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 30, 2021

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 incorporation or organization)	(I.R.S. Employer Identification No.)
7035 Ridge Road, Hanover, MD	**21076**
(Address of principal executive offices)	(Zip Code)

Registrant's telephone number, including area code: **(410) 694-5700**

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, $0.01 par value	**CIEN**	**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 whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer	☑	Accelerated filer	☐	Non-accelerated filer	☐	Smaller reporting company	☐
						Emerging growth company	☐

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☑

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Act) Yes ☐ No ☑

The aggregate market value of the registrant's Common Stock held by non-affiliates of the registrant was approximately $7.8 billion based on the closing price of the Common Stock on the New York Stock Exchange on April 30, 2021.

The number of shares of registrant's Common Stock outstanding as of December 10, 2021 was 154,882,650.

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 2022 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.

CIENA CORPORATION
ANNUAL REPORT ON FORM 10-K
FOR FISCAL YEAR ENDED OCTOBER 30, 2021

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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," "intends," "potential," "projects," "targets," or "continue" or the negative of those words and other comparable words. These statements may relate to, among other things, the impact of COVID-19 on our business, financial results and operations; our competitive landscape; market conditions and growth opportunities; factors impacting our industry and markets, including global supply chain constraints; factors impacting the businesses of network operators and their network architectures; adoption of next-generation infrastructures that are more open, programmable and automated; 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 (the "Tax 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 from any future results, activity, performance, or achievements expressed or implied by these forward-looking statements, including due to factors such as those set forth below in "Risk Factors Summary."

For a discussion of 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. We operate in a very competitive and dynamic environment and new risks and uncertainties emerge, are identified or become apparent from time to time and therefore may not be identified in this annual report. 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. Unless the context requires otherwise, references in this annual report to "Ciena," the "Company," "we," "us" and "our" refer to Ciena Corporation.

Risk Factors Summary

Investing in our securities involves a high degree of risk. The following is a summary of the principal factors that make an investment in our securities speculative or risky, all of which are more fully described below in the section titled "Risk Factors." This summary should be read in conjunction with the "Risk Factors" section and should not be relied upon as an exhaustive summary of the material risks facing our business. In addition to the following summary, you should consider the information set forth in the "Risk Factors" section and the other information contained in this annual report before investing in our securities.

Risks Related to Our Business and Industry

- Our revenue, gross margin and operating results can fluctuate significantly and unpredictably from quarter to quarter.
- Challenges relating to current supply chain constraints, including semiconductor components, could adversely impact our growth, gross margins and financial results.
- A small number of customers account for a significant portion of our revenue. The loss of these customers or a significant reduction in their spending could have a material adverse effect on our business and results of operations.
- We face intense competition that could hurt our sales and results of operations, and we expect the competitive landscape in which we operate to continue to broaden to include additional solutions providers.
- The COVID-19 pandemic has impacted our business and results of operation and could have a material adverse effect on our business, results of operations and financial condition in the future.
- Investment of research and development resources in communications networking technologies for which there is not an adequate market demand, or failure to invest sufficiently or timely in technologies for which there is market demand, would adversely affect our revenue and profitability.
- We have no guaranteed purchases and regularly have to re-win business for existing customers.
- Network equipment sales 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.
- If we are unable to adapt our business to the consumption models for networking solutions adopted by our customers and to offer attractive solutions across these consumption models, our business, competitive position and results of operations could be adversely affected.
- Our go-to-market activities and the distribution of our WaveLogic® coherent modem technology within the market for high-performance transceivers/modems could expose us to increased or new forms of competition, or adversely affect our existing systems business and results of operations.
- If we fail to predict demand accurately, we may be required to write off significant amounts of inventory as a result of our inventory purchase practices and could incur additional costs or experience manufacturing delays.
- If the market for network software does not evolve in the way we anticipate or if customers do not adopt our Blue Planet Automation Software and Services, we may not be able to monetize these software assets and realize a key part of our business strategy.
- 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.
- We may be required to write down the value of certain significant assets, which would adversely affect our operating results.
- Product performance problems and undetected errors affecting the performance, interoperability, reliability or security of our products could damage our business reputation and negatively affect our results of operations.
- Strategic acquisitions and investments could disrupt our operations and may expose us to increased costs and unexpected liabilities.

Risks Relating to the Macroeconomic Environment and our Global Presence

- 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.
- The international scale of our sales and operations exposes us to additional risk and expense that could adversely affect our results of operations.
- Efforts to increase our sales and capture market share in targeted international markets may be unsuccessful.
- We may be adversely affected by fluctuations in currency exchange rates.

Risks Related to Our Operations and Reliance on Third Parties

- We may experience delays in the development and production of our products that may negatively affect our competitive position and business.
- We rely on 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.
- Our reliance on third-party component suppliers, including sole and limited source suppliers, exposes our business to additional risk, including risk relating to our suppliers' businesses and financial position and risks arising as a result of geopolitical events, and could limit our sales, increase our costs and harm our customer relationships.
- We rely on third-party resellers and distribution partners to sell our solutions, and on third-party service partners for installation, maintenance and support functions, and our failure to develop and manage these relationships effectively could adversely affect our business, results of operations, and relationships with our customers.
- We may be exposed to unanticipated risks and additional obligations in connection with our resale of complementary products or technology of other companies.
- Growth of our business is dependent on 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.
- Restructuring activities could disrupt our business and affect our results of operations.
- If we are unable to attract and retain qualified personnel, or if our existing personnel are harmed by COVID-19, we may be unable to manage our business effectively.

Risks Related to Intellectual Property, Litigation, Regulation and Government Policy

- Our intellectual property rights may be difficult and costly to enforce.
- We may incur significant costs in response to claims by others that we infringe their intellectual property rights.
- 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.
- Data security breaches and cyber-attacks could compromise our intellectual property or other sensitive information and cause significant damage to our business and reputation.
- 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.
- Changes in trade policy, including the imposition of tariffs and efforts to withdraw from or materially modify international trade agreements, may adversely affect our business, operations and financial condition.
- Changes in government regulations affecting the communications and technology industries and the businesses of our customers could harm our prospects and operating results.
- The effects of the United Kingdom's withdrawal from membership in the European Union remain uncertain.
- Government regulations related to the environment, climate change and social initiatives could adversely affect our business and operating results.
- Changes in tax law or regulation, effective tax rates and other adverse outcomes with taxing authorities could adversely affect our results of operations.
- Failure to maintain effective internal controls over financial reporting could have a material adverse effect on our business, operating results and stock price.

Risks Related to Our Common Stock, Indebtedness and Investments

- Our stock price is volatile.
- Outstanding indebtedness under our senior secured credit facilities may adversely affect our liquidity and results of operations and could limit our business.

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

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 hardware, software and services that enable the transport, routing, 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 institutions and emerging network operators.

Our portfolio is designed to enable what we refer to as the Adaptive Network™, our vision for a network end state that emphasizes a programmable and scalable network infrastructure, software control and automation capabilities, network analytics and intelligence, and related advanced services. By transforming network infrastructures into a dynamic, programmable environment driven by automation and analytics, network operators can realize greater business agility, dynamically adapt to changing end-user service demands and rapidly introduce new revenue-generating services. They can also gain valuable real-time network insights, allowing them to optimize network operation and maximize the return on their network infrastructure investment.

Our solutions include Networking Platforms, including our Converged Packet Optical and Routing and Switching portfolios, which can be applied from the network core to end-user access points, and which allow network operators to scale capacity, increase transmission speeds, allocate traffic efficiently and adapt dynamically to changing end-user service demands. Our Converged Packet Optical portfolio includes products that support the connection of content to content, including in long haul and regional, submarine and data center interconnect networks, and users to content, including in metro and edge networks. Our Routing and Switching portfolio includes products and solutions that enable efficient internet protocol (“IP”) transport in next-generation metro edge, access and aggregation networks, connecting users to content in applications that include 5G and Internet of Things (“IoT”), mobile backhaul, optical access, virtualization and enterprise services.

To complement our Networking Platforms, we offer Platform Software, which includes a wide array of software solutions that deliver operations, administration, maintenance, and provisioning (“OAM&P”) functionality, as well as domain control, orchestration, operational support systems (“OSS”) and service assurance to achieve closed loop automation across multi-vendor and multi-domain network environments. Through our Blue Planet® Software suite, we enable customers to accelerate the digital transformation of their networks through service lifecycle automation.

In addition to our systems and software, we also offer a broad range of services that help our customers build, operate and improve their networks and associated operational environments. These include network transformation, consulting, implementation, systems integration, maintenance, network operations center (“NOC”) management, and optimization services.

Access to SEC Reports

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 are dynamic and are characterized by a high rate of change. 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. This network traffic growth is being driven by a diverse set of communications services that often require on-demand service levels by enterprise and consumer end users, as well as cloud-based services and applications:

- *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. In addition, content is increasingly moving to the edge of the network, creating new capacity and traffic demands closer to the user.

- *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.

- *Mobile Traffic and Applications.* Traffic from mobile web applications, including video, internet and data services, has expanded with the continued proliferation of smartphones and other wireless devices. Because 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 the backhaul and fronthaul portions of networks emanating from cell sites.

- *Residential Access Applications and Enterprise Applications.* In recent years we have seen a shift in bandwidth demands, traffic patterns and computing functions to the edge of networks. This trend has been meaningfully accelerated by the COVID-19 pandemic, including due to an increase in remote and hybrid working and work from home arrangements. With a higher percentage of data flows concentrating closer to the edge of the network, more capacity and higher bandwidth to home and enterprise locations is required. These shifts could be permanent, and could influence network architectures and require network operators to adapt.

Emerging technologies, services and applications are further impacting or expected to impact network infrastructures, particularly at the edge of networks, where increased computing power and automation are required to meet the quality of experience required by end users. These include:

- *5G*. Fifth-generation wireless broadband ("5G") technology is enabling meaningful increases in bandwidth and performance, and enabling emerging applications and services that 4G/LTE networks cannot support. To fully capitalize on these opportunities, network operators will need to consider the demands 5G technology will place on their wireline infrastructures, including through the addition of additional cell sites as part of the network densification efforts that are paving the way for 5G implementation.

- *Fiber Deep and Fiber-Based Access Networks*. Similar to 5G, Fiber Deep is a network densification initiative by cable and multiservice operators that seeks to push more digital fiber closer to the end user and to increase potential bandwidth, computing capability and data speeds to homes and enterprises, while at the same time decreasing power, space and operating costs. Wireline service providers are responding to similar trends by pushing fiber to the home and deeper into access networks.

- *Internet of Things*. As networked connections between devices and servers grow, machine-to-machine-related traffic ("M2M") is expected to represent an increasing portion of traffic. These connections allow sharing of data that can be monitored and analyzed, including in smart grid applications, health care and safety monitoring, resource and inventory management, home entertainment, consumer appliances, connected transportation and other M2M data applications.

- *Ultra-High Definition Video ("UHD") and Virtual Reality ("VR") and Augmented Reality ("AR").* UHD video and the advent of immersive technologies like VR, AR and 360° video are likely to place further capacity and capability demands on networks as adoption of these technologies grows. Consumer electronics industries are rapidly advancing these technologies and making them more widely available and affordable to consumers.

- *Edge Computing*. Immersive cloud services and gaming using AR and VR technologies require a low latency environment to provide the required user experience. We expect network operators to increase the number and capabilities of edge computing locations to allow these latency-sensitive workloads to be processed closer to users, which may affect network topologies and traffic patterns.

- *Machine Learning ("ML") and Artificial Intelligence ("AI")*. As broad foundational technologies that increase network intelligence and improve automation, ML and AI enable improvements in network planning, operations, user experience and trouble resolution. We believe that adoption of these technologies will continue to increase as the IoT expands and additional services are created, and therefore that ML and AI will serve as drivers of further network traffic and solutions innovation.

We believe that increased adoption of these technologies, services, and applications and their performance requirements will further increase network traffic and place additional service challenges on network infrastructures, requiring network operator investment in their metro, access and aggregation networks, as well as their core networks.

Demand for More Programmable and Automated Networks

Network operators continue to invest in the modernization of their businesses, with an objective to create a more digital experience, reduce operational costs and introduce more agility. To achieve this goal, they are adopting next generation infrastructures that combine end-to-end service automation with the deployment of highly programmable infrastructure. We expect network operators will continue to pursue strategies that emphasize one or more of the following:

- *Closed Loop Automation.* Network operators are seeking to reduce network operating costs and better leverage analytics, automation and control capabilities to automate end-to-end service creation and delivery. Closed loop automation is a continuous cycle of communications between the programmable network infrastructure and software control elements to analyze network conditions, traffic demands, and resource availability and to determine the best placement of traffic for optimal service quality and resource utilization.

- *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.

- *Network Function Virtualization ("NFV").* NFV is the separation of network services or capabilities from the physical network assets that traditionally provide these services or capabilities to end users. Network operators are increasingly using solutions like NFV, which enables network functions that traditionally would have run on specialized or dedicated hardware to be provided through software that runs on industry-standard servers and network and storage platforms, in order to reduce their dependence on single-purpose hardware and accelerate the time to market for new revenue-generating services.

We believe that adoption of these strategies, and the related evolution of core, metro and access network infrastructures, will require network operators and their network solutions vendors to increasingly look to utilize an ecosystem of both physical and virtual network resources, optimized through software. 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 networking solutions vendors.

Different Approaches to Design and Procure Network Infrastructure Solutions

Network operators are pursuing a diverse range of approaches, or "consumption models," in their design and procurement of network infrastructure solutions. In addition to purchasing fully integrated network solutions including hardware, software and services from the same vendor, new consumption models include the procurement or use of:

- a fully integrated infrastructure solution from one vendor with the separate use of a network operator's own software or that of another vendor;
- integrated photonic line systems with open interfaces from one vendor and the separate or "disaggregated" procurement of modem technology from a different vendor;
- open source software in concert with or as an alternative to integrated, proprietary third-party software solutions;
- open IP network operating systems running on off-the-shelf third-party equipment; and
- system integration services or customer self-integration to reconstitute the disaggregated components.

Some network operators, including certain of our largest customers, are also pursuing the development and 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). This commoditized hardware could be used with in-house developed data path and control software or third-party developed network operating software. Further, a number of network operators are pursuing network strategies that emphasize the deployment of smaller form factor, pluggable modem technology, typically in a switch or router platform, as an alternative to integrated optical platforms that combine purpose-built routers and optical systems.

