

CIENA CORP
Form 10-K
December 21, 2018
Table of Contents

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549
FORM 10-K

(Mark One)

ANNUAL REPORT PURSUANT TO
SECTION 13 OR 15(d) OF THE
SECURITIES EXCHANGE ACT OF 1934
For the fiscal year ended October 31, 2018

OR
 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 (I.R.S. Employer
Incorporation or organization) 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 NO

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 NO

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 NO

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). YES NO

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§232.405) 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.

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 Accelerated filer Non-accelerated filer Smaller reporting company

Emerging growth company

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

The aggregate market value of the Registrant's Common Stock held by non-affiliates of the Registrant was approximately \$3.7 billion based on the closing price of the Common Stock on the New York Stock Exchange on April 27, 2018.

The number of shares of Registrant's Common Stock outstanding as of December 17, 2018 was 156,481,822.

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 2019 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.

Table of Contents

CIENA CORPORATION
 ANNUAL REPORT ON FORM 10-K
 FOR FISCAL YEAR ENDED OCTOBER 31, 2018
 TABLE OF CONTENTS

	Page
<u>PART I</u>	
<u>Item 1. Business</u>	4
<u>Item 1A. Risk Factors</u>	19
<u>Item 1B. Unresolved Staff Comments</u>	35
<u>Item 2. Properties</u>	35
<u>Item 3. Legal Proceedings</u>	36
<u>Item 4. Mine Safety Disclosures</u>	36
<u>PART II</u>	
<u>Item 5. Market for Registrant’s Common Stock, Related Stockholder Matters and Issuer Purchases of Equity Securities</u>	37
<u>Item 6. Selected Consolidated Financial Data</u>	39
<u>Item 7. Management’s Discussion and Analysis of Financial Condition and Results of Operations</u>	40
<u>Item 7A. Quantitative and Qualitative Disclosures about Market Risk</u>	65
<u>Item 8. Financial Statements and Supplementary Data</u>	68
<u>Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure</u>	112
<u>Item 9A. Controls and Procedures</u>	113
<u>Item 9B. Other Information</u>	113
<u>PART III</u>	
<u>Item 10. Directors, Executive Officers and Corporate Governance</u>	114
<u>Item 11. Executive Compensation</u>	114
<u>Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters</u>	114
<u>Item 13. Certain Relationships and Related Transactions, and Director Independence</u>	114
<u>Item 14. Principal Accountant Fees and Services</u>	114
<u>PART IV</u>	
<u>Item 15. Exhibits and Financial Statement Schedules</u>	115
<u>Item 16. Form 10-K Summary</u>	115
<u>Signatures</u>	115
<u>Index to Exhibits</u>	117

Table of Contents

PART I

Cautionary Note Regarding Forward-Looking Statements

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,” “can,” “should,” “could,” “expects,” “future,” “plans,” “anticipates,” “believes,” “estimates,” “predicts,” “potential,” “projects,” “targets,” or “continue” or the negative of those words and other comparable words. These statements may relate to, among other things, our competitive landscape; market conditions and growth opportunities; factors impacting our industry and markets; factors impacting the businesses of network operators and their network architectures; adoption of next-generation network technology and software programmability and automation of networks; our 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; 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 information technology (IT) transitions or initiatives; the impact of the Tax Cuts and Jobs Act and changes in our effective tax rates; 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, gross margin 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 or security problems and undetected errors;
- our ability to diversify our customer base beyond our traditional customers and to broaden the application for our solutions in communications networks;
- the level of growth in network traffic and bandwidth consumption and the corresponding level of investment in network infrastructures by network operators;
- the international scale of our operations;
- 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;
- the potential failure to maintain the security of confidential, proprietary or otherwise sensitive business information or systems or to protect against cyber 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 ability to grow and maintain our new distribution relationships under which we will make available certain technology as a component;
- 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;
- our ability to attract and retain experienced and qualified personnel;

Table of Contents

- 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 commercialize and 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;
- the impact of the Tax Cuts and Jobs Act, changes in tax regulations and related accounting, and changes in our effective tax rates;
- future legislation or executive action in the U.S. relating to tax policy or trade regulation;
- the write-down of goodwill, long-lived assets, or our deferred tax 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. We cannot 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 networking systems, services and software company, providing solutions that enable a wide range of network operators to deploy and manage next-generation networks that deliver services to businesses and consumers. We provide network hardware, software and services that support the transport, switching, aggregation, service delivery and management of video, data and voice traffic on communications networks. Our solutions are used by 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.

Our solutions include a diverse portfolio of high-capacity Networking Platform products, which can be applied from the network core to network access points, and which allow network operators to scale capacity, increase transmission speeds, allocate traffic and adapt dynamically to changing end-user service demands. We also offer Platform Software that provides management and domain control of our next-generation packet and optical platforms and automates network lifecycle operations, including provisioning equipment and services. In addition, through our comprehensive suite of Blue Planet Automation Software, we enable network operators to use network data and analytics to drive enhanced automation across multi-vendor and multi-domain network environments, accelerate service delivery and enable an increasingly predictive and autonomous network infrastructure. To complement our hardware and software solutions, we offer a broad range of attached and software-related services that help our customers design, optimize, integrate, deploy, manage and maintain their networks and associated operational environments. Through our

complete portfolio of solutions, we enable our customers to transform their network into a dynamic, programmable environment driven by automation and analytics, which we refer to as the Adaptive Network. Our solutions for the Adaptive Network create business and operational value for our customers, enabling them to introduce new revenue-generating services, reduce costs and maximize the return on their network infrastructure investment.

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)

Table of Contents

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 these reports, 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 seen significant changes in recent years. In particular, optical networks – which carry video, data and voice traffic by encoding digital information on multiple wavelengths of light traveling across fiber optic cables – have experienced strong traffic growth for several years. This growth, and the resulting requirements for increased network capacity and transmission speed, is being driven by an increasingly diverse set of communications services and applications. These services and applications, including those set forth below, are increasing the bandwidth and service demands placed upon networks and are challenging the business models of many network operators.

Cloud-Based Services. Enterprises and consumers continue to replace locally-housed computing and storage by adopting a broad array of innovative cloud-based models – including Platform as a Service (PaaS), Software as a Service (SaaS) and Infrastructure as a Service (IaaS) – and an expanding range of cloud-based services that host key applications, store data, enable the viewing and downloading of content and utilize on-demand computing resources.

Over-the-Top (OTT) Services and Video Streaming. OTT content refers to video, multimedia and other applications provided directly from the content source to the viewer or end user across a third-party network. 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.

On-Demand Services. Users of communications services require an on-demand service level that allows them to be connected wherever and whenever 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 services, including peer-to-peer internet applications, augmented reality applications and multimedia streaming and downloads, to be available on-demand.

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

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

Network Densification. Increasing demand by businesses and consumers for data, content and related services are impacting network infrastructures, particularly at the edge of networks, where increased computing power and automation are required to meet the quality of experience required by these users. To cost-effectively address these demands, network operators will be required to adopt emerging wireless and wireline network architectures. Fifth-Generation wireless broadband technology (5G) is designed to enable significant increases in data

consumption by a growing number of users and devices, thereby better supporting the “Internet of Things” and other emerging applications. “Fiber deep” initiatives by cable and multiservice operators are designed to push digital fiber-based communications closer to the end-user, increasing potential bandwidth to homes and enterprises and increasing data speeds while addressing power, space and operating costs. Implementation of these network densification initiatives is expected to have a significant effect on wireline networks.

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 as the Internet of Things evolves. 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 along with the widening adoption of internet and cloud-based content delivery, smart grid applications, health care and safety monitoring, resource and inventory management, home entertainment, consumer appliances, connected transportation and other M2M data applications.

Table of Contents

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 technologies and making them more widely available and affordable to consumers.

We believe that increased adoption of these services and applications will further increase traffic and capacity requirements and place additional service challenges on network infrastructures.

Network Transition to Programmable Networks with Enhanced Automation

To reduce costs and promote network efficiency and simplicity, network operators, particularly communications service providers, are increasingly looking to adopt next-generation infrastructures that are more open, programmable and automated. Networks today are still primarily physical in nature and are generally managed via inventory management, planning and fulfillment systems. Moving toward digital network transformation, operators are increasingly leveraging information technology (IT) strategies that emphasize software capabilities and automation through policy controlled and analytics-driven network solutions that are more predictive and can adapt more quickly to changing end-user demands. To bridge the existing gap between the operational realities of today and the hybrid networks and operations of the future – emphasizing virtual elements, automation and analytics – we expect network operators to adopt strategies that may include one or more of the following:

Orchestration. Software-based orchestration simplifies the end-to-end creation, automation and deployment of services across multiple physical and virtual network domains. We believe software-based orchestration presents an opportunity to reduce network and operational complexity and offers an alternative to certain elements of traditional operations support and business support systems, which network operators have historically relied upon to support network management functions such as inventory, service provisioning, network configuration and fault management.

Network Function Virtualization (NFV). Through NFV, network operators can separate network services or capabilities from the physical network assets that traditionally provide these services or capabilities to end users. 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.

Software-Defined Networking (SDN). SDN seeks to simplify networks to create more open environments that ease management, support automation and quickly deliver customized services to end users, by enabling individual network elements to be directly programmable by standards-based software control. This results in end-to-end visibility of network flows, enabling the optimization of traffic paths and the control of data flows through a network.

