires significant capital. We have accessed the capital markets in the past and have successfully raised funds, including through the issuance of equity, convertible notes and other indebtedness, to increase our cash position, support our operations and undertake strategic growth initiatives. We regularly evaluate our liquidity position, debt obligations, and anticipated cash needs to fund our long-term operating plans, and we may consider it necessary or advisable to raise additional capital or incur additional indebtedness in the future. If we raise additional funds through further issuance of equity or securities convertible into equity, or undertake certain transactions intended to address our existing indebtedness, our existing stockholders could suffer dilution in their percentage ownership of our company or our leverage and outstanding indebtedness could increase. Global capital markets have undergone periods of significant volatility and uncertainty in recent years, and there can be no assurance that such financing alternatives would be available to us on favorable terms or at all, should we determine it necessary or advisable to seek additional cash resources.

Facilities transitions could be disruptive to our operations and may result in unanticipated expense and adverse effects to our cash position and cash flows.

We have recently undertaken and expect to undertake in the future the transition of two of our significant research and development facilities, which will affect a large number of our employees. The lease for our Lab 10 building on the Carling Campus in Ottawa, Canada will expire in fiscal 2018, and the leases for our facilities in Gurgaon, India will expire in fiscal 2018 and fiscal 2019. The Ottawa and Gurgaon facilities represent our two largest research and development sites, and they house both significant headcount including key engineering personnel and a large amount of sophisticated lab equipment. In Ottawa, we are in the process of developing a new research and development campus, and we will be transitioning our existing operations and personnel to the new campus during 2017 in anticipation of the expiration of the Lab 10 lease. In Gurgaon, we recently entered into a lease for a new building adjacent to one of our existing facilities, and we will be transitioning certain of our existing operations and personnel to the new building during 2017 and 2018. Relocating our engineering operations may be costly, and there can be no assurance that the transition of key engineering functions to a successor facility will not be disruptive or adversely affect productivity. Significant facilities transitions could be disruptive to our operations and may result in additional or unanticipated expense and adverse effects on our cash position and cash flows.

The potential effects of the referendum on the UK’s membership in the European Union remain uncertain.
On June 23, 2016, the United Kingdom (UK) held a referendum in which voters approved an exit from the European Union (EU), commonly referred to as "Brexit." The referendum was advisory, and the terms of any withdrawal are subject to a negotiation period that could last at least two years after the government of the UK formally initiates a withdrawal process. This will be either accompanied or followed by additional negotiations between the EU and the UK concerning the future relations between the parties. Nevertheless, the referendum has created significant uncertainty about the future relationship between the UK and the EU. It is possible that the level of economic activity in this region will be adversely impacted and that there will be increased regulatory and legal complexities, including those relating to tax, trade, security, and employees. Such changes could be costly and potentially disruptive to our operations and business relationships in these markets. In addition, Brexit could lead to economic uncertainty, including significant volatility in global stock markets and currency exchange rates, that may adversely impact our business. While we have adopted certain financial measures to reduce the risks of doing business internationally, we

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cannot ensure that such measures will be adequate to allow us to operate without disruption or adverse impact to our business and financial results in the affected regions.

Restructuring activities could disrupt our business and affect our results of operations.

We have previously taken steps, including reductions in force, office closures, and internal reorganizations to reduce the size and cost of our operations, improve efficiencies, or realign our organization and staffing to better match our market opportunities and our technology development initiatives. We may take similar steps in the future as we seek to realize operating synergies, optimize our operations to achieve our target operating model and profitability objectives, or better reflect changes in the strategic direction of our business. These changes could be disruptive to our business, including our research and development efforts, and could result in significant expense, including accounting charges for inventory and technology-related write-offs, workforce reduction costs and charges relating to consolidation of excess facilities. Substantial expense or charges resulting from restructuring activities could adversely affect our results of operations and use of cash in those periods in which we undertake such actions.

If we are unable to attract and retain qualified personnel, we may be unable to manage our business effectively.

Competition to attract and retain highly skilled technical, engineering and other personnel with experience in our industry is intense, and our employees have been the subject of targeted hiring by our competitors. Competition is particularly intense in certain jurisdictions where we have research and development centers, including the Silicon Valley area of northern California, and we may experience difficulty retaining and motivating existing employees and attracting qualified personnel to fill key positions. Because we rely upon equity awards as a significant component of compensation, particularly for our executive team, a lack of positive performance in our stock price, reduced grant levels, or changes to our compensation program may adversely affect our ability to attract and retain key employees. In addition, none of our executive officers is bound by an employment agreement for any specific term. The loss of members of our management team or other key personnel could be disruptive to our business, and, were it necessary, it could be difficult to replace members of our management team or other key personnel. If we are unable to attract and retain qualified personnel, we may be unable to manage our business effectively, and our operations and financial results could suffer.

Strategic acquisitions and investments could disrupt our operations and may expose us to increased costs and unexpected liabilities.