The consumption models that ultimately emerge and their level of adoption will depend in significant part on the circumstances and strategies of certain network operators. While the adoption of these approaches has been limited to date, we expect that continued 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 a premium on a vendor’s ability to provide robust network solutions with the maximum amount of flexibility and choice.

Supply Chain Constraints

Due to increased demand across a range of industries, the global supply market for certain raw materials and components, including in particular the semiconductor components used in most of our products, has experienced significant strain in recent periods. These conditions, which became more acute during the second half of fiscal 2021, have been exacerbated in part by the COVID-19 pandemic, supply chain challenges, and the strong demand environment. These conditions are impacting a wide range of industries, and across the networking industry, participants are experiencing component shortages, longer lead times and increased cost of components. We believe these supply chain challenges and their adverse impact on our industry will persist at least through the first half of calendar 2022, and may extend into periods thereafter.

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 to meet the intense investment capacity required to keep pace with technology innovation, there has been increased acquisition activity among competing vendors of networking solutions. Acquisition activity has also focused on adding complementary technologies, or accessing adjacent network domains or markets that increase addressable markets of networking vendors. Among our customers, there have been significant horizontal and vertical consolidation activities by communications service providers and cable operators, with several such operators acquiring media and content companies. Customer consolidation can increase their 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. Further, significant consolidation among component suppliers may reduce the number of independent suppliers and could create supply challenges affecting our pricing or supply volumes. 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 our competitive landscape.

Product Development & Sustainability

In the face of growing network traffic and service expansion, network operators are looking toward network technology innovation as a means to support their business model, to prepare for a low carbon future and to meet the requirements of their stakeholders. Network operators are increasingly looking to their technology vendor partners, who form part of their value and supply chain, as a key element of their overall sustainability strategy to manage the lifecycle impact of their networks, including their related power consumption, greenhouse gas emissions and other resource and environmental impacts. For innovation leaders capable of advancing a development strategy and product roadmap that addresses the network performance and sustainability outcomes sought by network operators, a market transition to a low carbon future and the ability to offer greener technology offerings present meaningful opportunities for enhanced competitive position and business growth for vendors.

Strategy

Our strategy is to leverage our technology leadership, diversification and global scale to drive the profitable growth of our business. Key elements of this strategy include:

Extend Innovation Leadership in Core and Optical Networking. We are focused on using our significant research and development investment capacity to push the pace of innovation in our markets and provide leading offerings that leverage our Adaptive Network vision to make our customers' networks more dynamic through further advances in programmable network platforms, analytics, control and automation. To strengthen our optical leadership, in fiscal 2021 we brought to market our footprint-optimized, lower power consumption WaveLogic 5 Nano ("WL5n") 100G-400G coherent pluggable transceivers to address next-generation access, metro, regional and data center interconnect network applications. We also introduced innovative intelligent photonics platforms in our 6500 RLS and ELS and are advancing our Converged Packet Optical portfolio for applications in data center interconnection, submarine networks and edge networks. To support our enhanced portfolio and solutions offerings, we intend to grow our attached services business and leverage network transformation with a broader service offering that includes network migration, optimization and multi-vendor network integration.

Invest in Next Generation Metro and Edge Networking Solutions. To expand our addressable markets and capture additional opportunities in metro and edge applications we are making significant investments in our Routing and Switching solutions. We are leveraging our optical expertise to offer new architectural approaches to address Metro and Edge network use cases. Among other things, we are developing Routing and Switching solutions with enhanced IP/Ethernet capabilities, including packet routing, aggregation and switching, 5G cross-haul, Fiber Deep, fiber-based passive optical network ("PON") access, and edge computing. To advance our strategy, and pursue the opportunity for our Routing and Switching solutions to transform the network edge, including 5G networks and cloud environments, in the first quarter of fiscal 2022, we acquired from AT&T its Vyatta virtual routing and switching technology.

Embrace Multiple Consumption Models and Promote Choice. As network operators pursue diverging consumption models, we intend to offer a range of networking solutions across those models to drive the evolution of next-generation network infrastructures and to promote choice in our markets. We are making our technology available in both integrated systems and pluggable form factors that together address a range of technical and economic requirements of network operators pursuing differing consumption models. Specifically, we are pursuing these two distinct product development paths for our next-generation coherent optical chipset to enable this range of solutions, and, in fiscal 2021 we introduced our WL5n 100G-400G coherent pluggable transceivers for next-generation access, metro, regional and data center interconnect network applications. Separately, through our Optical Microsystems business we are pursuing sales opportunities that leverage our WaveLogic technology in the form of high-performance transceivers/modems – the combination of a Ciena-designed optical chipset and application-specific integrated circuit (ASIC) with other key optical components and sold independently of integrated systems. Consistent with industry practice, we sell our transceiver/modem technology in the form of an optical module or pluggable to a variety of market participants, including other original equipment manufacturers with whom we compete. By addressing multiple consumption models, we seek to secure a larger portion of the world's optical network wavelengths, expand our addressable market and access new customer verticals and applications. We expect this may require us to continue to broaden our existing product offering beyond traditional hardware systems and to expand our commercial models over time.

Promote Enhanced Software Automation. We seek to improve network layer automation and programmability by advancing our microservices-based domain controller Manage, Control and Plan ("MCP") software. We are also focused on gaining adoption and expanding application for our Adaptive IP software, leveraging our Service-Aware Operating System ("SAOS") embedded in our Routing and Switching products. We also seek to promote broader adoption of our Blue Planet Automation Software, highlighting its ability to transform network operations and management and reduce the need for manual intervention in key operational processes. In so doing, we believe that Blue Planet can help customers with their digital transformations by transitioning legacy networks into "service ready" networks, accelerating the creation, delivery and lifecycle management of new services. To expand our addressable market, we are pursuing opportunities for our Blue Planet Automation Software platform in enterprise-related applications. We are also investing in Blue Planet-related services and seek to use insights from common business, operational and networking challenges to position our Blue Planet solutions as the means by which to achieve the digital network transformation sought by our customers. A key part of our strategy is to grow our software business as a portion of our total business through expanded customer adoption and broader applications, and to gain adoption of recurring and subscription-based models.

Focus Diversification on High-Growth Applications and Customer Segments. We believe that the 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. A key part of our strategy is to continue to diversify our solutions offerings, customer base and geographic reach to address fast-growing applications and markets, including those that are adjacent to or complementary with our current addressable market. Our go-to-market strategy seeks to capture additional market share with existing customers and emerging network operators, and to displace competitors, particularly in international markets.

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 include regional, metro, national and international wireline and wireless carriers, and access network providers.

- *Web-scale Providers.* Our "Web-scale" provider customers – also often referred to in the market as hyper-scale providers – include internet content providers and providers of internet services and infrastructure, including data centers, cloud networking, storage infrastructure and web hosting services. These providers are focused on applications such as search, social media, video, real-time communications and cloud-based service offerings, as well as other emerging network services. As significant purchasers of capacity on submarine networks and from communications service providers on a global basis, these customers can also influence networking solution alternatives by those network operators.

- *Cable and Multiservice Operators (MSO).* Our customers include regional, metro, 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, healthcare, transportation, utilities, energy and retail industries.

- *Government, Research and Education.* Our government customers include federal and state agencies in the United States as well as international governmental entities. Our research and education customers include research and education institutions around the world, as well as communities or consortia, including leaders in research, academia, industry and government.

Products and Services

Our products and services include the solutions described below within our Networking Platforms, Platform Software and Services, Blue Planet Automation Software and Services, and Global Services operating segments. We also offer solutions that bring together multiple products and services from across our operating segments and portfolios to address key customer use cases and infrastructure needs with an aim to enable our customers to evolve their existing network environments.

Networking Platforms

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

Converged Packet Optical. Our Converged Packet Optical portfolio includes a range of products and solutions that use our WaveLogic coherent optical technology and our intelligent photonics solutions and are optimized for the convergence of coherent optical transport, open optical networking, Optical Transport Network ("OTN") switching and IP routing and 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 100G to 800G, along with a flexible photonic layer and 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 access and metropolitan networks, regional and core networks, and submarine cable and satellite communications landing sites.

Our Waveserver® family of products consists of compact 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 purpose-built to address disaggregated transponder, data center and general space-constrained applications using a small footprint and low power design. With its modern software architecture, open APIs, and common data models, Waveserver is easy to operate and integrate into existing networks and facilitates deployment of on-demand cloud and high-capacity connectivity services.

Our 6500 Reconfigurable Line System (RLS) is a compact, simple-to-deploy, disaggregated intelligent photonic layer line system that improves scalability, reduces footprint, and offers more flexibility and programmability. Its applications include long-haul and metro data center interconnection and general network modernization and simplification. It offers double fiber capacity through automated C- and L-band deployments and provides highly dense remote optical add/drop multiplexing and switching features that enable network operators to react to unpredictable traffic requirements by scaling connectivity and capacity.

Our 5400 family of Packet-Optical Platforms consist of multi-terabit reconfigurable switching systems that consolidate the functionality of an add/drop multiplexer and a 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. These products provide for optical transport, traffic aggregation at the network edge and switching that are optimized for handoff at the network core.

Our coherent-optimized edge line system, Coherent ELS, is a high-capacity disaggregated line system that is designed to address next-generation access photonic line system requirements, including the transport of coherent wavelengths originating from pluggables, through a compact, hardened form factor designed to accommodate outside plant deployments. With a focus on reducing operational complexity, our Coherent ELS open line system (OLS) uses integrated intelligence and automation to simplify and scale deployments.

As discussed above, in fiscal 2021 we brought to market our footprint-optimized WL5n 100G-400G coherent pluggable transceivers to address next-generation access, metro, regional and data center interconnect network applications. However, our entrance into the market for high-performance coherent transceiver module and pluggable opportunities remains in the early stages, and revenue has not been significant to date. Sales of our Optical Microsystems products are reflected within the Converged Packet Optical product line of our Networking Platforms segment.

Routing and Switching. Effective as of the beginning of fiscal 2021, we renamed our "Packet Networking" product line "Routing and Switching." Our Routing and Switching portfolio includes products and solutions that enable next-generation metro, access and aggregation or "edge" networks, including solutions that allow customers to simplify their network designs while delivering new, revenue-generating services. These products route, aggregate and switch packet-based traffic to support such applications as IP services, Ethernet business services, cell site routing, mobile cross-haul, converged haul and services, Fiber Deep, and consumer/residential access, as well as ongoing network infrastructure scaling. Our Routing and Switching products are based on our Adaptive IP approach, which delivers end-to-end IP-based services in an automated and more simplified manner than traditional IP network designs. Our Routing and Switching products enable operators to achieve improved network cost effectiveness, including reduced costs associated with power and space, as compared to more complex, traditional IP routing.

Our 3900 family of Service Delivery Platforms and our 5000 family of Service Aggregation Platforms support network access and aggregation, respectively, and have been principally deployed to support IP and Ethernet business services and wireless front haul, backhaul and mid-backhaul applications. Our 3900 family of platforms are purpose-built to fit small to large customer sites as well as multi-tenant office and residential buildings and edge office or outside plant applications. They also allow customers to migrate toward software-based networking and services based on NFV. Our 5000 family provides aggregation to fill higher capacity links within both the metro access and aggregation tiers of networks, allowing operators to reduce the number of router assets required in the core and to better implement edge cloud architectures.

Our 6500 Packet Transport System ("PTS") combines packet switching, control plane operation and integrated optics. Together with our 3900 platforms, PTS enables our service provider customers to migrate their legacy TDM (SONET/SDH/PDH) services to a scalable, lower operational cost packet solution.

Our 8100 Coherent IP networking platforms combine high capacity IP routing and switching with high capacity coherent optical transport technologies for next-generation metro and edge applications.

Our Routing and Switching 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.

Employed within our Routing and Switching platforms is our SAOS, which provides the software-based IP capabilities to support 5G, IP VPN services, access, PON, converged interconnect network (CIN) architectures, coherent optical transport, and NFV.

Our Routing and Switching portfolio will also include the Vyatta virtual routing and switching technology that we acquired from AT&T in the first quarter of fiscal 2022.

Platform Software and Services

Our software offerings also include our Platform Software, which provides domain control management, analytics, data and planning tools to assist customers in managing our Networking Platforms products in their networks, including by creating more efficient operations and more proactive visibility into their networks. Our Platform Software includes:

- *Manage, Control and Plan*. MCP software provides intelligent network control of our routing, switching and optical solutions, enabling simplification, acceleration and automation of multi-layer network operations. Our suite of MCP applications integrate software control and analytics applications in a unified interface which provides network performance data. Our MCP domain controller provides fault, configuration, accounting, performance and security ("FCAPS") management for multi-layer networks, in combination with services management and online network planning. MCP simplifies multi-layer lifecycle operations – including equipment commissioning, service provisioning, service assurance and performance monitoring. MCP provides this functionality for Ciena-developed products as well as a number of products developed by other vendors where they form a unified solution. Through our suite of MCP applications and open APIs, MCP software can integrate into network operators' Operational Support Systems ("OSS") and business processes, supporting our customers' journey towards automation of end-to-end operational workflows.

- *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.

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

Blue Planet Automation Software and Services

Our Blue Planet Automation Software is a comprehensive, cloud native, and standards-based software portfolio that enables customers to realize digital transformation through the automation of the services lifecycle. Our Blue Planet applications are open and modular, and can be deployed either individually or in any combination. These applications 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 end-to-end services in this environment. Blue Planet enables service orchestration across multiple physical and virtual network domains, multiple layers (Optical, Ethernet, IP and Mobile) and multiple hardware and software vendors.

- *Inventory ("BPI").* By integrating or "federating" data from multiple inventory systems and presenting it in a single dynamic view, BPI allows real-time visibility into the topology and status of network and service resources from end to end. Integrating with legacy operation support systems (“OSS”), BPI helps network providers simplify key operational processes such as service fulfillment, network planning and service assurance.

- *Route Optimization and Analysis (“ROA”).* ROA combines routing, traffic and performance analytics for real-time monitoring of IP services across the cloud. These capabilities enable troubleshooting of latent or transient network problems and modeling to predict the impact of network infrastructure, service and workload changes to build more resilient networks.

- *NFV Orchestration (“NFVO”)*. Blue Planet provides NFV management and orchestration capabilities for creating 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 customers.