We believe that adoption of these strategies will require network operators and their network solutions vendors to increasingly look to utilize an ecosystem of physical and virtual network resources. 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 solutions providers.

Different Approaches to Design and Procure Network Infrastructure Solutions

Leading network operators are pursuing a diverse range of approaches, or “consumption models,” to manage the design and procurement of their network infrastructures. These consumption models 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 or another vendor's 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. Further, a number of network operators, and certain of our suppliers, are pursuing the development and future deployment of smaller form factor, pluggable modem technology as an alternative to integrated platforms. In parallel, network operators are also exploring a range of alternatives to meet their software requirements, from licensing integrated and proprietary third party software solutions to fully utilizing open source software.

Table of Contents

Many of these consumption models being pursued continue to be in their early stages of evaluation, and the models that ultimately emerge and their level of adoption will depend in significant part on the circumstances and strategies of certain network operators. We also believe that broader adoption of procurement models involving greater disaggregation remains uncertain, particularly for those network operators for whom such an approach would result in increased operational complexity, expense, and integration and support obligations. Based on our views of the market and customer interactions, we expect that the largest portion of deployed capacity, for at least the next few years, will continue to be through the purchase of fully integrated hardware solutions. We expect that customer consideration of a variety of consumption models will require network operators and vendors alike to assess, and possibly broaden, their offerings and commercial models over time, thereby placing premium on a vendor's ability to provide robust network solutions with the maximum amount of flexibility and choice.

Industry Consolidation

Our industry has experienced significant consolidation in recent years among our competitors, customers and suppliers alike. To drive scale and market share gains and meet the intense investment capacity required to keep pace with technology innovation, acquisition activity among vendors of networking solutions has increased. Among our customers, there have been significant horizontal and vertical consolidation activities by service providers and cable operators, with several such operators acquiring media and content companies. Customer consolidation can increase purchasing power and has in the past resulted in delays or reductions in network spending due to changes in strategy or leadership, the timing of regulatory approvals and debt burdens associated with such transactions. Finally, significant consolidation among component suppliers may reduce the number of independent suppliers and could disrupt our supply chain and adversely impact pricing. Consolidation activity across our industry can create opportunities and challenges for our business. We expect this trend to continue and it may have a significant impact on the entire industry, including the competitive landscape, the range sales opportunities for vendors and their supply chains.

Strategy

Our strategy is to leverage our technology leadership, diversify and expand our addressable markets, and drive the profitable growth of our business. Key initiatives of this strategy include:

Extend Innovation Leadership and Enable Customers to Realize an Adaptive Network. We are focused on pushing the pace of innovation in our markets and providing market-leading offerings that promote what we refer to as the Adaptive Network. Our Adaptive Network vision emphasizes programmable network infrastructure that leverages our WaveLogic coherent modem technology, enhanced IP capabilities in access and aggregation networks, and software control and automation capabilities. We are focused on providing market-leading programmable infrastructure innovation capable of providing advanced network telemetry and allowing for tuning of network capacity and speeds to meet changing needs. We are also introducing solutions with enhanced IP capabilities to help network operators make better operating decisions and to optimize their network performance and deliver a better user experience. We continue to invest in our automation solutions and believe that through automation, analytics and intent-based policies, we can enable an Adaptive Network that can rapidly scale, self-configure and self-optimize by assessing network pressures and demands.

Leverage Blue Planet for Intelligent, Closed-Loop Automated Networks. We seek to promote adoption of our Blue Planet Automation Software, highlighting its ability to transform network operations and management as well as IT and back office processes. Blue Planet is designed to automate, orchestrate and manage both physical and virtual network resources and their associated services across data centers and the wide area network (WAN). We believe that Blue Planet can transform legacy networks into "service ready" networks, accelerating the creation, delivery and lifecycle management of new, cloud-based services. We seek to enable closed-loop automation for networks by

leveraging automation and orchestration, multi-domain inventory, topology and federation, analytics, machine learning and assurance. Through our acquisitions of Packet Design, LLC and DonRiver Holdings, LLC in fiscal 2018, we augmented our software offerings to include route optimization and assurance functionality and multi-domain inventory topology and visualization. We are also investing in professional services delivery to enable the sale of broader solutions that combine software and services. This solutions-based selling approach seeks to use insights into our customers' common operational and networking issues and positions Blue Planet software and services to enable the digital network transformation that our customers are seeking.

Promote Flexibility and Choice. Choice is an increasingly important element of our customers' networking approach and their efforts to manage network demands and costs. Our philosophy is rooted in enabling choice in the market by developing network solutions that address a range of different customer consumption models. Our desire to promote choice influences our development priorities as well as our go-to-market approach. We intend to offer a range of choice to customers across packet-optical convergence, coherent modem leadership and multi-vendor, multi-domain network automation software. We are pursuing "merchant modem" sales opportunities that leverage our Wavelogic modem leadership, directly and indirectly.

Table of Contents

Merchant modems, often called transponders, are the combination of an optical chipset or ASIC with other key optical components that are sold independently of integrated systems. Merchant modem vendors often sell their modem technology in the form of an optical module or pluggable to a variety of market participants, including other original equipment manufacturers. While broader adoption of procurement models that emphasize disaggregation of hardware and software remains uncertain, we expect that a range of different consumption models will require us to broaden our existing offering and commercial models over time. We intend to offer solutions and pursue sales opportunities across a range of customer consumption models to drive the evolution of next-generation network infrastructures and to promote choice in our markets.

Focus Diversification on High-Growth Applications and Customer Segments. We believe that continued diversification of our business is important to address the dynamic industry environment in which we operate, to continue to grow our business, and to better withstand potential slowdowns adversely affecting particular geographies, markets or customer segments. Our strategy is to diversify our solutions offerings and customer base to address fast-growing applications and customer segments. We seek to increase adoption of our packet access and aggregation solutions and to secure and grow market share with our Blue Planet Automation Software platform. We are also pursuing opportunities with a diverse set of network operators in growth segments and geographies. Our go-to-market strategy seeks to capture additional market share with current customers and other Web-scale providers and emerging network operators, and to displace competitors in international markets, particularly in Asia-Pacific and India. We intend to use our direct and indirect sales channels to expand our sales with several other market verticals, including cable and multiservice operators, submarine network operators, enterprise customers and government and research and education (R&E) customers.

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. Our communications service provider customers, including regional, national and international wireline and wireless carriers, form our historical customer base and represent a majority of our revenue.

Web-scale Providers. Our “Web-scale” provider customers include a diverse range of internet content providers and data center operators focused on applications such as search, social media, video, real-time communications and cloud-based service offerings as well as and other emerging network operators. As significant purchasers of capacity on submarine networks and from communications service providers on a global basis, these customers influence networking solution alternatives by those network operators.

Cable and Multiservice Operators (MSO). Our customers include regional, national and international cable and multiservice operators.

Submarine Network Operators. Our customers include service providers, Web-scale providers and consortia operators of submarine communications networks across the globe.

Enterprises. Our enterprise customers include large, multi-site commercial organizations, including participants in the financial, health care, transportation, utilities, energy and retail industries.

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 around the world, as well as communities or consortia including leaders in research, academia, industry and government.

A significant portion of our revenue is concentrated among a small number of customers. See the risk factor captioned “A small number of customers accounts 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.” in Item 1A of this annual report.

Products and Services

We offer the market a comprehensive set of networking solutions that include hardware platforms and systems, our leading optical coherent modem technology and network software solutions. We also offer a broad set of service offerings that allow us to gain valuable insight into network and business challenges faced by our customers and to work closely with them in the assessment, planning, deployment and transformation of their networks.

8

Table of Contents

Networking Platforms

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

Converged Packet Optical. Our Converged Packet Optical portfolio includes a range of hardware networking solutions that use our WaveLogic coherent optical technology and are optimized for the convergence of coherent optical transport, Optical Transport Network (OTN) switching and packet switching.

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. This platform provides leading coherent wavelength capacities, from 40G to 400G, along with multi-layer control plane capabilities for scale and service differentiation. 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, the regional core and submarine cable landing sites.

Our Waveserver family of products consists of stackable interconnect platforms that allow network operators to scale bandwidth and support high bandwidth interconnect applications, such as high-speed data transfer, content delivery, virtual machine migration and disaster recovery/backup between data centers. Waveserver is a specialized platform that is purpose-built for addressing data center and other space-constrained environments using a small footprint and low power design. With its full suite of management interfaces and open APIs, Waveserver is easy to operate and integrate into existing networks and facilitates deployment of on-demand cloud and high-capacity connectivity services.

Our 5400 family of Packet-Optical Platforms consist of multi-terabit reconfigurable switching systems that consolidate the functionality of an add/drop multiplexer and digital cross-connect 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 Z-Series multi-layer switching and transport platforms are used in regional and metro networks and are designed to support a variety of use cases including Ethernet business services and Ethernet backhaul. These products provide for optical transport, traffic aggregation at the network edge and switching that is optimized for handoff at the network core.

Leveraging our WaveLogic coherent modem technology, we are taking steps to pursue merchant modem sales opportunities through our Optical Microsystems products. To date, we have not generated meaningful revenue through these activities; however, such sales will be reflected within the Converged Packet Optical product line of our Networking Platforms segment.