We may acquire or make investments in other technology companies, or enter into other strategic relationships, to expand the markets we address, diversify our customer base or acquire, or accelerate the development of, technology or products. To do so, we may use cash, issue equity that could dilute our current stockholders, or incur debt or assume indebtedness. Strategic transactions, including our acquisition of Cyan in fiscal 2015 and our acquisition of the high-speed photonics components (“HSPC”) assets from TeraXion in fiscal 2016, can involve numerous additional risks, including:

- failure to achieve the anticipated transaction benefits or the projected financial results and operational synergies;
- greater than expected acquisition and integration costs;
- disruption due to the integration and rationalization of operations, products, technologies and personnel;
- diversion of management attention;
- difficulty completing projects of the acquired company and costs related to in-process projects;
- difficulty managing customer transitions or entering into new markets;
- the loss of key employees;
- disruption on termination of business relationships with customers, suppliers, vendors, landlords, licensors and other business partners;

- ineffective internal controls over financial reporting;
- dependence on unfamiliar suppliers or manufacturers;
- assumption of or exposure to unanticipated liabilities, including intellectual property infringement or other legal claims; and
- adverse tax or accounting impact.

As a result of these and other risks, our acquisitions, investments or strategic transactions may not realize the intended benefits and may ultimately have a negative impact on our business, results of operation and financial condition. Adverse resolution of litigation may harm our operating results or financial condition.

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We are a party to claims and litigation in the normal course of our business. Such litigation can be expensive, lengthy, and disruptive to normal business operations. Moreover, the results of complex legal proceedings are difficult to predict and may harm our operating results or financial condition. For additional information regarding certain of the legal proceedings in which we are involved, see Item 3, “Legal Proceedings,” contained in Part I of this annual report.

Changes in government regulation affecting the communications industry and the businesses of our customers could harm our prospects and operating results.

The Federal Communications Commission, or FCC, has jurisdiction over the U.S. communications industry, and similar agencies have jurisdiction over the communication industries in other countries. Many of our largest customers, including service providers and multiservice network operators, are subject to the rules and regulations of these agencies. During 2015, the FCC approved rules that would regulate internet service providers as telecommunications service carriers under Title II of the Telecommunications Act. The impact of these rules is uncertain, and multiple court challenges to these rules are pending in the D.C. Circuit. These and similar changes in regulatory requirements covering access to, management of, or carriage of traffic on the internet in the United States and internationally could serve as a disincentive to certain wireline or wireless network operators, including certain of our customers, to invest in their network infrastructures or introduce new services. Such changes could adversely affect the sale of our products and services. Similarly, changes in regulatory tariff requirements or other regulations relating to pricing or terms of carriage on communications networks could slow the development or expansion of network infrastructures and adversely affect our business, operating results, and financial condition.

Government regulations affecting the use, import or export of products could adversely affect our operations, negatively affect our revenue and increase our costs.

The United States and various foreign governments have imposed controls, license requirements and other restrictions on the usage, import or export of some of the technologies that we sell. Government regulation of usage, import or export of our products, or our technology within our products, or our failure to obtain required approvals for our products, could harm our international and domestic sales and adversely affect our revenue and costs of sales. Failure to comply with such regulations could result in enforcement actions, fines, penalties or restrictions on export privileges. In addition, costly tariffs on our equipment, restrictions on importation, trade protection measures and domestic preference requirements of certain countries could limit our access to these markets and harm our sales. These regulations could adversely affect the sale or use of our products, substantially increase our cost of sales and adversely affect our business and revenue.

Government regulations related to the environment, potential climate change and other social initiatives could adversely affect our business and operating results.

Our operations are regulated under various federal, state, local and international laws relating to the environment and potential climate change. If we were to violate or become liable under these laws or regulations, we could incur fines, costs related to damage to property or personal injury, and costs related to investigation or remediation activities. Our product design efforts and the manufacturing of our products are also subject to evolving requirements relating to the presence of certain materials or substances in our equipment, including regulations that make producers for such products financially responsible for the collection, treatment and recycling of certain products. For example, our operations and financial results may be negatively affected by environmental regulations, such as the Waste Electrical and Electronic Equipment (WEEE) and Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) that have been adopted by the European Union. Compliance with these and similar environmental regulations may increase our cost of designing, manufacturing, selling and removing our products. The SEC has adopted disclosure requirements regarding the use of “conflict minerals” mined from the Democratic Republic of Congo and adjoining countries (“DRC”) and procedures regarding a manufacturer’s efforts to prevent the sourcing of

such minerals from the DRC. Certain of these minerals are present in our products. SEC rules implementing these requirements may have the effect of reducing the pool of suppliers who can supply DRC “conflict free” components and parts, and we may not be able to obtain conflict free products or supplies in sufficient quantities for our operations. Because our supply chain is complex, we may face reputational challenges with our customers, stockholders and other stakeholders if we are unable to verify sufficiently the origins for the “conflict minerals” used in our products and cannot assert that our products are “conflict free.” Environmental or similar social initiatives may also make it difficult to obtain supply of compliant components or may require us to write off non-compliant inventory, which could have an adverse effect on our business and operating results.

We may be required to write down goodwill or long-lived assets, and these impairment charges would adversely affect our operating results.