- *Unified Assurance & Analytics (“UAA”).* UAA leverages multi-layer/multi-domain assurance and AI-powered analytics to provide insights into the health and performance of network resources and services, ensuring an end-customer quality of experience and availability to meet dynamic service demands.

- *Blue Planet Services*. To complement our software portfolio, we offer a range of related services that include professional services for solution customization and OSS integration, software and solution support services, consulting and design, 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 Blue Planet Automation Software portfolio when used together allows operators to fulfill services rapidly and to meet end-customer quality-of-experience expectations via an entire services lifecycle approach, thus accelerating network operators towards their vision of self-healing and self-optimizing closed loop automation. Our entrance into the market relating to these software automation capabilities remains in the early stages and, as such, revenue from our Blue Planet Automation Software and Services segment continues to represent a relatively small portion of our total revenue.

Global Services

To complement our Networking Platforms portfolio, we offer a broad suite of value-added services that help our customers to build, operate and improve their networks. We believe that our services offerings and our close collaboration with our customers provide us with valuable insight into the network and business challenges they face, allowing us to provide services to meet their desired business outcomes. We have completed a multi-year transformation process to enhance our service delivery capabilities, reorganizing our resources into regional service delivery and customer success functions to better serve our customers, and streamlining our services cost structure. At the same time, we have broadened our services portfolio to include additional advanced services, including network migration and transformation, optimization, and multi-vendor service capabilities. Through these transformation initiatives, we believe that we can improve the cost model of our services offerings and drive greater business value for our customers.

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

- *Build.* Consulting and network design services to enhance network performance or migrate to next-generation infrastructures, implementation services to facilitate proper planning and design, installation and deployment services, and systems integration services to integrate third-party solutions;

- *Operate.* Maintenance services that provide end-to-end support for network hardware and software, and managed services to provide management of network infrastructure operations; and

- *Improve.* Optimization services designed to ensure that networks are running at peak performance, and training services designed to enable customers to better understand and operate their networks.

These services are delivered using a combination of our internal services resources, technical support engineers, and qualified and authorized third-party service partners.

Product Development

To remain competitive, we must continually invest in and enhance our solutions offerings, addressing new market opportunities, adding new features and functionality and ensuring alignment with market demand. Our product development efforts seek to design and bring to market solutions that leverage our Adaptive Network vision to make our customers' networks more adaptive through further advances in programmable systems and software, analytics, and control and automation. Through our development efforts, we seek to support network operators as they pursue new business models and sources of revenue from their network infrastructure, and to achieve improved economics and return on their network infrastructure investment. We seek to develop products aimed at optimizing price for performance, power consumption, space requirements, service enablement, lifecycle operating costs and the environmental impact of their network operations. 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 on:

- Reinforcing our coherent optical leadership with continued development that advances reach, transmission speed and spectral efficiency, including by leading in intelligent photonics;
- Executing on parallel innovation paths for our next generation modem technology, including expanding our WaveLogic 5 Nano offerings;
- Delivering on the Adaptive IP approach and extending the IP/routing capabilities and use cases of our Routing and Switching solutions to support mobile network cross-haul, edge cloud, and network densification and virtualization initiatives, such as 5G, Fiber Deep and residential access;
- Pursuing development to address different consumption models, including our module, pluggable, component, disaggregated IP NOS and VNF development initiatives;
- Enhancing our Adaptive Network vision through advances in hardware programmability and software-based domain control, automation and analytics through MCP and purpose-built applications; and
- Advancing our software-led transformation strategy and product development for our Blue Planet Automation Software to enable generation OSS transformation and closed loop automation.

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 solutions offerings and prospective development of new components, features or products in order 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.

Customer Engagement

Our Global Customer Engagement organization includes a direct sales presence that is organized geographically around the following markets: (i) the United States, Canada, the Caribbean and Latin America ("Americas"); (ii) Europe, Middle East and Africa ("EMEA"); and (iii) Asia Pacific, Japan and India ("APAC"). Within each geographic area, we maintain specific teams or personnel that focus on a particular region, country, customer or market vertical, or portfolio. These teams include sales management, account salespersons and sales engineers, as well as partner resources, field marketing, services professionals and commercial management personnel, who ensure that we maintain a high-touch, consultative relationship with our customers.

We also maintain a global partner program that includes distributors, 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. We believe there are 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. For third parties in our Ciena Partner Network, we maintain a code of conduct that is available on our website and that sets forth our expectations for the high standards of ethical and legally compliant conduct we require of them in supporting our business.

To support our global customer engagement efforts, we invest 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 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 the 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, including those 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, including political risk, changes in tax and trade policy involving such countries, and physical risk, including the impact of climate change in such geographies. We also rely upon 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. Generally, our agreements with our supply chain and contract manufacturers are frame agreements against which we place purchase orders and do not represent long-term commitments.

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.

We continue to focus on a range of initiatives that seek to optimize our operations, improve our resiliency, and drive cost reductions. We seek to balance these goals through our sourcing and supply chain strategy, outsourcing and use of lower cost geographies. Our 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.

We actively work with our third-party vendors and business partners to promote socially responsible business practices within our own business and those within our global supply chain. To that end, we have adopted the principles set forth in the Responsible Business Alliance ("RBA") Code of Conduct. The RBA Code of Conduct establishes standards that aim to ensure working conditions in the electronics industry, or industries in which electronics are a key component, and its supply chains are safe, that workers are treated with respect and dignity, and that business operations are environmentally responsible and conducted ethically. We promote these principles and require our suppliers to adhere to these same standards. We also publish a Sustainability Report, which includes more detail about our efforts to promote responsible business practices.

For a discussion of actions taken to manage through the ongoing global supply chain constraints, see "Management's Discussion and Analysis of Financial Condition and Results of Operations-- Overview - Supply Chain Constraints" in Item 7 of Part II of this report.

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.

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 solutions and aggressive selling efforts, including using significant pricing pressure to displace incumbent vendors and capture market share. Competition for sales of networking solutions, including our Networking Platforms and Platform Software and Services, 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 Ribbon Communications. We also compete with a number of companies that provide significant competition for a specific product, application, service, 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 component and module technology developed by and procured from third-party providers, including NTT Electronics ("NEL"), Marvell Technology Group (which acquired Inphi) and Cisco (which acquired Acacia Communications). We may compete with these providers, either indirectly as a result of their technology being a key enabling technology for our competitors or an alternative consumption model such as "whitebox" technology, or directly in module, pluggable and component sales opportunities.

As we promote our corporate strategy and seek increased customer adoption of our Blue Planet Automation Software, we expect to compete more directly with software vendors and traditional IT services vendors. Competitors for our Blue Planet Automation Software include Cisco, Nokia, Amdocs, Netcracker and Ericsson.

Across our markets and segments, the principal competitive factors can include, among others:

- 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;
- technology roadmap and forward innovation capacity, including the ability to invest significant sums in research and development;
- time-to-market in delivering products and features;
- company stability and financial health;
- ability to offer comprehensive networking solutions, consisting of hardware, software and services;
- 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;
- operating costs, space requirements and power consumption of network solutions;
- software and network automation capabilities;
- ability to manage challenging supply chain environments, including manufacturing and lead-time capability; and
- services and support capabilities.

As a result of the highly competitive environment in which we operate, winning new opportunities can often require that we agree to unfavorable commercial terms or pricing and other onerous contractual commitments. In so doing, our expectation is that we can recover or improve the economics of such relationships over time. However, these terms can adversely affect our results of operations in any period. 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.

Our competitive landscape has been and is likely to continue to be impacted by pending international trade and related matters, in particular between the U.S. and China. For example, in May 2019, the U.S. Department of Commerce amended the Export Administration Regulations by adding Huawei Technologies Co., Ltd. and certain affiliates to the "Entity List," resulting in significant new restrictions on export, reexport and transfer of U.S. regulated technologies and products to Huawei. In August 2020, the U.S. Department of Commerce added additional Huawei affiliates to the Entity List, confirmed the expiration of a temporary general license applicable to Huawei, and amended the foreign direct product rule under the U.S. Export Administration Regulations in a manner that significantly expanded its application to Huawei. Separately, the U.S. has taken steps to restrict federal agencies from doing business with, and U.S. wireless carriers from using federal subsidies to buy equipment from, Huawei and ZTE. The U.S. has also encouraged other governments to consider similar restrictions. These actions have resulted in escalating tensions between the United States and China and introduce a risk that the Chinese government may take additional steps to retaliate against U.S. industries or companies.

We also 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 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. 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

The success of our business and technology leadership depends significantly on 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 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, 2021, we had approximately 2,000 issued patents and more than 500 pending patent applications worldwide.

Enforcing proprietary rights, especially patents, can be costly, and we cannot be certain that the steps that we are taking will detect, prevent, or minimize the risks of 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, 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.

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. 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.

Governmental Regulations

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 (the "EU"). 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 applicable 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 require us to incur additional costs. To date, our compliance actions and costs relating to environmental regulations have not resulted in a material cost or effect on our capital expenditures, earnings or competitive position.

Our innovation efforts and our environmental sustainability initiatives are closely linked. Our product development efforts focus on allowing network operators to continually "do more with less." We promote environmental sustainability through our efforts to improve the energy efficiency per gigabit of throughput in our high-performance networking solutions, as well as our initiatives to improve power, space and cooling requirements, and to reduce the total number of network elements required to operate a network. We pursue opportunities to minimize the resource impacts in our product design and sourcing, and to assess and improve efficiencies over the life cycle of our products, including packaging and distribution, and end-of-life reuse, refurbishment, and recycling. We make CDP climate change and water disclosures and are a member of the RBA. We have adopted, and seek to ensure that our key direct suppliers adopt, the standards and principles set forth in the RBA Code of Conduct.

Other Regulations

As a company with global operations, we are subject to complex foreign and U.S. laws and regulations, including trade regulations, tariffs, import and export regulations, anti-bribery and corruption laws, antitrust or competition laws, data privacy laws, such as the EU General Data Protection Regulation (the "GDPR"), and environmental regulations, among others. We have policies and procedures in place to promote compliance with these laws and regulations. To date, our compliance actions and costs relating to these laws, rules and regulations have not resulted in a material cost or effect on our capital expenditures, earnings or competitive position. Government regulations are subject to change, and accordingly we are unable to assess the possible effect of compliance with future requirements or whether our compliance with such regulations will materially impact our business in the future. For further discussion of how government regulations may affect our business, see the related discussion in "Risk Factors – Risks Related to Intellectual Property, Litigation, Regulation and Government Policy."

People and Culture

Our technology solutions are developed, marketed, sold and supported by the talented individuals that make up our 7,241 person global workforce as of October 30, 2021, over 99% of whom were full-time employees. We have a broad base of talent in more than 35 countries, with approximately 59% in the Americas, 33% in APAC, and 8% in EMEA, the majority of whom are in engineering, operations or sales roles.

We understand that our industry and innovation leadership is ultimately rooted in people. Competition for qualified personnel in the technology space is intense, and our success depends in large part on our ability to recruit, develop and retain a productive and engaged workforce. Accordingly, investing in our employees and their wellbeing, offering competitive compensation and benefits, and adopting progressive human capital management practices constitute a core element of our corporate strategy.

Our Board of Directors oversees our corporate strategy, which includes management’s design and execution of our “people strategy.” This strategy seeks to ensure that we continue to attract and retain the talent necessary to execute on our business plans, and that we have programs, initiatives, rewards and recognition that are well aligned and support these goals. We launched our “People Promise” during fiscal 2020 and honor this promise by promoting a workplace environment where our employees are empowered, feel included and have an opportunity to make a difference through their work at Ciena. In doing so, we seek to cultivate for employees a culture of vibrancy, belonging and happiness, while enabling us to be an attractive employer of choice within our markets. Our executive team is actively involved in and sponsors key initiatives and employee resource groups intended to promote this corporate culture. To that end, our people strategy is focused on the following:

- *Promote Belonging through Diversity and Inclusion Initiatives.* We promote an inclusive and diverse workplace, where all individuals are respected and feel they belong regardless of their age, race, national origin, gender, religion, disability, sexual orientation or gender identity through recruiting outreach, internal networking and resource groups, inclusivity networks, and mentoring programs. As of October 30, 2021, our global workforce was approximately 20.6% female. Our Board of Directors is 30% female and 20% ethnically diverse. As of December 31, 2020, in the U.S., where we are headquartered, our approximately 1,700 employee workforce approximately reflected the following ethnicities: 64.6% White, 22.5% Asian, 6.0% Hispanic or Latino, 4.4% Black or African American, 2.0% two or more races (Not Hispanic or Latino), and 0.5% additional groups (including American Indian, Alaska Native, Native Hawaiian or Other Pacific Islander). We are deeply committed to increasing diversity in our workforce at all levels, and regularly monitor our recruitment process with an aim to improve the diversity of our workforce and candidate pool. Our commitment to providing an inclusive workplace is demonstrated through the introduction of our Conscious Inclusion Workshops which have had 100% participation by our executive leadership and 58% by our managers as of the end of fiscal 2021. In addition, we support multiple active internal networking and resource groups, including our Women@Ciena group, Black & African Heritage group, Pride@Ciena LGBT+ group, and our Ciena Next early in career group, and we launched our LatinX group in fiscal 2021. In fiscal 2021, we also ran an eight-month targeted development pilot with our Black & African Heritage group, aimed at strengthening individuals’ sense of belonging and enhancing communication and financial acumen. We also maintain a global Inclusivity Council, which is led by two of our executives and aims to address actions for inclusion, and we have signed The CEO Action for Diversity & Inclusion.

- *Support Employee Wellbeing and Engagement.* We prioritize supporting the overall wellbeing of our employees from a physical, mental and emotional, financial and social perspective. We also regularly seek input from employees, including through employee engagement and pulse surveys on specific issues that are intended to assess our degree of success in promoting an environment that supports our People Promise and measure our culture of compliance and employee comprehension of our business goals. Our fiscal 2021 employee engagement survey had a participation rate of approximately 75% and resulted in engagement scores across all indexes that met or exceeded industry benchmarks. Our global wellbeing program includes a long-standing practice of remote and flexible working arrangements, flexible paid time off in many of our geographies, life planning and retirement readiness programming, wellness platforms and expense reimbursement benefits, fitness challenges and rewards, 24x7 crisis support and employee assistance program, and mental health coaching.