Packet Networking. Our Packet Networking products allow customers to simplify their network designs while delivering new, revenue-generating services. These products target applications primarily from the access to metro networks, where they aggregate and switch packet-based traffic to support such applications as Ethernet business services, mobile backhaul services, fiber deep, as well as ongoing network infrastructure scaling. Our Packet Networking products facilitate network cost effectiveness, including reduced costs associated with power and space, as compared to more complex, traditional IP routing network designs.

To date, revenue from our Packet Networking segment has been primarily related to our 3900 family of Service Delivery Switches and our 5000 family of Service Aggregation Switches and Platforms. These products support the access and aggregation tiers of telecommunications networks and have principally been deployed to support business services and wireless backhaul applications. Our 3900 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 5100 family of Service Aggregation Switches and Platforms provide aggregation to fill higher capacity links within both the metro access and aggregation tiers of networks, minimizing the number of router assets required in the core. The recent introduction of our 3900 family of Service Virtualization Platforms allows for customers to migrate towards software-based networking and services based on Network Function Virtualization.

Our Packet Networking portfolio also 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 packet switching and coherent WaveLogic DWDM optical transport technologies for both data center networks and metro networks.

We have recently introduced our Adaptive IP solution, which leverages the Adaptive Network vision to deliver end-to-end IP-based services in a more simplified and modular manner than traditional router-based IP network designs. Adaptive IP at the programmable infrastructure layer is built upon the latest generation of our Service Aware Operating System (SAOS) within our Packet Networking platforms, which adds IP capabilities targeted towards 5G, IP VPN services and fiber deep applications. We have also recently introduced our 6500 Packet Transport System (PTS), which combines packet switching, control plane operation and integrated optics. Together with our 3900 platforms, PTS provides our service provider customers with a

Table of Contents

complete solution to migrate their legacy TDM (SONET/SDH/PDH) services to a scalable, low operational cost packet solution.

Software and Software-Related Services

Our Software and Software-Related Services segment consists of our Blue Planet Automation Software and Services and our Platform Software and Services.

Blue Planet Automation Software and Services. Our Blue Planet Automation Software is a comprehensive, micro-services based open software suite that allows service providers to use enhanced knowledge about their networks to drive adaptive optimization of their services and operations. Blue Planet facilitates the evolution toward more efficient, modernized network operations with software-defined programmability that accelerates the delivery of on-demand services, reduces costs and enables a path toward a more predictive, autonomous network. We believe our Blue Planet solutions can enable network operators to minimize vendor-specific management silos, reduce network complexity and improve end-to-end service visibility and control. A number of applications can be deployed on the core platform, either individually or in any combination, and include:

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 intent-based, model-driven templates, Blue Planet simplifies end-to-end services lifecycle management and increases service velocity by abstracting the complexity of underlying domains.

Inventory (BPI). By integrating or “federating” data from multiple existing inventory and assurance systems and presenting it in a single dynamic view, network operators can gain real-time visibility into the topology and state of network and service resources from end to end. Integrating with legacy inventory systems, BPI helps network providers simplify and optimize key operational processes such as service fulfillment, network planning and service assurance. When integrated with other Blue Planet applications, BPI can leverage SDN and NFV to enable even greater levels of automation, deliver more dynamic services and respond more quickly to customers’ rapidly changing requirements.

Route Optimization and Assurance (BP ROA). Optimizing the delivery of IP services across the cloud, BP ROA combines routing, traffic and performance analytics for real-time, path-aware operational monitoring. These capabilities enable forensics for troubleshooting transient network problems that can cause service disruptions. Interactive modeling helps engineers predict the impact of network infrastructure and service changes, simulate new workloads for capacity planning and test failure scenarios to build more resilient networks.

- **NFV Orchestration (NFVO).** Blue Planet provides network operators with carrier-grade, NFV management and orchestration capabilities for instantiating and managing virtualized network functions and data center resources. NFVO 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.

Analytics. Blue Planet Analytics incorporates big data analytics and machine-learning to generate network insights, thereby helping operators make smarter, data-driven business decisions. Analytics collects, processes and stores data from multiple sources across the network and leverages machine learning innovations for analysis and insights. Analytics enables the visualization and identification of network trends to create profitable services, better predict capacity requirements and anticipate potential network and service disruptions before they happen. We also offer a related Network Health Predictor application that provides preemptive network maintenance across the optical, Ethernet and IP layers of the network.

Blue Planet Services. To complement our software portfolio, we offer a range of related services that include professional services for solution customization, software and solution support services, consulting and design, build-operate-transfer services and technical support relating to our software offerings. These services are focused on enhancing network automation and network analytics, enabling multi-vendor integration and support, and implementing programmable multi-domain next-generation networks.

The market relating to these software automation capabilities is in the early stages and, as such, revenue from our Blue Planet Automation Software platform has not been significant to date.

Table of Contents

Platform Software and Services. Our software offerings also include our Platform Software, which provides analytics, data and planning tools to assist customers in managing our Networking Platforms products in their networks. Our Platform Software includes:

Manage, Control and Plan (MCP). MCP software provides SDN-based domain control of our next-generation packet and optical networks, unifying Fault, Configuration, Accounting, Performance and Security (FCAPS) management of our multi-layer network infrastructure, with service management and online network planning. Built on Blue Planet's open, extensible microservices-based architecture, MCP marks a shift from legacy, fragmented network management software, to programmable, cloud-native operations that integrate into network operators' business processes. Lifecycle operations – including equipment commissioning, service provisioning, assurance and performance monitoring – are greatly automated and simplified through MCP. Providing granular resource management and control, MCP allows network operators to plan to meet customer service needs.

OneControl Unified Management System. OneControl is an integrated network and service management solution that supports much of our Networking Platform product lines from a single software 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 enables management functions, including network inventory, network element configuration backup, network element software delivery and security administration.

Platform Software Services. To complement our Platform Software portfolio, we offer a range of related services that include software subscription services, consulting, network migration and integration, installation and upgrade support services, and technical support relating to our Platform Software offerings. These services are focused on enabling our customers to operate their Ciena networks most efficiently, and to modernize their operations through migration to our MCP domain control solution.

Our Platform Software offering also includes planning tools and a number of legacy software solutions that support our installed base of network solutions. As we gain further customer adoption of our MCP software platform and we transition features, functionality and customers to this platform, we expect revenue to decline for our legacy Platform Software solutions.

Global Services

To complement our Networking Platforms portfolio, we offer a broad suite of “attached services” that help our customers to design, optimize, deploy, integrate, manage and maintain their communications networks. We believe that our broad set of services offerings is a significant differentiator from our competitors. We believe that our services offerings and our close collaborative engagement with customers provide us with valued insight into network and business challenges faced by our customers, enabling them to achieve their desired outcomes for their network investment. Our services offerings enable us to work closely with our customers in the assessment, planning, deployment and transformation of their networks. We have begun a multi-year transformation process to enhance our service delivery capability and expand our service portfolio. Through these transformation initiatives, we believe we can improve the cost model of our services and drive greater incremental value for our customers in new ways.

Our Global Services portfolio includes a wide range of offerings to meet customer needs and maximize their network infrastructure investment throughout the network lifecycle. These services include:

Planning and Design Services

Network advisory, consulting and design services;

Network optimization and modernization;
Reconfiguration and migration services;
Project management services, including staging, site preparation and installation support activities;
Deployment Services
On-site and remote services to assist in deployment of networks including full turn-key solutions;
installation, turn-up and test services;
Maintenance and Support Services
helpdesk and technical support assistance;
spares and logistics management;
engineering dispatch, preventive maintenance and on-site professional services; and
equipment repair and replacement;

Table of Contents

Managed network services, including 24/7 monitoring through our network operations center (NOC) services; and
Analytics to provide insights into network health and operations with actionable recommendations

We also provide learning 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 our technical support engineers and qualified and authorized third-party service partners.

Product Development

To remain competitive, we must continually invest in and enhance our Networking Platforms, adding new features and functionality and ensuring alignment with market demand. Through our development efforts we seek to enable network operators to achieve improved economics and efficiency, including with respect to price for performance, power consumption, space requirements and lifecycle operating costs. Our research and development strategy emphasizes software-enabled programmability, automation and open interfaces, and seeks to promote broad application of our solutions, including in submarine, long-haul, metropolitan and access networks, data center interconnect, enterprise networking and packet-based infrastructures for cloud-based service delivery. Our approach is also focused on designing products that address a range of emerging consumption models for networking solutions. Our current development efforts are focused upon:

Enhancing and extending our Packet-Optical and Packet Networking solutions, including:

Coherent optical leadership and continued development of our WaveLogic coherent modems to advance transmission speed, spectral efficiency, power usage and reach;

Legacy service migration to next-generation packet infrastructures; and

Support of fiber densification initiatives, such as 5G and fiber deep.

Developing products that enhance software-based network management, automation and control, service orchestration and network function virtualization, and analytics capabilities.

Our research and development efforts are also geared toward portfolio optimization and engineering changes intended to drive product and manufacturing 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 sales organizations. In some cases, where we seek to utilize or gain access to complementary or emerging technologies or solutions, we may obtain 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.

Sales and Marketing

Our Global Sales and Marketing organization includes 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, Japan and India. 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 sales engineers, as well as services professionals and commercial management personnel,

who ensure that we maintain a high-touch, consultative relationship with our customers.