- *Offer Competitive Compensation and Ensure Pay Equity.* We strive to ensure that our employees receive competitive, fair and transparent compensation and progressive benefits offerings. We conduct an annual pay fairness assessment of gender globally and of ethnicity in the U.S. and Canada, and take action to ensure we are paying individuals performing similar work equitably, and recently adopted analytic software to enable better global pay fairness assessments. To align performance and stockholder interest, we base our annual incentive compensation on both business and individual performance, we maintain an employee stock purchase plan and we have provided broader employee opportunities for equity compensation in recent years. We also offer competitive family leave, including global family leave to support employees throughout various life stages, carer's leave, bereavement leave, parental leave that includes a minimum of 18 weeks paid time off for new mothers (including eight weeks recovery and ten weeks bonding) and ten weeks paid time off for new fathers and adoptive parents, and financial assistance for adoptive parents. We offer meaningful retirement benefits and programming to promote retirement readiness among our employee base. In recent years, we have enhanced employer contributions to our North America retirement plans, added our first ESG fund option for employees and, as of October 30, 2021, greater than 99% of our eligible employees in the U.S. and Canada were participating in our defined contribution retirement plans.

- *Provide Programs for Employee Recognition.* We also offer rewards and recognition programs to our employees, including awards to recognize employees who best exemplify our core values, "applause" and spot awards to recognize employee contributions, patent incentive and distinguished engineer awards, and awards recognizing employees who exemplify our commitment to our communities and volunteerism. We believe that providing these recognition programs helps drive strong employee performance.

- *Create Opportunities for Growth and Development.* As of October 30, 2021, approximately 19% of our employees are "early in career," or age 30 and under, 53% are "mid-career," or age 31 to 50, and 28% are "late in career," or age 51 and over. We focus on creating opportunities for employee growth, development, training and education at all career stages, including opportunities to cultivate talent and identify candidates for new roles from within the company, early in career and new graduate networking and development programs, management and leadership development programs, mentoring programs, and support for continuing education through tuition reimbursement. We also operate a leadership succession planning process that aims to develop and retain key talent and ensure business continuity for key roles.

- *Promote Community Outreach and Support.* We believe it is important to give back and promote community outreach and support through corporate giving, charitable matching, and employee volunteerism in the communities in which we live and work. Through our "Ciena Cares" community program, we provide corporate matching of employee charitable donations, flexible volunteering during work time, and corporate rewards for service hours that can be donated by employees. In fiscal 2020, we launched our digital inclusion initiative, which aims to mobilize our global workforce, leverage our innovation leadership, and collaborate with customers, suppliers and other partners to bridge the digital divide. Through this initiative, we have funded programming to support underserved students in our global communities by emphasizing digital inclusion and equity through greater connectivity, access to enabling technologies and digital skills development. We have also partnered with Tree-Nation by planting a tree for each existing and new employee at Ciena.

- *Promote a Strong Ethical Business Culture.* We believe that commitments to good corporate governance and the highest ethical standards are essential to our long-term success, and are dedicated to instilling in our employees a commitment to integrity and business ethics. We maintain a Code of Business Conduct and Ethics that sets standards of conduct for Ciena's directors, officers and employees. All employees are required to complete training on our Code of Business Conduct and Ethics, and we conduct recurring employee affirmations with respect to our Code of Business Conduct and Ethics and periodic training and communication related to specific topics contained therein. In addition, we maintain a Corporate Compliance Committee that promotes integrity and compliance leadership throughout Ciena, and in 2020 we created and resourced a new dedicated function focused exclusively on Compliance and Ethics. We also maintain several easily accessible internal and external methods by which our employees, business partners, and investors can report concerns relating to the ethical operation of our business, including anonymously where permitted. We conduct surveys of all employees on our compliance program and culture of integrity in order to assess and strengthen our culture and practices and received feedback from approximately 75% of our employees in fiscal 2021.

Response to the COVID-19 Pandemic. In response to the COVID-19 pandemic, we have prioritized the safety of our employees and business partners, while continuing to support the needs of our customers and communities during this unprecedented period.

- *Employees.* As of the end of fiscal 2021, most of our offices remain closed with limited exceptions or for certain geographies where conditions and local regulations permit, or for a small number of employees in certain key roles. We have adopted a comprehensive set of global site reopening guidelines, which specify the requirements for and limited circumstances under which we will consider reopening one or more of our offices during the ongoing pandemic. Since the onset of the pandemic, most of our employees have worked from home on a regular basis, using digital platforms and virtual collaboration tools to maintain productivity and to remain in contact with one another and our business partners. To support and protect our employees, we have also: instituted travel bans and restrictions and taken meaningful precautions in accordance with relevant guidelines to protect the health and safety of the small number of employees who need to be in offices, laboratory environments or at customer or partner sites to perform their roles. We have adopted new employee benefits and wellbeing initiatives, including physical, emotional, mental, and social programming, global pandemic leave, and work from home reimbursement benefits. We have also hosted regular mental wellbeing sessions, internal communication and morale initiatives, and launched new wellbeing platforms that focus on the mental and emotional health needs of our employees during this time.

- *Community*. In an unprecedented time, we and our global workforce have focused on service and compassion. We have undertaken a range of volunteering and charitable actions to support our neighbors and communities. Among other things, during fiscal 2021 we adopted an enterprise-level goal for our employees to volunteer and provide service to their communities. We have also created and advanced a new community initiative focused on promoting digital inclusion, providing greater opportunities for underserved students through improved access, technology and digital skills, and have undertaken joint community projects with business partners as part of this program.

Information About Our 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.	78	Executive Chairman of the Board of Directors
Gary B. Smith	61	President, Chief Executive Officer and Director
Stephen B. Alexander	62	Senior Vice President and Chief Technology Officer
Rick L. Hamilton	50	Senior Vice President, Blue Planet Software
Scott A. McFeely	58	Senior Vice President, Global Products and Services
James E. Moylan, Jr.	70	Senior Vice President and Chief Financial Officer
Andrew C. Petrik	58	Vice President and Controller
Jason M. Phipps	49	Senior Vice President, Global Customer Engagement
David M. Rothenstein	53	Senior Vice President, General Counsel and Secretary
Mary Yang	53	Senior Vice President and Chief Strategy Officer
Hassan M. Ahmed, Ph.D. (1)(3)	63	Director
Bruce L. Claflin (1)(2)	70	Director
Lawton W. Fitt (2)	68	Director
Patrick T. Gallagher (1)(3)	66	Director
Devinder Kumar (2)	66	Director
T. Michael Nevens (2)	72	Director
Judith M. O'Brien (1)(3)	71	Director
Joanne B. Olsen (1)(3)	63	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, Mr. Kumar and Dr. Nettles in 2022; Ms. O'Brien, Ms. Olsen and Mr. Smith in 2023; and Dr. Ahmed, Mr. Claflin, Mr. Gallagher and Mr. Nevens in 2024.

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. Dr. Nettles previously served on the boards of directors of Axcelis Technologies, Inc., where he was independent chairman of the board, The Progressive Corporation, where he was chair of the audit committee, Apptrigger, Inc., which was formerly known as Carrius Technologies, Inc., and Optiwind Corp, and previously served as a Trustee for the Georgia Tech Foundation, Inc.

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 previously served on the boards of directors of CommVault Systems, Inc.

and 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.

Rick L. Hamilton joined Ciena in October 2016 and has served as Senior Vice President, Blue Planet Software 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 Routing and Switching 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 and became an executive officer in February 2017. 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. joined Ciena in 2007 and 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 Customer Engagement (formerly titled 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.

Mary Yang joined Ciena in April 2020 as Senior Vice President and Chief Strategy Officer. Prior to joining Ciena, she served as Vice President of Corporate and Business Development at NIO from 2016 to 2020. From 2014 to 2016, she served as Vice President of Corporate Development and Strategic Alliances at Fortinet.

Hassan M. Ahmed, Ph.D. has served as a Director of Ciena since June 2020. Dr. Ahmed most recently served as Chairman of the Board and Chief Executive Officer of Affirmed Networks, which was acquired by Microsoft in April 2020. Before founding Affirmed Networks in 2010, he was a senior advisor at Charles River Ventures. From 1998 to 2008, Dr. Ahmed served as Chairman and Chief Executive Officer of Sonus Networks. Prior to that time, he served in various executive roles at Ascend Communications, Cascade Communications and Analog Devices. He also served as President and founder of WaveAccess, and founded and served as director of the VLSI Systems Group of Motorola Codex. Dr. Ahmed previously served as Associate Professor of Electrical, Computer and Systems Engineering and Associate Professor of Finance at Boston University. Dr. Ahmed currently serves on the boards of directors of KINS Technology and Founders SPAC, both publicly traded companies, and Vesper Technologies, Inc., Oxefit, Inc., Avesha Networks, and Sway AI, all private companies.

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., a publicly traded company, where he is the Chairman of the Nominating and Governance Committee. Mr. Claflin previously served on the board of directors of Advanced Micro Devices, Inc. ("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 Inc., The Progressive Corporation, where she serves as Chairperson of the Board, and Micro Focus International PLC, all publicly traded companies. Ms. Fitt also serves as a director or trustee of several non-profit organizations. Ms. Fitt previously served on the boards of directors of ARM Holdings PLC and Thomson Reuters Corporation.

Patrick T. Gallagher has served as a Director of Ciena since May 2009. Since October 2007, Mr. Gallagher has served as Chairman of Harmonic Inc., a publicly traded company and global provider of high-performance video solutions to the broadcast, cable, telecommunications and managed service provider sectors. Mr. Gallagher has served as Chairman of privately held Intercloud SAS, a Paris-headquartered provider of global private cloud connectivity services, since July 2015, and as Chairman of privately held Mirabeau SAS, a French wine producer, since August 2019. 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 also previously served on the board of directors of Sollers JSC.

Devinder Kumar has served as a Director of Ciena since August 2019. Mr. Kumar currently serves as Executive Vice President, Chief Financial Officer and Treasurer of AMD, a publicly traded company, in which capacity he is responsible for their global finance organization as well as global corporate services and facilities. He was appointed Chief Financial Officer in January 2013 and Treasurer in April 2015. Since he joined AMD in 1984, Mr. Kumar has progressed through several leadership positions in corporate accounting and corporate finance, including serving as interim CFO, corporate controller and assistant treasurer. He also spent 10 years in Asia as financial controller for AMD Penang and group finance director for AMD's Manufacturing Services Group across Singapore, Thailand, China and Malaysia.

T. Michael Nevens has served as a Director of Ciena since February 2014. Since 2006, Mr. Nevens has served as senior adviser to Permira Advisers, LLC, an international private equity fund. From 1980 to 2002, Mr. Nevens held various leadership positions at McKinsey & Co., most recently as a director (senior partner) and as managing partner of the firm's Global Technology Practice. He also served on the board of the McKinsey Global Institute, which conducts research on economic and policy issues. Mr. Nevens has been an adjunct professor of Corporate Governance and Strategy at the Mendoza College of Business at the University of Notre Dame. Mr. Nevens also serves as the Chairman of the board of directors of NetApp, Inc., a publicly traded company, and on the board of directors of TalonX, a private company. 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. From November 2012 until her retirement in December 2019, Ms. O'Brien served as a partner and head or co-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 Theatro Labs, Inc., MagicCube, Inc., and LightDeck Diagnostics, Inc. Ms. O'Brien also previously served on the boards of directors of Adaptec, Inc. and Inform, 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 boards of directors of Teradata Corporation and Keysight Technologies, Inc., both publicly traded companies.

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.

Risks Related to Our Business and Industry

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 during 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 any 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 network deployment plans by customers, particularly with respect to our service provider and Web-scale provider customers;
- order timing and volume, including book to revenue orders;
- shipment and delivery timing;
- backlog levels;
- the level of competition and pricing pressure in our industry;
- the pace and impact of price erosion that we regularly encounter in our markets;
- 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;
- our incurrence of start-up costs, including lower margin phases of projects required to support initial deployments, gain new customers or enter new markets;
- our level of success in accessing new markets and obtaining new customers;
- long- and short-term changing behaviors or customer needs that impact demand for our products and services or the products and services of our customers;
- technology-based price compression and our introduction of new platforms with improved price for performance;
- changing market, economic and political conditions, including the impact of tariffs and other trade restrictions or efforts to withdraw from or materially modify international trade agreements;
- factors beyond our control such as natural disasters, climate change, acts of war or terrorism, and public health emergencies, including the COVID-19 pandemic;
- the financial stability of our customers and suppliers;
- consolidation activity among our customers, suppliers and competitors;
- 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.

Challenges relating to current supply chain constraints, including semiconductor components, could adversely impact our growth, gross margins and financial results.

Due to increased demand across a range of industries, the global supply chain for certain raw materials and components, including the semiconductor components used in most of our products, has experienced significant strain in recent periods. The COVID-19 pandemic has also contributed to and exacerbated this strain. This constrained supply environment has adversely affected, and could further affect, availability, lead times and cost of components. These conditions have impacted lead times for our products, and could impact our ability to meet customer demand where we cannot timely secure supply of these components. In an effort to mitigate these risks, in some cases, we have incurred higher costs to secure available inventory, or have extended or placed non-cancellable purchase commitments with semiconductor suppliers, which introduces inventory risk if our forecasts and assumptions prove inaccurate. We have also multi-sourced and pre-ordered components and finished goods inventory in some cases in an effort to reduce the impact of the adverse supply chain conditions we have experienced. Despite our attempts to mitigate the impact on our business, these constrained supply conditions are expected to adversely impact our costs of goods sold, including our ability to continue to reduce the cost to produce our products in a manner consistent with prior periods. In addition, some suppliers have indicated that as a result of current shortages they intend to cease manufacture of certain components used in our products. Limits on manufacturing availability or capacity or delays in production or delivery of components or raw materials due to COVID-related restrictions could further delay or inhibit our ability to obtain supply of components and produce finished goods. There can be no assurance that the impacts of the pandemic on the supply chain will not continue, or worsen, in the future. These supply chain constraints and their related challenges could result in shortages, increased material costs or use of cash, engineering design changes, and delays in new product introductions, each of which could adversely impact our growth, gross margin, and financial results.

A small number of customers account for a significant portion of our revenue. The loss 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 55.5% of our revenue for fiscal 2021 and 54.5% of our fiscal 2020 revenue. Historically, our largest customers by revenue principally consisted of large communications service providers. For example, AT&T accounted for approximately 12.4% of our revenue for fiscal 2021 and 10.6% of our revenue for fiscal 2020. As a result of efforts in recent years to diversify our business, the customer segments and geographies that comprise our customer base and top customers by revenue have changed. During fiscal 2021, four Web-scale providers were among our top ten customers. Web-scale customers have been important contributors to our revenue through both our direct sales to them, including for data center interconnection, and their indirect impact on purchases by other network operators. Consequently, our financial results and our ability to grow our business are closely correlated with the spending of a relatively small number of customers. Our business and results of operations could be materially adversely impacted by the loss of a large customer within or outside of these customer segments as well as by reductions in spending or capital expenditure budgets, changes in network deployment plans or changes in consumption models for acquiring networking solutions by our largest customers.

There have been significant horizontal and vertical consolidation activities by communications service providers and cable operators, with several such operators acquiring media and content companies.

Customer consolidation can increase customer 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.

Because of our concentration of revenue with communications service providers and Web-scale providers, our business and results of operations can be significantly affected by market, industry or competitive dynamics adversely affecting these customer segments. For example, communications service providers 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 in the past had an adverse effect on network spending levels by certain of our largest service provider customers. Several of these, including AT&T, have announced various initiatives that seek to modify how they purchase networking infrastructure or reduce capital expenditures on network infrastructure in future periods that may adversely affect our results of operations. Our business and results of operations could be materially adversely affected by these factors and other market, industry or competitive dynamics adversely impacting our 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. Our industry has historically been dominated by a small number of very large vendors, some of which have substantially greater financial, marketing and research and development 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, which may provide them with a competitive advantage.

Certain of our 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, 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 these customers. We also compete with a number of smaller companies that provide significant competition for specific products, applications, customer segments or geographic markets. 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 customer business needs and drive successful outcomes;
- functionality, speed, capacity, scalability, performance, quality and reliability 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 and ability to deliver on network innovation;
- 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 emerging customer consumption models for network solutions;
- operating costs, space requirements and power consumption of network solutions;
- software and network automation and analytics capabilities;
- manufacturing and lead-time capability; and
- 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 we invest in complementary technologies or adjacent market opportunities, and 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 and Services, and as network operator demands for programmability, automation and analytics increase, we expect to compete more directly with software vendors and IT 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. An increase in competitive intensity, the adoption of new consumption models, our entry into new markets or the entry of new competitors into our markets may adversely impact our business and results of operations.

The COVID-19 pandemic has impacted our business and results of operation and could have a material adverse effect on our business, results of operations and financial condition in the future.

The COVID-19 pandemic and related countermeasures have caused economic and financial disruptions in most of the regions in which we sell our products and services and conduct our business operations. Unprecedented actions have been taken by governments and other institutions globally to try to contain the COVID-19 pandemic, such as travel bans and restrictions, business closures, social distancing measures, quarantines and shelter-in-place orders. In fiscal 2021, the COVID-19 pandemic continued to challenge our business operations and adversely impact our financial results, including due to restrictions on travel and gatherings, significant supply chain disruptions, disruption in our ability to provide services to customers, and a dynamic demand environment for our products and services. Different jurisdictions have imposed or retained varying restrictions and achieved varying success at managing the impact of the pandemic. In addition, many jurisdictions have experienced resurgences in COVID-19 cases and have halted or reversed the loosening of restrictions in response. For example, an outbreak of COVID-19 in India beginning in March 2021 led to increase employee absenteeism and resulting government restrictions limited in certain cases the movement of our employees. The magnitude and duration of disruption from the COVID-19 pandemic, and its impact on global business activity and our business and operations, remain uncertain. If the COVID-19 pandemic or its adverse effects become more severe or prevalent or are prolonged in the locations where we, our customers, suppliers or manufacturers conduct business, or we experience more pronounced disruptions in our business or operations, or in economic activity and demand for our products and services generally, our business and results of operations in future periods could be materially adversely affected.

Employees

As a result of the COVID-19 pandemic, we have kept most of our offices globally temporarily closed, implemented travel restrictions and withdrawn from certain industry events. Restrictions on travel and gatherings due to COVID-19 have impacted, and are likely to continue to impact, our interaction with customers, the timing of certain field and lab trials, our ability to carry out certain sales and marketing activities, as well as our ability to secure new customers, to qualify and sell new products, and to grow sales with customers where we do not have longer-standing supply relationships, including within our Blue Planet Automation Software and Services segment and our Routing and Switching product line. In addition, government requirements intended to mitigate the impact of the pandemic, including mandates that require employees to be vaccinated or be tested regularly, may lead to increased attrition, challenges in meeting labor needs, inefficiencies related to employee turnover, and costs associated with implementation and ongoing compliance.

Services and Customer Fulfillment

We have experienced some disruption in our ability to provide installation, professional and fulfillment services to customers during the COVID-19 pandemic. These disruptions have resulted from site access limitations, limited customer availability, project delays or re-prioritization by customers, travel bans and restrictions on movement or gatherings. We have also experienced transportation disruptions, such as reduced availability of air transport, port closures, and increased border controls or closures. These conditions have also made it more challenging to execute and adversely impacted the timing of customer plans to operationalize newer projects and recent customer design wins, primarily in international markets. Our customers have also experienced, and may continue to experience, disruptions in their operations, which can result in delayed, reduced, or canceled orders, and increased collection risks, and which may adversely affect our results of operations.

Demand for Products and Services

The demand environment for our products and services remains dynamic and continues to be impacted by the effects of the COVID-19 pandemic. For example, we experienced a constrained spending environment during the second half of fiscal 2020 and the first quarter of fiscal 2021 that adversely impacted our revenue during that period. During the remainder of fiscal 2021, we experienced significantly stronger order volumes for our products and services, particularly among a concentrated set of larger customers with which we have existing positions as a supplier. We believe some portion of these orders reflects certain short-term customer purchasing behaviors, including network operators addressing capacity and network requirements following a period of constrained spending in previous quarters, and possible acceleration of future orders due to the implementation of security of supply strategies amidst global supply constraints for semiconductor components. As our customers and their customers continue to evaluate the ways in which networks and working environments will change even after the pandemic subsides, there may be long-lasting changes in customer behaviors and needs, including the end users of our customers, which may impact the demand for our products and services in the long-term.

See also the risk factor above entitled "*Challenges relating to current supply chain constraints, including semiconductor components, could adversely impact our growth, gross margins and financial results.*"

Investment of research and development resources in communications networking technologies for which there is not an adequate market demand, or failure to invest sufficiently or timely 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. Accordingly, there is no guarantee that our new products or enhancements to other solutions will achieve market acceptance or that the timing of market adoption will be as predicted. As a result of the COVID-19 pandemic, technology preferences, customer demand and the markets for our solutions may move in directions that we had not anticipated. As a general matter, there is a significant possibility that some of our development decisions, including significant expenditures on acquisitions, research and development, or investments in technologies, will not meet our expectations, and that our investment in some projects will be unprofitable. There is also a possibility that we may miss a market opportunity because we failed to invest or invested too late in a technology, product or enhancement sought by our customers or the markets into which we sell. 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. In addition, failure to develop, on a cost-effective basis, innovative new or enhanced solutions that are attractive to customers and profitable to us could have a material adverse effect on our business, results of operations, financial condition and cash flows.

We have no guaranteed purchases and regularly have to re-win business for existing customers.

Generally, our customer contracts do not require customers to purchase any minimum or guaranteed volumes, and we conduct sales through framework contracts under which customers place purchase orders for which they often have the right to modify or cancel. We must regularly compete for and win business with existing customers across all of our customer segments. In addition, Web-scale providers tend to operate on shorter procurement cycles than some of 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.

Network equipment sales 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 efforts, 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 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 time before deployment can vary depending on 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, 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. Alternatively, customers may insist on 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 and gross margin.

If we are unable to adapt our business to the consumption models for networking solutions adopted by our customers and to offer attractive solutions across these consumption models, our business, competitive position and results of operations could be adversely affected.

Growing bandwidth demands and network operator efforts to reduce costs are resulting in 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 acquiring 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 development and use of published reference designs and open source specifications for the procurement of "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, certain Web-scale providers and others are pursuing network strategies that emphasize enhanced software programmability, management and control of networks, and deployment of "white box" hardware. A number of network operators are pursuing the deployment of smaller form factor, pluggable modem technology, particularly within switching and routing solutions, as an alternative to integrated optical networking platforms. Other network operators, including certain of 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 solutions and 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 routing vendors, component vendors and IT software vendors. If we are unable to adapt our business to these new consumption models and 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.

Our go-to-market activities and the distribution of our WaveLogic coherent modem technology within the market for high-performance transceivers/modems could expose us to increased or new forms of competition, or adversely affect our existing systems business and results of operations.

We recently entered the market for high-performance transceivers/modems 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 or other component technologies. 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 market for high-performance transceivers/modems could expose us to increased or new forms of competition, or adversely affect our systems business and results of operation.

If we fail to predict demand accurately, we may be required to write off significant amounts of inventory as a result of our inventory purchase practices and could incur additional costs or experience manufacturing delays.

Accurately predicting demand and purchasing inventory and components within the current supply constrained and dynamic demand environment is challenging and could adversely impact our financial results and customer experience. To avoid delays and meet customer delivery demands, we place orders with our contract manufacturers and component suppliers based on forecasts of customer demand. In many 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 and may have difficulty forecasting inventory and customer spending. Moreover, our customer purchase agreements generally do not include any minimum purchase commitment and customers often have the right to modify, reduce or cancel purchase quantities. 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 or newer product. We may also be exposed to 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. Conversely, if we underestimate our demand, our contract manufacturers and component suppliers may have inadequate time, materials, or components required to manufacture our products. This could increase costs or delay or interrupt manufacturing of our products, resulting in delays in shipments and deferral or loss of revenues and could adversely impact customer satisfaction.

If the market for network software does not evolve in the way we anticipate or if customers do not adopt our Blue Planet Automation Software and Services, we may not be able to monetize these software assets and realize a key part of our business strategy.

A key part of our business strategy is to increase customer adoption of 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 commercialize, increase market awareness and gain adoption of our Blue Planet Automation Software and Services within those markets, revenue from our Blue Planet Automation Software and Services may not grow. We have a limited history in commercializing and selling these software solutions and have only recently acquired certain elements of our Blue Planet portfolio. Moreover, the market and competitive landscape for these solutions is dynamic, 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 Blue Planet Automation Software and

Services, a key part of our strategy for growth would be adversely affected and our financial results may suffer.

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

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

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 30, 2021 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 30, 2021, our balance sheet includes a $800.2 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 assets 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 30, 2021, our balance sheet also includes $311.6 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 30, 2021, our balance sheet also includes $450.3 million in long-lived assets, which includes $65.3 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 on 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.

Product performance problems and undetected errors affecting the performance, interoperability, 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, or are in the process of launching, a number of new hardware and software offerings, including evolutions of our WaveLogic coherent optical modem technology, new Routing and Switching platforms and solutions targeting access and metro networks, and 5G 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 in customer networks transmitting a range of sensitive information, and any actual or perceived 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 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;
- higher charges for 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.

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

From time to time, we 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;
- 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.

Risks Relating to the Macroeconomic Environment and our Global Presence

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 that adversely affected our operating results. The current global macroeconomic environment is challenging, and continues to be significantly and adversely impacted by the COVID-19 pandemic, global supply chain constraints and a dynamic demand environment. Macroeconomic and market conditions could also be adversely affected by a variety of political, economic or other factors in the United States and international markets that could in turn adversely affect spending levels of our customers and their end users, and could create volatility or deteriorating conditions in the markets in which we operate. Due to our concentration of revenue in the United States, we would expect to incur a more significant impact from any adverse change in the capital spending environment or macroeconomic or market weakness in the United States. 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;
- decreased ability to forecast operating results and make 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;
- business and financial difficulties faced by our suppliers or other partners, including impacts to 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; and
- increased risk of charges relating to excess and obsolete inventories and the write-off of other intangible assets.

Each of our customers has a unique set of circumstances, and it is unclear how macroeconomic and market conditions, including those created or exacerbated by COVID-19, may continue to impact their purchasing volumes or behaviors. 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.

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 on a global supply chain for sourcing important components and manufacturing our products. Our international sales and operations are subject to inherent risks, including:

- adverse social, political and economic conditions;
- 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 (including as a result of climate change), acts of war or terrorism, and public health emergencies, including the COVID-19 pandemic.

We utilize a sourcing strategy that emphasizes global procurement of materials that has direct or indirect dependencies upon a number of vendors with operations in the Asia-Pacific region. We also rely upon third-party contract manufacturers, including those with facilities in Canada, Mexico, Thailand and the United States, to manufacture, support and ship our products. Physical, regulatory, technological, market, reputational, and legal risks related to climate change in these regions and globally are increasing in impact and diversity and the magnitude of any short term or long term adverse impact on our business or results of operations remains unknown. The physical impacts of climate change, including as a result of certain types of natural disasters occurring more frequently or with more intensity or changing weather patterns, could disrupt our supply chain, result in damage to or closures of our facilities, and could otherwise have an adverse impact on our business, operating results, and financial condition. See also the risk factor below entitled "*Government regulations related to the environment, climate change and social initiatives could adversely affect our business and operating results*."

Our international operations are subject to complex foreign and U.S. laws and regulations, including anti-bribery and corruption laws, antitrust or competition laws, data privacy laws, such as the GDPR, and environmental regulations, 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 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. Our policies and procedures to promote compliance with these laws and regulations and to mitigate these risks may not 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 success of our international sales and operations will depend, in large part, on our ability to anticipate and manage these risks effectively. 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.

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 EMEA and APAC. This diversification of our markets and customer base has been a significant component of the growth of our business in recent years. 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.

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 U.S. Dollars, and a weakened U.S. 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 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.