We also maintain and have recently relaunched a global channel program that involves resellers, systems integrators, service providers and other third-party distributors who market and sell our products and services. We utilize these third party channel partners to market and sell our solutions into specific geographies, applications or customer verticals, including submarine networks, governments and Web-scale providers. We see opportunities to leverage these relationships to expand our addressable market, while at the same time reducing the financial and operational risk of entering additional markets.

To support our sales efforts, we engage in marketing activities to generate demand for our products and services. Our marketing strategy is highly focused on building our brand to create customer preference for Ciena, engaging in thought leadership programs to illustrate how our innovations solve customer business problems, and enabling our sales teams to drive customer adoption of our solutions. Our marketing team supports our sales efforts through a variety of activities, including

12

Table of Contents

direct customer interaction, account-based marketing campaigns, portfolio marketing, industry events, media relations, industry analyst relations, social media, trade shows, our website and other marketing vehicles 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 sourcing strategy that emphasizes global 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 distribution operations. 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. We work closely with our manufacturers and suppliers 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 currently use distribution partners to fulfill and deliver our products. We believe that our sourcing, manufacturing and distribution strategies allow 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.

As part of our effort to optimize our operations, we continue to focus on driving cost reductions through sourcing, rationalizing our contract manufacturers and supply chain, outsourcing or virtualizing certain activities, and consolidating distribution sites and service 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 instances of both cancellation and non-acceptance are rare. 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 was \$1.26 billion as of October 31, 2018 as compared to \$1.13 billion as of October 31, 2017. Backlog includes product and service orders from commercial and government customers combined. Backlog at October 31,

2018 includes approximately \$226.8 million, primarily related to orders for products and maintenance and support services that are not expected to be filled or performed within fiscal 2019. 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 experience 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 has often resulted in 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.

Table of Contents

Competition

Competition among networking solution vendors remains intense on a global basis. The markets in which we compete are characterized by rapidly advancing technologies, frequent introduction of new networking solutions and aggressive selling efforts, including using significant pricing pressure 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 Huawei, Nokia, Cisco, Juniper Networks and ZTE. As compared to us, many of these competitors have substantially greater financial, operational and marketing resources, significantly broader product offerings and more established relationships with service providers and other customer segments. Because of their scale and resources, they may be perceived to be a better fit for the procurement or network strategies of larger network operators. 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 Infinera, ADVA and ECI. We also compete with a number of smaller companies that provide significant competition for a specific product, application, customer segment or geographic market.

Keeping pace with the market's demands for technology innovation requires considerable research and development investment capacity. As a result, some of our competitors, both large and small, have chosen to rely upon coherent modem technology developed by and procured from third-party "merchant" providers, including Acacia Communications, NTT Electronics (NEL) and Inphi. We may compete with these providers, either indirectly as a result of their technology being a key enabling technology for our competitors, or directly across emerging consumption models as we pursue our strategy of capturing market share within merchant modem sales opportunities.

The principal competitive factors applicable to our markets include:

- the ability to meet business needs and drive successful outcomes;
- functionality, speed, capacity, scalability and performance of network solutions;
- price for performance, cost per bit and total cost of ownership of network solutions;
- incumbency and strength of existing business relationships;
- ability to offer comprehensive networking solutions, consisting of hardware, software and services;
- time-to-market in delivering products and features;
- technology roadmap and forward innovation capacity;
- company stability and financial health;
- 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 requirements and power consumption of network solutions;
- software and network automation capabilities;
- manufacturing and lead-time capability; and
- services and support capabilities.

As a result of the intense environment in which we compete, winning new opportunities can often require that we agree to unfavorable commercial terms or pricing and 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 competition in our industry to continue to broaden and to intensify as network operators pursue a diverse range of network strategies. As these changes occur, 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 Automation Software, and network operator demands for software programmability, management and automation 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 pluggable modem technology or other 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 to adopt a disaggregated approach to the procurement of hardware and software.

Patents, Trademarks and Other Intellectual Property Rights

Table of Contents

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 incentive program for inventions and patents 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, 2018, we had 1,620 issued U.S. patents, 244 pending U.S. patent applications, 315 issued non-U.S. patents and 154 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 software, Platform Software, Blue Planet Automation 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, 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, 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 actions and 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, 2018, we had a global workforce consisting of 6,013 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.

Table of Contents

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.	75	Executive Chairman of the Board of Directors
Gary B. Smith	58	President, Chief Executive Officer and Director
Stephen B. Alexander	59	Senior Vice President and Chief Technology Officer
James A. Frodsham	52	Senior Vice President and Chief Strategy Officer
Rick L. Hamilton	47	Senior Vice President, Global Software and Services
Scott A. McFeely	55	Senior Vice President, Global Products and Services
James E. Moylan, Jr.	67	Senior Vice President and Chief Financial Officer
Andrew C. Petrik	55	Vice President and Controller
Jason M. Phipps	46	Senior Vice President, Global Sales and Marketing
David M. Rothenstein	50	Senior Vice President, General Counsel and Secretary
Bruce L. Claflin (1)(2)	67	Director
Lawton W. Fitt (2)	65	Director
Patrick T. Gallagher (1)(3)	63	Director
T. Michael Nevens (2)	69	Director
Judith M. O'Brien (1)(3)	68	Director
Joanne B. Olsen (1)(3)	60	Director
Michael J. Rowny (2)	68	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. Fitt, Dr. Nettles and Mr. Rowny in 2019; Ms. O'Brien and Mr. Smith in 2020, and Mr. Claflin, Mr. Gallagher and Mr. Nevens in 2021. In October 2018, Ms. Olsen was appointed to fill a newly created vacancy in the Board of Directors. Accordingly, she will stand for election at the 2019 Annual Meeting of stockholders and, if elected by stockholders, her term of office will expire in 2020.

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 previously served on the board of Axcelis Technologies, Inc., where he was independent chairman of the board. Dr. Nettles has previously served on the boards of directors of Appttrigger, 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 board of directors of CommVault Systems, Inc. and previously served on the board of directors of Avaya 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 and Technology and General Manager of Transport and Switching and 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

16

Table of Contents

employed in senior level positions with Nortel Networks in product development and marketing strategy.

Mr. Frodsham serves on the boards of directors of Innovance Networks and Relogix Inc.

Rick L. Hamilton joined Ciena in October 2016 and has served as Senior Vice President, Global Software and Services since February 2017. Mr. Hamilton is responsible for managing Ciena's Blue Planet Automation Software and Services portfolio. Mr. Hamilton previously served as Senior Vice President, Global Services & Automation. Prior to joining Ciena, he served as Corporate Vice President, Professional Services for Juniper Networks from January to October 2016. From January 2004 to December 2015, Mr. Hamilton served with Cisco Systems in various services leadership positions, including most recently as Vice President, Cloud & Managed Services.

Scott A. McFeely joined Ciena in March 2010 and has served as Senior Vice President, Global Products and Services since May 2018. Mr. McFeely is responsible for all aspects of Ciena's networking portfolio including research and development activities relating to its Converged Packet-Optical and Packet Networking portfolios, Platform Software and Services, product line management, supply chain operations, and Global Services. From November 2015 to May 2018, Mr. McFeely served as Senior Vice President, Networking Platforms. From March 2010 to October 2015, he served as Vice President, Global Portfolio Management and Business Operations. Mr. McFeely joined Ciena in connection with its acquisition of Nortel's Metro Ethernet Networks business, with which he spent more than 20 years in a variety of technical and management roles.

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. He also served as Treasurer from August 1997 to October 2008.

Jason M. Phipps joined Ciena in 2002 and has served as Senior Vice President, Global Sales and Marketing since February 2017. Mr. Phipps is responsible for Ciena's global sales organization and its marketing and communications functions. From January 2014 to February 2017, Mr. Phipps served as Vice President and General Manager, North America Sales, during which time he also oversaw the Global Partners & Channels practice, and from March 2011 to December 2013 he served as Vice President, Global Sales Operations. Mr. Phipps has also previously held a number of sales and marketing leadership positions with Ciena.

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.

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 currently serves on the board of directors of IDEXX Laboratories, Inc., where he is the Chairman of the Nominating and Governance Committee. Mr. Claflin previously served on the board of directors of Advanced Micro Devices (AMD).

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. Ms. Fitt currently serves on the boards of directors of The Carlyle Group LP, The Progressive Corporation and Micro Focus International PLC. Ms. Fitt also has previously served on the boards of directors of ARM Holdings PLC and Thomson Reuters Corporation. Ms. Fitt 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 Sollers JSC.

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

Table of Contents

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 boards of directors of privately-held companies, Teatro Labs, Inc., Inform, Inc. and MagicCube, Inc. Ms. O'Brien has also previously served on the board of directors of Adaptec, Inc.

Joanne B. Olsen has served as a Director of Ciena since October 2018. Ms. Olsen previously served as Executive Vice President of Global Cloud Services and Support at Oracle from 2016 until her retirement in August 2017. In that role, she drove Oracle's cloud transformation services and support strategy, partnering with leaders across all business units. Ms. Olsen previously served as Senior Vice President and leader of Oracle's applications sales, alliances, and consulting organizations in North America from 2012 through 2016, and from 2010 through 2012 served in various general management positions at Oracle. Ms. Olsen began her career with IBM, where, between 1979 and 2010, she held a variety of executive management positions across sales, global financing and hardware. Ms. Olsen also serves on the board of directors of Teradata Corporation.