Risks Related to Our Operations and Reliance on Third Parties

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 chipset, our WaveLogic modem technology and the components thereof, 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 capture market opportunities and impact the timing and level of demand for our products. Among other things, we are currently extending our Routing and Switching portfolio with additional IP features, and introducing new solutions within our Platform Software and Services and Blue Planet Automation Software and Services segments. 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. 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. 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 on 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 on third-party contract manufacturers, including those 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, environmental or health factors, including pandemics or widespread health epidemics such as the COVID-19 pandemic;
- changes in law or policy governing tax, 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;
- inventory liability for excess and obsolete supply;
- 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 we experience a disruption of manufacturing or our contract manufacturers discontinue operations, we may be required to identify and qualify alternative manufacturers, which could cause us to be delayed in or 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 experience significant business disruption and could lose revenue and damage our existing customer relationships. See the risk factor above entitled *"The COVID-19 pandemic has impacted our business and results of operation and could have a material adverse effect on our business, results of operations and financial condition in the future"* for additional factors related to COVID-19 and our third-party contract manufacturers that could adversely affect our business and financial results.

Our reliance on third-party component suppliers, including sole and limited source suppliers, exposes our business to additional risk, including risk relating to our suppliers' businesses and financial position and risks arising as a result of geopolitical events, and could limit our sales, increase our costs and harm our customer relationships.

We maintain a global sourcing strategy and depend on a diverse set of third-party suppliers in international markets that comprise our supply chain. We rely on these third parties for activities relating to product design, development and support, and in the sourcing of products, components, subcomponents and related raw materials. 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 on 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. Increases in market demand or scarcity of raw materials or components have resulted, and may in the future result, in shortages in availability of important components for our solutions, supply allocation challenges, deployment delays and increased cost, lead times and delivery cycle timelines. There are a number of significant technology trends or developments underway or emerging – including the Internet of Things, autonomous vehicles, and advances in mobile communications such as the emergence of 5G – that have previously resulted in, and we believe will continue to result in, increased market demand for key raw materials or components upon which we rely.

A number of our key technology vendors rely upon sales to customers, including our competitors, in China for a material portion of their revenue. Recently, there have been a number of significant geopolitical events, including trade tensions and regulatory actions, involving the governments of the United States and China. In May 2019, the U.S. Department of Commerce amended the Export Administration Regulations by adding Huawei Technologies Co., Ltd. and certain affiliates to the "Entity List" for actions contrary to the national security and foreign policy interests of the United States, imposing significant new restrictions on export, reexport and transfer of U.S. regulated technologies and products to Huawei. In August 2020, the U.S. Department of Commerce added additional Huawei affiliates to the Entity List, confirmed the expiration of a temporary general license applicable to Huawei and amended the foreign direct product rule in a manner that represents a significant expansion of its application to Huawei. Several of our third-party component suppliers, including certain sole and limited source suppliers, sell products to Huawei and, in some cases, Huawei is a significant customer for such suppliers. At this time, there can be no assurance regarding the scope or duration of these restrictions, including the foreign direct product rule, or further actions imposed on Huawei, and any future impact on our suppliers. Any continued restriction on our suppliers' ability to make sales to Huawei may adversely impact their businesses and financial position. In addition, China is in the midst of executing a five-year plan to improve China's capabilities in the optoelectronics industry. There can be no assurance that this initiative, or similar efforts in China such as the Made in China 2025 initiatives, will not have an adverse impact on the business of our suppliers or our access to necessary components. These and similar industry, market and regulatory disruptions affecting our suppliers could, in turn, expose our business to loss or lack of supply or discontinuation of components that could result in lost revenue, additional product costs, increased lead times and deployment delays that could harm our business and customer relationships. 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.

We rely on third-party resellers and distribution partners to sell our solutions, and on third-party service partners for installation, maintenance and support functions, and our failure to develop and manage these relationships effectively could adversely affect our business, results of operations, and relationships with our customers.

In order to sell into new 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 believe that these relationships are 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.

We also rely on a number of third-party service partners, both domestic and international, to complement our global service and support resources. We rely on 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.

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.

We must also assess and certify or qualify third-party resellers, distribution partners, sales agents and service partners in order to ensure their understanding of and willingness and ability to adhere to our Code of Business Conduct and Ethics, our Ciena Partner Network Code of Business Conduct and Ethics, the RBA Code of Conduct, and ethical business practices, as applicable. Vetting and certification of these resellers, agents and distribution and service partners can be costly and time-consuming. Certain resellers, agents and distribution and service partners may not have the same operational history, financial resources and scale that we have.

If we do not effectively identify, develop and manage our relationships with third-party resellers, distribution partners, sales agents or service partners, or if they fail to perform services in the manner or time required, our financial results and relationships with customers could be adversely affected. We may also 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 or service partners could have a material adverse effect on our business, operating results and financial condition.

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 on 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.

Growth of our business is dependent on 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 on 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 system upgrades 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 IT systems, and those of third-party IT 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 (including as a result of climate change), cyber-security related incidents, and computer system or network failures. 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.

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

We have taken steps, including reductions in force, office closures, and internal reorganizations to reduce the 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 achieve our target operating model and profitability objectives, or to reflect more closely changes in the strategic direction of our business or the evolution of our site strategy and workplace. 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, or if our existing personnel are harmed by COVID-19, we may be unable to manage our business effectively.

Our future success and ability to maintain a technology leadership position depends upon our ability to recruit and retain the services of executive, engineering, sales and marketing, and support personnel. 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 for engineering talent generally. The impact of the COVID-19 pandemic has resulted in higher employee costs, increased attrition and significant shifts in the labor market and employee expectations. We may experience difficulty retaining and motivating existing employees and attracting qualified personnel to fill key positions. In addition, labor shortages and employee mobility may make it more difficult to hire and retain employees. There can be no assurance that the programs, initiatives, rewards and recognition that are part of our annual "people strategy" will be successful in attracting and retaining the talent necessary to execute on our business plans. Because we rely on 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. We have a number of workforce planning initiatives underway and our failure to manage these programs effectively could result in the loss of key personnel. Similarly, the failure to properly manage the necessary knowledge transfer required from these employee transitions could impact our ability to maintain industry and innovation leadership. The loss of members of our management team or other key personnel, including due to COVID-19 and related vaccine and testing mandates, could be disruptive to our business and, were it necessary, it could be difficult to replace such individuals. 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.

In addition, a number of our team members are foreign nationals who rely on visas or work-entry permits in order to legally work in the United States and other countries. Changes in government policy and global events such as pandemics may interfere with our ability to hire or retain personnel who require these visas or entry permits. For example, in response to the COVID-19 pandemic, numerous U.S. Embassies suspended or delayed the processing of new visa applications for a period of time during the pandemic due to COVID-19 related concerns impacting embassy operations and staffing. Additional changes in immigration policy, including the implementation of restrictive interpretations by the U.S. Citizenship and Immigration Services of regulatory requirements for H-1B, L-1 and other U.S. work visa categories, may also adversely affect our ability to hire or retain key talent, which could have an impact on our business operations.

Risks Related to Intellectual Property, Litigation, Regulation and Government Policy

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 for our 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 detect, prevent or minimize the risks of such unauthorized use. In addition, our intellectual property strategy must continually evolve to protect our proprietary rights in new solutions, including our software solutions. Litigation may be necessary to enforce or defend our intellectual property rights or to determine the validity or scope of the proprietary rights of others. Such litigation could result in substantial cost and diversion of management time and resources, and there can be no assurance that we will obtain a successful result. Any inability to protect and enforce our intellectual property rights could harm our ability to compete effectively.

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

From time to time third parties may assert claims or initiate litigation or other proceedings related to patent, copyright, trademark and other intellectual property rights to technologies and related standards that are relevant to our business. We have been subject to several claims related to patent infringement, and we have been requested to indemnify customers pursuant to contractual indemnity obligations relating to infringement claims made by third parties. 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 or otherwise require us to incur substantial costs, including legal fees. 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 the acquired 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 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.

Some of our solutions, including our Blue Planet Automation Software, 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 on 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 subjected to a wide variety of security incidents, cyber-attacks and other attempts to gain unauthorized access to networks or sensitive information. Our network systems and storage and other business applications, and the systems and storage and other business applications maintained by our third-party providers, have been in the past, and may be in the future, subjected 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 or any of our third-party providers' networks, we could incur significant costs and our reputation could be harmed. In addition, the internet has experienced an increase in cyber threats during the COVID-19 pandemic in the form of phishing emails, malware attachments and malicious websites.

While we 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 future cyber-attacks or security breaches. We have been subjected in the past, and expect to be subjected in the future, to a range of incidents including phishing, emails purporting to come from a company executive or vendor seeking payment requests, and communications from look-alike corporate domains, as well as security-related risks created by the use of third-party software and services. For example, in December 2020 we learned that SolarWinds, an information technology company, was the subject of a cyberattack that created potential security vulnerabilities for its customers, including Ciena. We believe that none of our products, software or research and development environments were accessed as a result of the SolarWinds attack; however, other similar attacks could have a material adverse impact on our systems and operations. While these types of incidents to which we have been subjected have not had a material effect on our business or our network security to date, future incidents involving access to 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 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. 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. 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.

Changes in trade policy, including the imposition of tariffs and efforts to withdraw from or materially modify international trade agreements, may adversely affect our business, operations and financial condition.

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 distribution and fulfillment to customers around the world. Recently, 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 on 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, increase our costs, and make our products less competitive in the U.S. and other markets.

For example, our supply chain includes certain direct and indirect suppliers based in China who supply goods to us, our manufacturers or our third-party suppliers. Recently, there have been a number of significant geopolitical events, including trade tensions and regulatory actions, involving the governments of the United States and China. The U.S. government has raised tariffs, and imposed new tariffs, on a wide range of imports of Chinese products, including component elements of our solutions and certain finished goods products that we sell. China has retaliated by raising tariffs, and imposing new tariffs, on certain exports of U.S. goods to China. In May 2020, the U.S. introduced significant further restrictions limiting access to controlled U.S. technology to additional Chinese government and commercial entities, including certain of our competitors based in China. In August 2020, the U.S. Department of Commerce took further action against Huawei by adding additional Huawei affiliates to the Entity List, confirming the expiration of a temporary general license applicable to Huawei and amending the foreign direct product rule in a manner that represents a significant expansion of its application to Huawei. The situation involving U.S.-China trade relations remains volatile and uncertain and there can be no assurance that further actions by either country will not have an adverse impact on our business, operations and access to technology, or components thereof, sourced from China.

At this time, it remains unclear what additional actions, if any, will be taken by the U.S. or other governments with respect to international trade agreements, the imposition of tariffs on goods imported into the U.S., tax policy related to international commerce, or other trade matters. Based on our manufacturing practices and locations, there can be no assurance that any future executive or legislative action in the United States or other countries relating to tax policy and trade regulation would not adversely affect our business, operations and financial results.

Government regulation of usage, import or export of our products, or our technology within our products, changes in that regulation, 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.

Changes in government regulations affecting the communications and technology industries and the businesses of our customers could harm our prospects and operating results.

The Federal Communications Commission (the "FCC") has jurisdiction over many companies in the U.S. telecommunications 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 deregulated broadband internet access service providers and removed their classification as telecommunications service providers under Title II of the Communications Act. This decision, which was partially upheld in an October 2020 decision by the U.S. Court of Appeals for the District of Columbia Circuit, 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's initial decision has preempted state jurisdiction on net neutrality, the U.S. Court of Appeals decision vacated the specific preemption provision in the 2017 order. A number of states have taken executive action directed at reinstating aspects of the FCC's 2015 order. California, among other states, has passed legislation that seeks to reestablish net neutrality.

The current FCC is expected to initiate a rulemaking to reclassify broadband internet access service as a Title II telecommunications service, with additional net neutrality obligations. 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.

Separately, certain of our Web-scale customers have been the subject of regulatory and other government actions, including inquiries and investigations, formal or informal, by competition authorities in the United States, Europe and other jurisdictions. In July 2019, the U.S. Department of Justice announced that it would commence an antitrust review into significant online technology platforms, and in September 2019, various state attorneys general announced antitrust investigations involving certain technology companies. In addition, certain committees of the U.S. Congress have recently held hearings and pursued investigations to consider the businesses associated with these platforms, their impact on competition, and their conduct. There can be no assurance that these government actions will not adversely impact the network spending, procurement strategies, or business practices of our Web-scale customers in a manner adverse to us.

The effects of the United Kingdom's withdrawal from membership in the European Union remain uncertain.

In January 2020, the UK formally withdrew from the EU in an action commonly known as Brexit. It remains possible that the level of economic activity in this region will be adversely impacted by Brexit 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. Economic uncertainty related to Brexit, including volatility in global stock markets and currency exchange rates, could adversely impact our business. While we have adopted certain operational and 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.

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

Changes in tax law or regulation, 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.

The Tax Act, signed into law in December 2017, introduced significant changes to U.S. federal corporate tax law. 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, as well as additional legislation and guidance around the Tax Act. Any refinements to tax estimates are difficult to predict and could impact our financial results. In April 2021, President Joseph R. Biden released the Made in America Tax Plan, which includes significant modifications to key provisions of the existing U.S. corporate income tax regime, including an increased tax rate, promotion of a global minimum tax and other changes that address taxes on profits from intangible assets and activities of foreign subsidiaries. In June 2021, finance leaders of the Group of Seven countries agreed to back a new global minimum tax rate that would apply regardless of headquarters location or physical presence, and in October 2021, the leaders of the Group of 20 agreed to back similar plans. In August 2021, the Senate Finance Committee released draft legislation that would overhaul the international tax provisions of the Tax Act and address taxes on profits from intangible assets and activities of foreign subsidiaries. Although it is uncertain if some or all of these proposals will be enacted, a significant change in U.S. tax law, or that of other countries where we operate or have a presence, may materially and adversely impact our income tax liability, provision for income taxes, effective tax rate and results of operations.

We are also subject to the continuous examination of our income tax and other returns by the Internal Revenue Service and other tax authorities globally, and we 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 tax law or regulation impacting our effective tax rates, will not have an adverse effect on our business, financial condition and results of operations.

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.

Risks Related to Our Common Stock, Indebtedness and Investments

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 2021, our closing stock price ranged from a high of $60.77 per share to a low of $39.15 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 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.

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 $300 million senior secured asset-based revolving credit facility and an outstanding senior secured term loan with approximately $680.9 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 on our business. In addition, major debt rating agencies regularly evaluate our debt based on a number of factors. There can be no assurance that we will be able to maintain our existing debt ratings, and failure to do so could adversely affect our cost of funds, liquidity and access to capital markets.

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

The operation of our business requires significant capital. We have accessed the capital markets in the past and have successfully raised funds, including through the issuance of equity, convertible notes and other indebtedness, to increase our cash position, support our operations and undertake strategic growth initiatives. We regularly evaluate our liquidity position, debt obligations and anticipated cash needs to fund our long-term operating plans, and we may consider it necessary or advisable to raise additional capital or incur additional indebtedness in the future. If we raise additional funds through further issuance of equity or securities convertible into equity, or undertake certain transactions intended to address our existing indebtedness, our existing stockholders could suffer dilution in their percentage ownership of our company, or our leverage and outstanding indebtedness could increase. Global capital markets have undergone periods of significant volatility and uncertainty in 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.

Item 1B. Unresolved Staff Comments

Not applicable.

Item 2. Properties

Overview. As of October 30, 2021, 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 business segments and related functions. Our principal executive offices are located in one building in Hanover, Maryland.

Our largest facilities are our research and development centers located in Ottawa, Canada and Gurgaon, India. We also have engineering facilities located in San Jose, California; Alpharetta, Georgia; Quebec, Canada; and Pune and Bangalore, India. 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 105,000 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 approximately 170,000 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 255,000 square feet.

Gurgaon Leases. On August 13, 2020, Ciena India Pvt. Ltd. extended our rental agreement for five years 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 282,000 square feet.

For additional information regarding our lease obligations, see Note 18 to our Consolidated Financial Statements included in Item 8 of Part II of this annual report.

Item 3. Legal Proceedings

The information set forth under the heading "Litigation" in Note 27 to our 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

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 10, 2021, there were approximately 757 holders of record of our common stock and 154,882,650 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

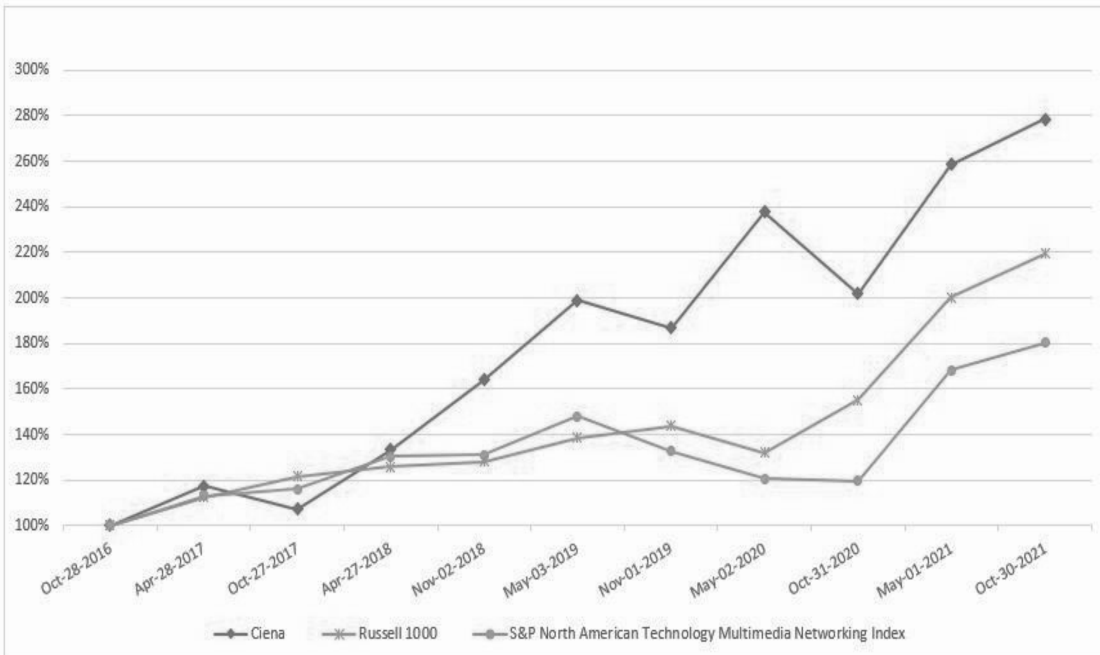
The following table provides a summary of repurchases of our common stock during the fourth quarter of fiscal 2021:

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, 2021 to August 28, 2021	141,838	$ 56.42	141,838	$ 202,031
August 29, 2021 to September 25, 2021	147,640	$ 54.20	147,640	$ 194,028
September 26, 2021 to October 30, 2021	204,032	$ 52.58	204,032	$ 183,301
Total	493,510	$ 54.17	493,510	

(1) On December 13, 2018, we announced that our Board of Directors authorized a program to repurchase up to $500 million of our common stock. Shares reported in this table were repurchased under this program. Subsequent to the end of fiscal 2021, on December 9, 2021, we announced that our Board of Directors authorized a program to repurchase up to $1.0 billion of our common stock, which replaced in its entirety the previous stock repurchase program. The program may be modified, suspended, or discontinued at any time. 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. On December 13, 2021, in connection with this repurchase program, we entered into an accelerated share repurchase agreement for the repurchase of $250.0 million of our common stock. See "Management's Discussion and Analysis of Financial Condition and Results of Operations-- Liquidity and Capital Resources --Stock Repurchase Authorization" in Item 7 of Part II of this report and Note 22 and 28 to our Consolidated Financial Statements in Item 8 of Part II of this report for information regarding the stock repurchase programs 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 North American Technology-Multimedia Networking Index and the Russell 1000 from October 31, 2016 to October 30, 2021. The Russell 1000 index comprises the stocks representing the 1,000 largest publicly traded American companies as measured by market capitalization. The S&P North American Technology-Multimedia Networking Index comprises stocks in the S&P Total Market Index that are classified under the Global Industry Classification Standard communications equipment sub-industry. This graph is not deemed to be "soliciting material" or "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.



Assumes $100 invested in Ciena Corporation, the S&P North American Technology-Multimedia Networking Index and the Russell 1000, respectively, on October 31, 2016 with all dividends reinvested at month-end.

(b) Not applicable.

(c) Not applicable.

Item 6. [Reserved]

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 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 hardware, software and services that enable the transport, routing, 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 institutions and emerging network operators.

Our portfolio is designed to enable what we refer to as the Adaptive Network™, our vision for a network end state that emphasizes a programmable and scalable network infrastructure, software control and automation capabilities, network analytics and intelligence, and related advanced services. By transforming network infrastructures into a dynamic, programmable environment driven by automation and analytics, network operators can realize greater business agility, dynamically adapt to changing end-user service demands and rapidly introduce new revenue-generating services. They can also gain valuable real-time network insights, allowing them to optimize network operation and maximize the return on their network infrastructure investment.

Our solutions include Networking Platforms, including our Converged Packet Optical and Routing and Switching portfolios, which can be applied from the network core to end-user access points, and which allow network operators to scale capacity, increase transmission speeds, allocate traffic efficiently and adapt dynamically to changing end-user service demands. Our Converged Packet Optical portfolio includes products that support the connection of content to content, including in long haul and regional, submarine and data center interconnect networks, and users to content, including in metro and edge networks. Our Routing and Switching portfolio includes products and solutions that enable efficient IP transport in next-generation metro edge, access and aggregation networks, connecting users to content in applications that include 5G and Internet of Things, mobile backhaul, optical access, virtualization and enterprise services.

To complement our Networking Platforms, we offer Platform Software, which includes a wide array of software solutions that deliver operations, administration, maintenance, and provisioning ("OAM&P") functionality, as well as domain control, orchestration, operational support systems ("OSS") and service assurance to achieve closed loop automation across multi-vendor and multi-domain network environments. Through our Blue Planet® Software suite, we enable customers to accelerate the digital transformation of their networks through service lifecycle automation.

In addition to our systems and software, we also offer a broad range of services that help our customers build, operate and improve their networks and associated operational environments. These include network transformation, consulting, implementation, systems integration, maintenance, network operations center ("NOC") management, and optimization services.

Supply Chain Constraints

Due to increased demand across a range of industries, the global supply market for certain raw materials and components, including, in particular, the semiconductor components used in most of our products, has experienced significant disruption in recent periods. These conditions, which worsened during the second half of fiscal 2021, have been exacerbated in part by the COVID-19 pandemic. As a result, we have experienced ongoing component shortages, longer lead times and increased cost of components, particularly relating to semiconductors. Some of our suppliers have indicated that, as a result of current constraints, they intend to cease manufacturing of certain components used in our products. These conditions have impacted the lead times for our products, and could adversely impact our ability to meet customer demand where we cannot timely secure supply of these components. In response, we have implemented mitigation strategies and increased our purchases of inventory for certain components. In some cases, we have incurred higher costs to secure available inventory, or have extended our purchase commitments or placed non-cancellable orders with suppliers, which introduces inventory risk if our forecasts and assumptions are inaccurate.

We expect these constrained supply conditions to increase our costs of goods sold and to adversely impact our ability to continue to reduce the cost to produce our products in a manner consistent with prior periods. The current supply conditions can also be expected to adversely impact our gross margin as well as the level and timing of our revenue during fiscal 2022. We believe these supply chain challenges and their adverse impact on our business and financial results will persist, at least through the first half of calendar 2022, and may extend into periods thereafter. See “Risk Factors” in Item 1A of Part I of this report for further discussion of risks related to our supply chain.

Impact of the COVID-19 Pandemic on our Business and Operations

In response to the COVID-19 pandemic, we have prioritized the safety of our employees and business partners, while continuing to support the needs of our customers and communities during this unprecedented period. We have also implemented business continuity plans designed to minimize potential business disruption from the COVID-19 pandemic and to protect our supply chain and customer fulfillment and support operations. During fiscal 2021, the COVID-19 pandemic continued to affect our business operations, including as set forth below.

Demand for Products & Services. The demand environment for our products and services remains dynamic and continues to be impacted by the effects of the COVID-19 pandemic. For example, we experienced a constrained spending environment during the second half of fiscal 2020 and the first quarter of fiscal 2021 that adversely impacted our revenue during that period. During the remainder of fiscal 2021, we experienced significantly stronger order volumes for our products and services, particularly among a concentrated set of larger customers with which we have existing positions as a supplier. This improved demand environment and growth in order volumes contributed to our increased revenue in the second half of fiscal 2021 compared to the first half of fiscal 2021. We believe some portion of these orders reflects certain short-term customer purchasing behaviors, including network operators addressing capacity and network requirements following a period of constrained spending in previous quarters, and possible acceleration of future orders due to the implementation of security of supply strategies amidst global supply constraints for semiconductor components. Over the longer term, we continue to believe that the increased demands placed on network infrastructures as a result of the COVID-19 pandemic, and the related increase in remote working worldwide, have accelerated certain trends, including cloud network adoption, networking resilience and flexibility, and enhanced network automation.

Services and Customer Fulfillment. During fiscal 2020 and fiscal 2021, we experienced some disruption in our ability to provide installation, professional and fulfillment services to customers due to site readiness and access limitations, limited customer availability, project delays or re-prioritization by customers, and travel bans or restrictions on movement or gatherings. We have also experienced some disruption and delays in our supply chain operations and logistics, including shipping delays and higher transport costs. The duration and severity of conditions in the future is uncertain and, as a result, may continue to adversely impact our revenue and results of operations.

Sales & Marketing. Restrictions on travel due to COVID-19 and limitations on interactions with customers, such as field and lab trials, have continued to negatively impact our ability to carry out certain sales and marketing activities, including our ability to secure new customers, to qualify and sell new products, and to grow sales with customers. Customer delays in operationalizing new network projects during fiscal 2021 that we anticipated occurring on their original timelines adversely affected our revenue. Conversely, our recent gross margin performance during fiscal 2021 benefited from these dynamics, with a larger percentage of our revenue comprised of existing business, as compared to new design wins and early in life projects, which tend to have lower margins.

Canada Emergency Wage Subsidy ("CEWS"). In April 2020, the government of Canada introduced the CEWS program to help employers offset a portion of their employee wages for a limited period in response to the COVID-19 outbreak, retroactive to March 15, 2020. Amounts from the CEWS program positively impacted our operating expense and measures of profit for the fiscal year ended October 30, 2021. For the fiscal year ended October 30, 2021, we recorded CEWS benefits of CAD$52.2 million ($41.3 million), net of certain fees, related to claim periods beginning March 15, 2020, including CAD$43.9 million ($35.4 million) related to employee wages from fiscal 2020. The CEWS program has expired and we do not anticipate a similar impact on our financial results in future periods. See Note 3 to our Consolidated Financial Statements included in Item 8 of Part II of this annual report for more information.

The COVID-19 pandemic and countermeasures taken to contain its spread have caused economic and financial disruptions globally. We continue to monitor the situation and actively assess further implications for our business, supply chain, fulfillment operations and customer demand. However, the COVID-19 pandemic and its impact remain dynamic. Variants continue to emerge, efforts to mitigate or contain the impacts of the pandemic continue to evolve, and the duration and severity of the impact of the pandemic on our business and results of operations in future periods remain uncertain. If the COVID-19 pandemic or its adverse effects become more severe or prevalent or are prolonged in the locations where we, our customers, suppliers or manufacturers conduct business, or we experience more pronounced disruptions in our business or operations, or in economic activity and demand for our products and services generally, our business and results of operations in future periods could be materially adversely affected.

Supply Chain and Distribution Structure; Recognition of Deferred Tax Asset in Fiscal 2021

To better accommodate the requirements of a global business, we are implementing a plan to reorganize our global supply chain and distribution structure more substantially, which includes a legal entity reorganization and related system upgrade. We completed the first phase of this plan in fiscal 2021, and expect to continue to implement the plan during the first half of fiscal 2022. As part of this reorganization, we completed an internal transfer of certain of our non-U.S. intangible assets, which created amortizable tax basis resulting in the discrete recognition of $119.3 million as a deferred tax asset with a corresponding tax benefit. The impact of this transfer is reflected in our effective tax rate for the year ended October 30, 2021, and had a significant, one-time impact on our net income for the period.