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 has also previously served on the board of directors of Neustar, Inc.

Table of Contents

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, gross margin and operating results can fluctuate significantly and unpredictably from quarter to quarter. Our revenue, gross margin 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. Visibility into customer spending levels can be uncertain, spending patterns are 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, gross margin and operating results include:

- changes in spending levels or patterns by customers, particularly with respect to our service provider and Web-scale provider customers;
- 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;
- the mix of revenue by product segment, geography and customer in any particular quarter;
- our level of success in achieving targeted cost reductions and improved efficiencies in our supply chain;
- the pace and impact of price erosion that we regularly encounter in our markets;
- our level of success in executing our strategy of capturing additional market share and displacing competitors;
- our incurrence of start-up costs, including lower margin phases of projects required to support initial deployments, gain new customers or enter new markets;
- technology-based price compression and the introduction of new platforms with improved price for performance;
- changing market, economic and political conditions;
- consolidation activity among our customers and suppliers;
- the timing of revenue recognition on sales, particularly relating to large orders;
- 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.

As a result of these factors and other conditions affecting our business and operating results, we believe that quarterly comparisons of our operating results are not necessarily a good indication of possible future performance. Quarterly fluctuations from the above factors may cause our revenue, gross margin and results of operations to underperform in relation to our guidance, long-term financial targets or the expectations of financial analysts or investors, which may cause volatility or decreases in our stock price.

A small number of customers 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.

A significant portion of our revenue is concentrated among a small number of customers. For example, our ten largest customers contributed 56.5% of our fiscal 2018 revenue. Historically, our largest customers by revenue principally consisted of large communications service providers. For example, AT&T and Verizon accounted for approximately 12.1% and 10.3% of fiscal 2018 revenue, respectively. As a result of efforts in recent years to diversify our business, our customer base, including some of our largest customers, currently includes Web-scale providers. In addition to their position among our largest customers by revenue, these customers are increasingly important contributors to our

overall growth through both our direct sales to this market vertical and their impact on purchases by other network operators. During fiscal 2018, two Web-scale providers were among our top ten customers. Consequently, our financial results and our ability to grow our business are closely correlated with the spending of a relatively small number of customers in these segments. Changes in their levels of network spending or their consumption models for acquiring networking solutions could adversely affect our operating results.

Table of Contents

Because a number of our largest customers and our largest customer segment 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 continue to face a rapidly shifting competitive landscape as cloud service operators, “over-the-top” (OTT) providers and other content providers challenge their traditional business models and network infrastructures. These dynamics have had an adverse effect on network spending levels in this segment. A number of our service provider customers, including AT&T, with whom we experienced declines in annual revenue during fiscal 2017 and fiscal 2018, have announced various procurement initiatives or efforts to reduce capital expenditures on network infrastructure in future periods that may adversely affect our results of operations. Moreover, a number of our communications service providers and cable operator customers, including AT&T, Verizon and Centurylink, have either recently announced significant acquisition transactions or are in the process of significant related integration activities, including the acquisition of media or content companies. Such transactions have in the past, and may in the future, result in spending delays or deferrals, or changes in preferred vendors, due to changes in strategy or leadership, the timing of regulatory approvals and debt burdens associated with such transactions. Our business and results of operations could be materially adversely affected by these factors and other market, industry or competitive dynamics adversely impacting our customer segments.

We do not have long-term contracts that obligate our customers, including our largest customers, to purchase any minimum or guaranteed volumes, and we conduct sales under purchase orders for which our customers often have the right to modify or cancel. We must regularly compete for and win business with existing customers. Moreover, Web-scale providers tend to operate on shorter procurement cycles than our traditional customers, which can require us to compete to re-win business with these customers more frequently than required with other customers segments. As such, there is no assurance that our incumbency will be maintained at any given customer or that our revenue levels from a customer in a particular period can be achieved in future periods. Customer spending levels can be unpredictable and our sales to any customer could significantly decrease or cease at any time. Our business and results of operations would be materially adversely impacted by the loss of a large customer or reductions in spending or capital expenditure budgets by our largest customers.

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 vendors 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. In addition, to drive scale and market share gains and meet the intense investment capacity required to keep pace with technology innovation, acquisition activity among vendors of networking solutions has increased. Consolidation in our industry may result in competitors with greater resources, pricing flexibility, or other synergies, that provide them with a competitive advantage.

Moreover, certain customers are adopting procurement strategies that seek to purchase a broader set of networking solutions from a single or small number of vendors. Because of their scale and resources, and a more diverse set of solution offerings, certain of our larger competitors may be perceived to be a better fit for the procurement or network operating and management strategies of large service providers. 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:

- the ability to meet business needs and drive successful outcomes;
- functionality, speed, capacity, scalability and performance of solutions;

- price for performance, cost per bit and total cost of ownership of solutions;
- incumbency and strength of existing business relationships;
- ability to offer comprehensive networking solutions, consisting of hardware, software and services;
- time-to-market in delivering products and features;
- technology roadmap and forward innovation capacity;
- company stability and financial health;
- 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;
- software and network automation capabilities;
- manufacturing and lead-time capability; and

Table of Contents

services and support capabilities.

Part of our strategy is to leverage our technology leadership and to aggressively capture additional market share and displace competitors, particularly with communications service providers internationally. In an effort to maintain our incumbency or to 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 onerous commercial and legal terms and conditions that place a disproportionate amount of risk on us.

We expect the competition in our industry to continue to broaden and to intensify, as network operators pursue a diverse range of network strategies and consumption models. 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 Automation Software platform, and as 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, that 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. Such an increase in competitive intensity, the emergence of new consumption models, or the entry of new competitors into our markets, 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 depend significantly on general market and economic conditions. Market volatility and weakness in the regions in which we operate 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, which 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 in a particular region where we operate, would adversely affect our business, results of operations and financial condition.

Investment of research and development resources in communications networking technologies for which there is not an adequate market demand, 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 may move in directions that we had not anticipated. There is no guarantee that our new products, including our Blue Planet Automation 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 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

Table of Contents

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, competing solutions may be more attractive in the market. As a result, 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 monetize our software assets and realize a key part of our business strategy. A key part of our business strategy depends on our ability to commercialize and gain market adoption for our Blue Planet Automation Software platform. If the markets relating to software solutions for network automation, including service orchestration, route optimization, analytics and assurance and SDN or NFV, do not develop as we anticipate, or if we are unable to increase market awareness and adoption of our Blue Planet solutions as a preferred solution within those markets, demand for our Blue Planet solutions may not grow. Our long-term success in the software market will depend to a significant extent on both 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 software programmability and automation within their networks. We have a limited history in commercializing and selling these software solutions and have only recently acquired elements of our Blue Planet portfolio to facilitate our go to market strategy for these solutions. Moreover, 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 be able to increase sales of our Blue Planet platform, and a key part of our business strategy would be adversely affected.

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

Growing bandwidth demands and network operator efforts to reduce costs 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 controller;

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 their levels of adoption will depend in significant part on the nature of the circumstances and strategies of particular network operators. 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 operators,

Table of Contents

including our Web-scale customers, are playing a leading role in the transition to software-defined networking or the standardization of communications network solutions. We believe that the potential for different approaches to the procurement of networking infrastructure will require network operators and vendors to evolve and broaden their existing commercial models over time. Adoption of a range of consumption models may also 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 and commercial models that accommodate the range of consumption models ultimately adopted by our customers or within our markets, 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 coherent optical modem components, 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.

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 a substantial portion of our supply chain activities, including component sourcing, manufacturing, product testing and quality, and fulfillment and logistics relating to the distribution and support 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 may 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.

A substantial portion of our products are manufactured by third-party contract manufacturers in Mexico. The United States, Canada and Mexico have only recently reached an agreement to update the North American Free Trade

Agreement. The new United States-Mexico-Canada Agreement is not yet in effect and requires additional approvals, including legislative approval. In addition, the U.S. has generally indicated a willingness to revise, renegotiate, or terminate various multilateral trade agreements and to impose new taxes on certain goods imported into the U.S. Such steps, if adopted, could adversely impact our business and operations, and may make our products less competitive in the U.S. and other markets. At this time, it remains unclear what additional actions, if any, will be taken by the U.S. government with respect to such trade agreements, tax policy related to international commerce, or the imposition of tariffs on goods imported into the U.S. There can be no assurance that any future

Table of Contents

legislation or executive action in the U.S. relating to tax policy and trade regulation would not adversely affect our business, operations and financial results.

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 in international markets 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. We do not have any guarantees of supply from our third-party suppliers, and in certain cases we have limited contractual arrangements or are relying upon 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. 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 and increased costs and could negatively affect our product gross margin and results of operations. There are a number of significant technology trends or developments underway or emerging, including the Internet of Things, autonomous vehicles and mobile communication adoption, that have during fiscal 2018 and can be expected in the future to result in increased market demand for key raw materials or components. 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 and delivery cycles.

We are exposed to risks relating to unfavorable economic conditions and a wide range of challenges affecting the businesses and results of operations of our component suppliers. These challenges can affect their material costs, sales, liquidity levels, ability to continue investing in their businesses, ability to import or export goods, ability to meet development commitments and manufacturing capability. For example, there have been a number of recent geopolitical events involving the governments of the United States and China – including potential tariffs and trade restrictions by both countries and China’s announcement of a five-year plan to invest in a domestic optical components industry – may have an adverse impact on certain of our component suppliers in one or more of these respects. These and other industry, market and regulatory disruptions and 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 have experienced, and may experience in the future, consolidation among suppliers of our components. Consolidation in the optical components and semiconductor industry can result in a reduction in the number of suppliers available to us, which can negatively impact our ability to access components or the price we have to pay for such components. Moreover, our access to necessary components could be adversely impacted by evolving competitive landscapes, converging solutions offerings and competition from component vendors, including those in our supply chain, that develop competing networking products for emerging consumption models, including pluggable modem technology or offerings based on off-the-shelf or commoditized hardware technology, referred to as “white box” hardware.

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.

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 offerings, including evolutions of our WaveLogic coherent optical chipset, packet networking platforms and solutions targeting access and metro networks and data center interconnect applications. 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. Remediation of such events could materially adversely impact our business and results of operations. In addition, we may encounter unanticipated security vulnerabilities relating to our products or the activities of our supply chain. Our products are used customer networks transmitting a range of sensitive information and any actual or perceived

Table of Contents

exposure of our solutions to malicious software or cyber-attacks, could adversely affect our business and results of operations. 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, liabilities and claims that may not be covered by 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.

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:

- social, political and 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;
- higher incidence of corruption or unethical business practices;
- less protection for intellectual property rights in some countries;
- tax and customs changes that adversely impact our global sourcing strategy, manufacturing practices, transfer-pricing, or competitiveness of our products for global sales;
- compliance with certain testing, homologation or customization of products to conform to local standards;
- 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 subject to complex foreign and U.S. laws and regulations, including anti-bribery and corruption laws, antitrust or competition laws, environmental regulations and data privacy laws, among others. In particular, recent years have seen a substantial increase in anti-bribery law enforcement activity by U.S. regulators, and we currently operate and seek to operate in many parts of the world that are recognized as having a greater potential for corruption. Violations of any 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. We cannot assure that our policies and procedures to ensure compliance with these laws and regulations and to mitigate these risks will protect us from all acts committed by our employees or third-party vendors, including contractors, agents and services partners. Additionally, the costs of complying with these laws (including the costs of investigations, auditing and monitoring) could adversely affect our current or future business.

The U.S. government has indicated a willingness to revise, renegotiate, or terminate various, existing multilateral trade agreements and to impose new taxes on certain goods imported into the U.S. Because we rely upon a global sourcing strategy and third-party contract manufacturers in markets outside of the U.S. to perform substantially all of the manufacturing of our products, such steps, if adopted, could adversely impact our business and operations, and may make our products less competitive in the U.S. and other markets. At this time, it remains unclear what additional actions, if any, the U.S. government will take with respect to such trade agreements, tax policy related to international commerce, or imposition of tariffs on goods imported into the U.S. There can be no assurance that any future legislation or executive action in the U.S. relating to tax policy and trade regulation would not adversely affect our

business, operations and financial results.

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.

25

Table of Contents

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 or contractual 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 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. We regularly incur, on a quarterly basis, expense provisions against excess or obsolete inventory. 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 with existing products.

Accordingly, it is increasingly possible that customers may forgo purchases of certain products we have inventoried in favor of a similar, newer 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 go to market activities and the distribution of our WaveLogic coherent technology within the merchant modem market could expose us to increased or new forms of competition, or adversely affect our systems business and results of operations.

We recently entered the merchant modem market to monetize our coherent optical technology, expand our addressable market and address a range of customer consumption models for networking solutions. Making our critical technology available in this manner could adversely impact the sale of products in our existing systems business. For example, our customers may choose to adopt disaggregated consumption models or third-party solutions that embed Ciena-designed optical modules instead of purchasing systems-based solutions from us. Accordingly, we may encounter situations where we are competing for opportunities in the market directly against a system from one of our competitors that incorporates Ciena-designed modules. Making this key technology available and enabling third-party sales of Ciena-designed modules may adversely affect our competitive position and increase the risk that third parties misappropriate or attempt to use our technology or related intellectual property without our authorization. These and other risks or unanticipated liabilities or costs associated with the sales of our WaveLogic coherent technology could harm our reputation and adversely affect our business and our results of operations. Our go to market activities and the distribution of our WaveLogic coherent technology within the merchant modem market could expose us to increased or new forms of competition, or adversely affect our systems business and results of operation.

Efforts to increase our sales and capture market share in targeted international markets may be unsuccessful.

Part of our business and growth strategy is to expand our geographic reach and increase market share in international markets through a combination of direct and indirect sales resources. We are also aggressively pursuing opportunities with service provider customers in additional geographies, including Asia-Pacific and India. This diversification of our markets and customer base has been a significant component of the growth of our business. Our efforts to continue to increase our sales and capture market share in international markets may ultimately be unsuccessful or may adversely impact our financial results, including our gross margin. Our failure to continue to increase our sales and market share in international markets could limit our growth and could harm our results of operations.

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

Table of Contents

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 to derive value from their ownership solely 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 would 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.

We integrate third-party software and other technology into our operating system, network management, and intelligent automation software 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 Automation Software platform, utilize elements of open source or publicly available software. As network operators seek to enhance programmability and automation 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.

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 our 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. Companies in the technology industry have been increasingly subject to a wide variety of security incidents,

27

Table of Contents

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 and other business applications maintained by our third-party providers, have in the past and may in the future be subject to attempts to gain unauthorized access, breach, malfeasance or other system disruptions. In 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 security occurs in our network, we could incur significant costs and our reputation could be harmed. While we continually work to safeguard our internal network systems and validate the security of our third party providers, to mitigate these potential risks, including through information security policies and employee awareness and training, there is no assurance that such actions will be sufficient to prevent cyber-attacks or security breaches. We have been subjected in the past to a range of incidents including phishing, emails purporting to come from an executive or vendor seeking payment requests, and communications from look alike corporate domains. While these have not had a material effect on our business or our network security to date, 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.

We rely on third-party resellers and distribution partners to sell our solutions, and our failure to effectively develop and manage these relationships could adversely affect our business and result of operations.

In order to sell into new geographic markets, diversify our customer base and broaden the application for our solutions, and to complement our global field resources, we rely on a number of third-party resellers, distribution partners and sales agents, both domestic and international, and we expect these relationships to be an important part of our business. There can be no assurance that we will successfully identify and qualify these resources or that we will realize the expected benefits of these sales relationships. Our failure to effectively identify, develop and manage our third-party sales relationships could adversely affect our business, growth and result of operations. We must also assess and qualify resellers, distribution partners and sales agents under our channel programs to ensure their understanding of and willingness and ability to adhere to our Code of Business Conduct and Ethics and ethical business practices. We may be held responsible or liable for the actions or omissions of these third parties. Actions, omissions or violations of law by our third-party sales partners or agents could have a material adverse effect on our business, operating results and financial condition.

Our failure to manage our relationships with third-party service partners effectively could adversely impact our financial results and relationships 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. We must also assess and certify service partners in order to ensure their understanding of and willingness and ability to adhere to our Code of Business Conduct and Ethics and ethical business practices. 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 we have. 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, that we will be able to maintain the continuity of their services, or that they will adhere to our approach to ethical business practices. 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 effectively manage 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.

Table of Contents

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

As a company with global operations, we face exposure to movements in foreign currency exchange rates. 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 we cannot hedge against all foreign exchange rate volatility. 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, to diversify our product portfolio, or to address a 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.

We are a party to legal proceedings, investigations and other claims or disputes, which are costly to defend and, if determined adversely to us, could require us to pay fines or damages, undertake remedial measures or prevent us from taking certain actions, any of which could adversely affect our business.

In the course of our business, we are, and in the future may be, a party to legal proceedings, investigations and other claims or disputes, which have related and may relate to subjects including commercial transactions, intellectual property, securities, employee relations, or compliance with applicable laws and regulations. A description of certain of these matters can be found in Note 24, Commitments and Contingencies, in the Notes to Consolidated Financial Statements in Item 8 of Part II of this Report. Among these matters, in September 2017 we voluntarily contacted the Securities and Exchange Commission and the U.S. Department of Justice to advise them of an internal investigation that we initiated to determine whether certain payments to an individual employed by a customer in a country in the ASEAN region may have violated applicable laws and regulations, including the U.S. Foreign Corrupt Practices Act. Legal proceedings and investigations are inherently uncertain and we cannot predict their duration, scope, outcome or consequences. There can be no assurance that these or any such matters that have been or may in the future be brought against us will be resolved favorably. In connection with any government investigations, in the event the government takes action against us or the parties resolve or settle the matter, we may be required to pay substantial fines or civil and criminal penalties and/or be subject to equitable remedies, including disgorgement or injunctive relief. And, other legal or regulatory proceedings, including lawsuits filed by private litigants, may also follow as a consequence. These matters are likely to be expensive and time-consuming to defend, settle and/or resolve, and may require us to implement certain remedial measures that could prove costly or disruptive to our business and operations. They may also cause damage to our business reputation. The unfavorable resolution of one or more of these matters could have a material adverse effect on our business, results of operations, financial condition or cash flows.

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

Table of Contents

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.

Growth of our business is dependent upon the proper functioning and scalability of our internal business processes and information systems. Adoption of new systems, modifications or interruptions of services 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. We continually pursue initiatives to transform and optimize our business operations through the reengineering of certain 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 will not be subject to similar incidents, exposing us to significant cost, reputational harm and disruption or damage to our business.

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

We are a party to credit agreements relating to a \$250 million senior secured asset-based revolving credit facility and an outstanding senior secured term loan with approximately \$700.0 million repayable at maturity in fiscal 2025. 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 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 debt transactions or credit facilities, including equipment loans, working capital lines of credit, senior notes 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

Table of Contents

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 the past, and there can be no assurance that such financing alternatives will be available to us on favorable terms or at all, should we determine it necessary or advisable to seek additional capital. The potential effects of the referendum on the UK's membership in the European Union remain uncertain.

In June 2016, the United Kingdom (UK) held a referendum in which voters approved an exit from the European Union (EU), commonly referred to as "Brexit," and in March 2017, notified the EU that it intended to exit as provided in Article 50 of the Treaty on European Union. The terms of the withdrawal are subject to ongoing negotiation that 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 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 often 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, to optimize our operations to achieve our target operating model and profitability objectives, or to reflect more closely 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 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;

31

Table of Contents

• difficulty managing customer transitions or entering into new markets;

• the loss of key employees;

• disruption or 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. 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 (the “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 cable and multiservice network operators, are subject to the rules and regulations of these agencies, while others participate in and benefit from government-funded programs that encourage the development of network infrastructures. These regulatory requirements and funding programs are subject to changes that may adversely impact our customers, with resulting adverse impacts on our business. In December 2017, the FCC voted to roll back its 2015 order regulating broadband internet service providers as telecommunications service carriers under Title II of the Telecommunications Act. This decision repeals net neutrality regulations that prohibit blocking, degrading or prioritizing certain types of internet traffic and restores the light touch regulatory treatment of broadband service in place prior to 2015. Although the FCC has preempted state jurisdiction on net neutrality, at least two states, Montana and New York have already taken executive action directed at reinstating aspects of the FCC’s 2015 order. In addition, in September 2018, California passed legislation that seeks to reestablish net neutrality. Changes in regulatory requirements or uncertainty associated with the regulatory environment could delay or serve as a disincentive to investment in network infrastructures by network operators, which 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 established certain trade and tariff requirements under which we have implemented a global approach to the sourcing and manufacture of our products, as well as the distribution and fulfillment to customers around the world. Changes or restrictions impacting the import of our components to manufacturing facilities outside of the U.S., the importation of finished goods to the U.S., or the export of products globally, would adversely affect our operations, increase our costs and adversely impact our revenue. 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

Table of Contents

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 disclosure requirements with respect to 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 that 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 the value of certain significant assets which would adversely affect our operating results.

We have a number of significant assets on our balance sheet as of October 31, 2018 and the value of these assets can be adversely impacted by factors related to our business and operating performance, as well as factors outside of our control. As of October 31, 2018, our balance sheet includes a \$745.0 million net deferred tax asset. The value of our net deferred tax assets can be significantly impacted by changes in tax policy or our tax planning strategy. For example, the Tax Cuts and Jobs Act (the “Tax Act”) required us to write down our net deferred tax asset by approximately \$438.2 million in fiscal 2018. If any additional write downs are required, our operating results may be materially adversely affected.

As of October 31, 2018, our balance sheet also includes \$298.0 million of goodwill. We test each reporting unit for impairment of goodwill on an annual basis and, between annual tests, if an event occurs or circumstances change that would, more likely than not, reduce the fair value of the reporting unit below its carrying value. As of October 31, 2018, our balance sheet also includes \$486.0 million in long-lived assets, which includes \$148.2 million of intangible assets. Valuation of our long-lived assets requires us to make assumptions about future sales prices and sales volumes for our products. These assumptions are used to forecast future, undiscounted cash flows upon which our estimates are based. The value of our net deferred tax asset above may also be subject to change in the future, based on our actual or projected generation of future taxable income. If market conditions or our forecasts for our business or any particular operating segment change, we may be required to reassess the value of these assets. We could be required to record an impairment charge against our goodwill and long-lived assets or a valuation allowance against our deferred tax assets. Any write down of the value of these significant assets would have the effect of decreasing our earnings or increasing our losses in such period. If we are required to take a substantial write down or charge, our operating results would be materially adversely affected in such period.

Failure to maintain effective internal controls over financial reporting could have a material adverse effect on our business, operating results and stock price.

Section 404 of the Sarbanes-Oxley Act of 2002 requires that we include in our annual report a report containing management’s assessment of the effectiveness of our internal controls over financial reporting as of the end of our fiscal year and a statement as to whether or not such internal controls are effective. Compliance with these requirements has resulted in, and is likely to continue to result in, significant costs and the commitment of time and operational resources. Certain ongoing initiatives, including efforts to transform business processes or to transition certain functions to third-party resources or providers, will necessitate modifications to our internal control systems, processes and related information systems as we optimize our business and operations. Our expansion into new regions could pose further challenges to our internal control systems. We cannot be certain that our current design for internal control over financial reporting, or any additional changes to be made, will be sufficient to enable management to determine that our internal controls are effective for any period, or on an ongoing basis. If we are unable to assert that our internal controls over financial reporting are effective, market perception of our financial

condition and the trading price of our stock may be adversely affected, and customer perception of our business may suffer.

Our stock price is volatile.

Our common stock price has experienced substantial volatility in the past and may remain volatile in the future.

Volatility in our stock price can arise as a result of a number of the factors discussed in this “Risk Factors” section.

During fiscal 2018, our closing stock price ranged from a high of \$32.07 per share to a low of \$19.57 per share. The stock market has experienced significant price and volume fluctuation that has affected the market price of many technology companies, with such volatility often unrelated to the operating performance of these companies.

Divergence between our actual results and our forward-looking guidance for such results, the published expectations of investment analysts, or the expectations of the market generally, can

Table of Contents

cause significant swings in our stock price. Our stock price can also be affected by market conditions in our industry as well as announcements that we, our competitors, vendors or our customers may make. These may include announcements by us or our competitors of financial results or changes in estimated financial results, technological innovations, the gain or loss of customers, or other strategic initiatives. Our common stock is also included in certain market indices, and any change in the composition of these indices to exclude our company would adversely affect our stock price. These and other factors affecting macroeconomic conditions or financial markets may materially adversely affect the market price of our common stock in the future.

Changes in effective tax rates and other adverse outcomes with taxing authorities could adversely affect our results of operations.

Our future effective tax rates could be subject to volatility or adversely affected by changes in tax laws, regulations, accounting principles, or interpretations thereof. The impact of income taxes on our business can also be affected by a number of items relating to our business. These may include estimates for and the actual geographic mix of our earnings; changes in the valuation of our deferred tax assets; the use or expiration of net operating losses or research and development credit arrangements applicable to us in certain geographies; and changes in our methodology for transfer pricing, valuing developed technology or conducting intercompany arrangements. On December 22, 2017, the Tax Act was signed into law and introduced significant changes to U.S. federal corporate tax law. These changes include a reduction to the federal corporate income tax rate, the current taxation of certain foreign earnings, the imposition of base-erosion prevention measures which may limit the deductions relating to certain intercompany transactions, and possible limitations on the deductibility of net interest expense or corporate debt obligations.

Accounting for the income tax effects of the Tax Act requires significant judgments and estimates that are based on then current interpretations of the Tax Act and could be affected by changing interpretations of the Act, as well as additional legislation and guidance around the Act. Any refinements to tax estimates are difficult to predict and could impact our financial results. We are also subject to the continuous examination of our income tax and other returns by the Internal Revenue Service and other tax authorities and have a number of such reviews underway at any time. It is possible that tax authorities may disagree with certain positions we have taken and an adverse outcome of such a review or audit could have a negative effect on our financial position and operating results. There can be no assurance that the outcomes from such examinations, or changes in our effective tax rates, will not have an adverse effect on our business, financial condition and results of operations.

Table of Contents

Item 1B. Unresolved Staff Comments

Not applicable.

Item 2. Properties

Overview. As of October 31, 2018, all of our properties are leased, and we do not own any real property. We lease facilities globally related to the ongoing operations of our three business segments and related functions. Our principal executive offices are located in two buildings in Hanover, Maryland.

Our largest facilities are our research and development centers located in Ottawa, Canada and Gurgaon, India. We also have engineering and/or service delivery facilities located in San Jose, California; Petaluma, California; Alpharetta, Georgia; Quebec, Canada; Austin, Texas; Pune, India; and Rostov and Taganrog, Russia. In addition, we lease various smaller offices in the United States, Canada, Mexico, South America, Europe, the Middle East and the Asia-Pacific region to support our sales and services operations. We believe the facilities we are now using are adequate and suitable for our business requirements.

Hanover, Maryland Headquarters Lease. We entered into an agreement dated November 3, 2011, with W2007 RDG Realty, L.L.C. relating to a 15-year lease of office space for our corporate headquarters in Hanover, Maryland, consisting of an agreed-upon rentable area of approximately 154,100 square feet.

Ottawa Leases. On October 23, 2014, Ciena Canada, Inc. entered into an 18-year lease agreement for the office building located at 5050 Innovation Drive, Ottawa, Canada, consisting of a rentable area of 170,582 square feet. In addition, on April 15, 2015, Ciena Canada, Inc. entered into a 15-year lease agreement for two new office buildings adjacent to the building at 5050 Innovation Drive, located at 383 and 385 Terry Fox Drive, Ottawa, Canada, consisting of a rentable area of approximately 254,318 square feet.

Gurgaon Leases. On October 12, 2016, Ciena India Pvt. Ltd. entered into a five-year rental agreement for an office building located at Plot No. 13, Echelon Institutional Sector 32, Gurgaon, which is adjacent to another building rented by Ciena India Pvt. Ltd., located at Plot No. 14, Echelon Institutional Sector 32, Gurgaon. The Gurgaon offices consist of a rentable area of approximately 282,580 square feet.

For additional information regarding our lease obligations, see Note 24 to the Consolidated Financial Statements included in Item 8 of Part II of this annual report.

Table of Contents

Item 3. Legal Proceedings

The information set forth under the headings “Litigation” and “Investigations” in Note 24, Commitments and Contingencies, in Notes to Consolidated Financial Statements in Item 8 of Part II of this Report, is incorporated herein by reference.

Item 4. Mine Safety Disclosures

Not applicable.

PART II

36

Table of Contents

Item 5. Market for Registrant’s Common Stock, Related Stockholder Matters and Issuer Purchases of Equity Securities

a) Our common stock is traded on the New York Stock Exchange under the stock symbol “CIEN.”

As of December 14, 2018, there were approximately 946 holders of record of our common stock and 156,481,822 shares of common stock outstanding. We have never paid cash dividends on our capital stock. We currently intend to retain earnings for use in our business, and we do not anticipate paying any cash dividends in the foreseeable future.

Issuer Purchases of Equity Securities

The following table provides a summary of repurchases of our common stock during the fourth quarter of fiscal 2018:

Period	Total Number of Shares Purchased (1)	Average Price Paid Per Share	Total Number of Shares Purchased as Part of Publicly Announced Plans or Programs (1)	Approximate Dollar Value of Shares that May Yet Be Purchased Under the Plans or Programs (in Thousands)
August 1, 2018 to August 31, 2018	425,900	\$ 26.10	425,900	\$ 214,097
September 1, 2018 to September 30, 2018	319,217	\$ 30.69	319,217	\$ 204,300
October 1, 2018 to October 31, 2018	517,566	\$ 29.53	517,566	\$ 189,019
Total	1,262,683	\$ 28.66	1,262,683	

(1) On December 7, 2017, we announced that our Board of Directors authorized a program to repurchase up to \$300 million of our common stock through the end of fiscal 2020. Shares reported in this table were repurchased under this program. Effective December 13, 2018, this program was terminated and replaced by a new program to repurchase up to \$500 million of our common stock. The amount and timing of repurchases are subject to a variety of factors including liquidity, cash flow, stock price and general business and market conditions. The program may be modified, suspended, or discontinued at any time. See Note 19 to the Consolidated Financial Statements in Item 8 of Part II of this Report for information regarding the share repurchase program authorized by our Board of Directors.

Stock Performance Graph

The following graph shows a comparison of cumulative total returns for an investment in our common stock, the S&P Telecom Select Index and the S&P Global SmallCap Index from October 31, 2013 to October 31, 2018. The S&P Telecom Select Industry Index comprises stocks in the S&P Total Market Index that are classified in the Global Industry Classification Standard as alternative carriers, communications equipment, integrated telecom services and wireless telecom services sub-industries. The S&P Global SmallCap Index comprises the stocks representing the lowest 15% of float-adjusted market cap in each developed and emerging country. This graph is not deemed to be “filed” with the SEC or subject to the liabilities of Section 18 of the Securities Exchange Act of 1934, as amended (the “Exchange Act”), and the graph shall not be deemed to be incorporated by reference into any prior or subsequent filing by us under the Securities Act of 1933, as amended, or the Exchange Act.

Table of Contents

Assumes \$100 invested in Ciena Corporation, the S&P Telecom Select Index and the S&P Global SmallCap Index, respectively, on October 31, 2013 with all dividends reinvested at month-end.

(b) Not applicable.

(c) Not applicable.

38

Table of Contents

Item 6. Selected Consolidated Financial Data

The following selected consolidated financial data should be read in conjunction with Item 7, “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and the Consolidated Financial Statements and the notes thereto included in Item 8, “Financial Statements and Supplementary Data” in Part II of this annual report. We have a 52 or 53-week fiscal year, which ends on the Saturday nearest to the last day of October in each year. For purposes of financial statement presentation, each fiscal year is described as having ended on October 31. Fiscal 2018 consisted of 53 weeks and fiscal 2017, 2016, 2015 and 2014 each consisted of 52 weeks.

	Year Ended October 31, (in thousands, except per share data)				
	2018 ^{(1) (2)} _{(3) (4)}	2017 ^{(2) (3) (4)}	2016 ^{(2) (3)}	2015	2014
Revenue	\$3,094,286	\$2,801,687	\$2,600,573	\$2,445,669	\$2,288,289
Gross profit	\$1,314,690	\$1,245,786	\$1,161,576	\$1,075,563	\$948,352
Income from operations	\$229,946	\$214,722	\$156,169	\$100,448	\$45,704
Provision (benefit) for income taxes	\$493,471	\$(1,105,827)	\$14,134	\$12,097	\$13,964
Net income (loss)	\$(344,690)	\$1,261,953	\$72,584	\$11,667	\$(40,637)
Basic net income (loss) per common share	\$(2.40)	\$8.89	\$0.52	\$0.10	\$(0.38)
Diluted net income (loss) per potential common share	\$(2.49)	\$7.53	\$0.51	\$0.10	\$(0.38)
Weighted average basic common shares outstanding	143,738	141,997	138,312	118,416	105,783
Weighted average diluted potential common shares outstanding	143,738	169,919	150,704	120,101	105,783
Net cash provided by operating activities	\$229,261	\$234,882	\$289,520	\$262,112	\$89,816
Cash used for repurchase of common stock - repurchase program	\$110,981	\$—	\$—	\$—	\$—
Cash, cash equivalents and investments	\$953,374	\$969,429	\$1,143,035	\$1,021,183	\$776,982
Deferred tax asset, net	\$745,039	\$1,155,104	\$1,116	\$—	\$—
Total assets	\$3,756,523	\$3,951,711	\$2,873,575	\$2,685,001	\$2,058,842
Short-term and long-term debt, net	\$693,450	\$935,981	\$1,253,682	\$1,264,089	\$1,451,064
Total liabilities	\$1,827,189	\$1,815,369	\$2,107,234	\$2,064,125	\$2,128,457
Stockholders’ equity (deficit)	\$1,929,334	\$2,136,342	\$766,341	\$620,876	\$(69,615)

(1) See Note 2 to our Consolidated Financial Statements included in Item 8 of Part II of this annual report for additional information regarding the acquisitions of Packet Design, LLC (“Packet Design”) on July 2, 2018 and DonRiver Holdings, LLC (“DonRiver”) on October 1, 2018. See also Note 19 to the Consolidated Financial Statements in Item 8 of Part II of this Report for information regarding a share repurchase program authorized by our Board of Directors.

(2) See Note 16 to our Consolidated Financial Statements included in Item 8 of Part II of this annual report for additional information regarding changes in our short-term and long-term debt.

(3) See Note 18 to our Consolidated Financial Statements included in Item 8 of Part II of this annual report for additional information regarding changes in our weighted average basic and diluted potential common shares outstanding.

(4) Net income, deferred tax asset, net, total assets and stockholders’ equity for fiscal 2018 reflect a \$472.8 million impact for the remeasurement of the net deferred tax assets and the federal transition tax and fiscal 2017 reflects a \$1.2 billion deferred tax asset valuation allowance reversal. See Note 20 to our Consolidated Financial Statements included in Item 8 of Part II of this annual report for additional information.

No other factors materially affected the comparability of the information presented above.

Table of Contents

Item 7. Management’s Discussion and Analysis of Financial Condition and Results of Operations

The following discussion and analysis should be read in conjunction with our “Selected Consolidated Financial Data” and consolidated financial statements and notes thereto included elsewhere in this annual report.

Overview

We are a networking systems, services and software company, providing solutions that enable a wide range of network operators to deploy and manage next-generation networks that deliver services to businesses and consumers. We provide network hardware, software and services that support the transport, switching, aggregation, service delivery and management of video, data and voice traffic on communications networks. Our solutions are used by 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.

Our solutions include a diverse portfolio of high-capacity Networking Platform products, which can be applied from the network core to network access points, and which allow network operators to scale capacity, increase transmission speeds, allocate traffic and adapt dynamically to changing end-user service demands. We also offer Platform Software that provides management and domain control of our next-generation packet and optical platforms and automates network lifecycle operations including provisioning equipment and services. In addition, through our comprehensive suite of Blue Planet Automation Software, we enable network operators to use network data and analytics to drive enhanced automation across multi-vendor and multi-domain network environments, accelerate service delivery and enable an increasingly predictive and autonomous network infrastructure. To complement our hardware and software solutions, we offer a broad ran