Market Opportunity

The markets in which we sell our communications networking solutions are dynamic and are characterized by a high rate of change, including rapid growth in bandwidth demand and network traffic, the proliferation of cloud-based services and new approaches, or "consumption models," for designing and procuring networking solutions. Emerging services and applications, including 5G mobile communications, Fiber Deep and the Internet of Things, are further impacting or expected to impact wireline network infrastructures, particularly at the edge of networks, where increased computing power and automation are required to provide the quality of experience demanded by end users. Many network operators are under pressure to constrain their capital expenditure budgets, as they cannot grow their network spending at the rate of bandwidth growth. To address these growing service demands and manage network cost, many network operators are looking to adopt next-generation infrastructures that are more programmable and better capable of leveraging data for network insight, analytics and automation. Other network operators are pursuing a diverse range of consumption models in their design and procurement of network infrastructure solutions. Our Adaptive Network vision and our business strategy to capitalize on these changing market dynamics include the initiatives set forth in the "Strategy" section of the description of our business in Item 1 of Part 1 of this annual report.

Business Diversification

A key element of our strategy is to continue to diversify our solutions offerings, customer base and geographic reach to address fast-growing applications and markets. We believe that the continued diversification of our business is important to address the dynamic industry environment in which we operate, to grow our business, and to withstand potential slowdowns adversely affecting particular geographies, markets or customer segments. We believe this diversification has allowed us to maintain a greater degree of stability, to remain resilient and to continue to grow our business despite the impact of the COVID-19 pandemic on any particular geography, segment or customer account.

Investment in Technology Innovation

We are focused on growing our optical and packet infrastructure business by addressing fast-growing markets and applications, including data center interconnection, packet aggregation and routing and submarine networks. In fiscal 2021, we brought to market our footprint-optimized WaveLogic 5 Nano 100G-400G coherent pluggable transceivers. We are also developing Routing and Switching solutions with enhanced IP/Ethernet capabilities to expand our addressable market into additional next generation metro and access applications including packet routing, aggregation and switching, 5G cross-haul, Fiber Deep, and edge computing. In fiscal 2021, we also added several new routing platforms to support the demands of mobile xHaul (fronthaul, midhaul and backhaul) transport. During the first quarter of fiscal 2022, we acquired AT&T's Vyatta virtual routing and switching technology, which is intended to expand and accelerate our Adaptive IP solutions and address the growing market opportunity to transform the edge, including 5G networks and cloud environments. See Note 28 to our Consolidated Financial Statements included in Item 8 of Part II of this report for more information on this acquisition and the related accounting.

Fiscal Year-End 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 $2.17 billion as of October 30, 2021 as compared to $1.19 billion as of October 31, 2020. Backlog includes product and service orders from commercial and government customers combined, and our significant annual growth reflects the demand dynamics described above. Backlog at October 30, 2021 includes approximately $241.7 million primarily related to orders for products and maintenance and support services that are not expected to be filled or performed within fiscal 2022. 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.

Consolidated Results of Operations

A discussion regarding our financial condition and results of operations for fiscal 2021 compared to fiscal 2020 is presented below. A discussion of fiscal 2020 compared to fiscal 2019 can be found under Item 7 of Part II of our Annual Report on Form 10-K for the fiscal year ended October 31, 2020, filed with the SEC on December 18, 2020 (our "2020 Annual Report"), which is available free of charge on the SEC's website at www.sec.gov and our Investor Relations website at investor.ciena.com.

Operating Segments

Our results of operations are presented based on the following operating segments: (i) Networking Platforms; (ii) Platform Software and Services; (iii) Blue Planet Automation Software and Services; and (iv) Global Services. Effective as of the beginning of fiscal 2021, we renamed our "Packet Networking" product line "Routing and Switching." This change was made on a prospective basis and does not impact comparability of previous financial results or the composition of this product line. References to our "Packet Networking" product line in prior periods have been changed to "Routing and Switching" in this report. See Notes 2 and 25 to our Consolidated Financial Statements included in Item 8 of Part II of this annual report for more information on our segment reporting.

Fiscal 2021 Compared to Fiscal 2020

Revenue

Currency Fluctuations

During fiscal 2021, approximately 16.4% of our revenue was non-U.S. Dollar denominated, primarily including sales in Euros, Canadian Dollars, Brazilian Reais, British Pounds, Japanese Yen, and Indian Rupee. During fiscal 2021, as compared to fiscal 2020, the U.S. Dollar primarily weakened against these and other currencies. Consequently, our revenue reported in U.S. Dollars slightly increased by approximately $21.8 million, or 0.6%, as compared to fiscal 2020.

Operating Segment Revenue

The table below sets forth the changes in our operating segment revenue for the periods indicated (in thousands, except percentage data):

	Fiscal Year					
	2021	%*	2020	%*	Increase (decrease)	%**
Revenue:						
Networking Platforms						
Converged Packet Optical	$ 2,553,509	*70.5*	$ 2,547,647	*72.1*	$ 5,862	*0.2*
Routing and Switching	271,796	*7.5*	267,416	*7.6*	4,380	*1.6*
Total Networking Platforms	2,825,305	*78.0*	2,815,063	*79.7*	10,242	*0.4*
Platform Software and Services	229,588	*6.4*	197,809	*5.6*	31,779	*16.1*
Blue Planet Automation Software and Services	77,247	*2.1*	62,632	*1.8*	14,615	*23.3*
Global Services						
Maintenance Support and Training	283,350	*7.8*	269,354	*7.6*	13,996	*5.2*
Installation and Deployment	171,489	*4.7*	152,003	*4.3*	19,486	*12.8*
Consulting and Network Design	33,705	*1.0*	35,296	*1.0*	(1,591)	*(4.5)*
Total Global Services	488,544	*13.5*	456,653	*12.9*	31,891	*7.0*
Consolidated revenue	$ 3,620,684	*100.0*	$ 3,532,157	*100.0*	$ 88,527	*2.5*

* Denotes % of total revenue

** Denotes % change from 2020 to 2021

- **Networking Platforms segment revenue** increased, reflecting product line sales increases of $5.9 million of our Converged Packet Optical products and $4.4 million of our Routing and Switching products.
    - Converged Packet Optical sales increased, primarily reflecting sales increases of $88.4 million of our Waveserver® products and $45.6 million of our 6500 Reconfigurable Line System (RLS), primarily to communication service providers. These sales increases were partially offset primarily by sales decreases of $75.7 million of our 6500 Packet-Optical Platform primarily to enterprise customers and communication service providers and $40.2 million of our 5400 family of Packet-Optical Platforms primarily to communications service providers.
    - Routing and Switching sales increased, primarily reflecting sales increases of $10.9 million of our platform independent software and $8.1 million of our 3000 and 5000

families of service delivery and aggregation switches to communication service providers. These increases were partially offset by a sales decrease of $12.5 million of our 8700 Packetwave Platform primarily to government customers.

- **Platform Software and Services segment revenue** increased, reflecting an increase of $33.2 million in services, primarily to communication service providers. This sales increase was partially offset by a $1.5 million decrease in software sales. The software sales decrease was primarily due to declines in sales of $4.0 million of our OneControl Unified Management System software and $2.9 million of our other legacy software solutions, partially offset by increased sales of $5.1 million of our MCP software platform. We continue to pursue further customer adoption of our MCP software platform and its enhanced features and functionality. As we transition existing customers as well as features and functionality from our legacy software to this platform, we expect revenue declines for our legacy software solutions within this segment.
- **Blue Planet Automation Software and Services segment revenue** increased, reflecting increases of $9.0 million of software and $5.6 million in software services.
- **Global Services segment revenue** increased, primarily reflecting sales increases of $19.5 million of our installation and deployment services and $14.0 million of our maintenance support and training, partially offset by a sales decrease of $1.6 million of our consulting and network design services.

Revenue by Geographic Region

Our operating segments engage in business and operations across three geographic regions: Americas; Europe, Middle East and Africa ("EMEA") and Asia Pacific, Japan and India ("APAC"). The geographic distribution of our revenue can fluctuate significantly from period to period, and the timing of revenue recognition for large network projects, particularly outside of the United States, can result in large variations in geographic revenue results in any particular period. The increase in our EMEA region revenue for fiscal 2021 was primarily driven by increased sales in the United Kingdom, France and the Netherlands. The increase in our Americas region revenue for fiscal 2021 was primarily driven by increased sales in the United States, Canada, and Brazil. The decrease in our APAC region revenue for fiscal 2021 was primarily driven by decreased sales in Japan, Singapore and Australia, partially offset by increased sales in India. The following table reflects our geographic distribution of revenue, which is principally based on the relevant location for our delivery of products and performance of services. Our revenue, when considered by geographic distribution, can fluctuate significantly, and the timing of revenue recognition for large network projects, particularly outside of the United States, can result in large variations in geographic revenue results in any particular period. The table below sets forth the changes in geographic distribution of revenue for the periods indicated (in thousands, except percentage data):

	Fiscal Year					
	2021	%*	2020	%*	Increase (decrease)	%**
Americas	$ 2,525,619	*69.8*	$ 2,469,278	*69.9*	$ 56,341	*2.3*
EMEA	670,462	*18.5*	591,468	*16.8*	78,994	*13.4*
APAC	424,603	*11.7*	471,411	*13.3*	(46,808)	*(9.9)*
Total	$ 3,620,684	*100.0*	$ 3,532,157	*100.0*	$ 88,527	*2.5*

* Denotes % of total revenue

** Denotes % change from 2020 to 2021

- **Americas revenue** increased, reflecting sales increases of $18.4 million within our Networking Platforms segment, $13.3 million within our Platform Software and Services segment, $12.4 million within our Global Services segment and $12.3 million within our Blue Planet Automation Software and Services segment.
- **EMEA revenue** increased, reflecting sales increases of $47.5 million within our Networking Platforms segment, $17.4 million within our Global Services segment, $8.7 million within our Platform Software and Services segment and $5.4 million within our Blue Planet Automation Software and Services segment. These sales increases were primarily due to increased sales to Web-scale providers in the Netherlands and the United Kingdom, and communications service providers in France and the United Kingdom.
- **APAC revenue** decreased, primarily reflecting sales decreases of $55.6 million within our Networking Platforms segment and $3.0 million within our Blue Planet Automation Software and Services segment. These decreases were partially offset by sales increases of $9.8 million within our Platform Software and Services segment and $2.1 million within our Global Services segment. Our Networking Platforms segment revenue sales decreases were primarily due to decreased sales to communications service providers in Japan, enterprise customers in Australia, and Web-scale providers in Singapore, partially offset by increased sales to enterprise customers in India.

In fiscal 2021 and fiscal 2020, our top ten customers contributed 55.5% and 54.5% of our revenue, respectively. Consequently, our financial results are closely correlated with the spending of a relatively small number of customers and can be significantly affected by market, industry or competitive dynamics affecting the businesses of those customers. Our reliance on a relatively small number of customers increases our exposure to changes in their spending levels, network priorities and purchasing strategies. The loss of a significant customer could have a material adverse effect on our business and results of operations, and our results of operations can fluctuate quarterly depending on sales volumes and purchasing priorities with these large customers. Sales to AT&T were $447.4 million, or 12.4% of total revenue, in fiscal 2021, and $373.2 million, or 10.6% of total revenue, in fiscal 2020. No other customer accounted for greater than 10% of our revenue in fiscal 2021 or fiscal 2020.

While drivers of bandwidth growth and network evolution remain strong, many of our network operator customers are under pressure to constrain their capital expenditure budgets, and their businesses cannot grow their network spending at the rate of bandwidth growth. As a result, as we innovate and introduce new and more robust solutions that increase capacity or add features, there is a market expectation for solutions that are more cost-effective than existing or competing solutions and that new products consistently deliver lower price per bit performance. The combination of this regular technology-driven price compression, price competition in our markets and ongoing customer efforts to manage network costs can impact our growth rates and requires that we increase our volume of product shipments to maintain and grow revenue.

Cost of Goods Sold and Gross Profit

Product cost of goods sold consists primarily of amounts paid to third-party contract manufacturers, component costs, employee-related costs and overhead, shipping and logistics costs associated with manufacturing-related operations, warranty and other contractual obligations, royalties, license fees, amortization of intangible assets, cost of excess and obsolete inventory and, when applicable, estimated losses on committed customer contracts.

Services cost of goods sold consists primarily of direct and third-party costs associated with our provision of services including installation, deployment, maintenance support, consulting and training activities, and, when applicable, estimated losses on committed customer contracts. The majority of these costs relate to personnel, including employee and third-party contractor-related costs.

Our gross profit as a percentage of revenue, or "gross margin," can fluctuate due to a number of factors, particularly when viewed on a quarterly basis. Our gross margin can fluctuate and be adversely impacted depending on our revenue concentration within a particular segment, product line, geography, or customer, including our success in selling software in a particular period. Our gross margin remains highly dependent on our continued ability to drive annual product cost reductions relative to the price erosion that we regularly encounter in our markets. This can be challenging, particularly within the current supply constrained environment. Moreover, we are often required to compete with aggressive pricing and commercial terms, and, to secure business with new and existing customers, we may agree to pricing or other unfavorable commercial terms that adversely affect our gross margin. Success in taking share and winning new business can result in additional pressure on gross margin from these pricing dynamics and the early stages of these network deployments. Early stages of new network builds also often include an increased concentration of lower margin "common" equipment, photonics sales and installation services, with the intent to improve margin as we sell channel cards and maintenance services to customers as they add capacity and need to monitor their networks. Gross margin can be impacted by technology-based price compression and the introduction or substitution of new platforms with improved price for performance as compared to existing solutions that carry higher margins. Gross margin can also be impacted by changes in expense for excess and obsolete inventory and warranty obligations.

Service gross margin can be affected by the mix of customers and services, particularly the mix between deployment and maintenance services, geographic mix and the timing and extent of any investments in internal resources to support this business.

In fiscal 2021, we recorded CEWS benefits of $7.0 million, net of certain fees, related to the particular line item within costs of goods sold in our Consolidated Statement of Operations to which the grant activity related. For further information relating to our receipt of amounts under the CEWS program, see Note 3 to our Consolidated Financial Statements included in Item 8 of Part II of this report. The tables below set forth the changes in revenue, cost of goods sold and gross profit for the periods indicated (in thousands, except percentage data):

	Fiscal Year					
	2021	%*	2020	%*	Increase (decrease)	%**
Total revenue	$ 3,620,684	*100.0*	$ 3,532,157	*100.0*	$ 88,527	*2.5*
Total cost of goods sold	1,898,705	*52.4*	1,879,266	*53.2*	19,439	*1.0*
Gross profit	$ 1,721,979	*47.6*	$ 1,652,891	*46.8*	$ 69,088	*4.2*

* Denotes % of total revenue

** Denotes % change from 2020 to 2021

	Fiscal Year					
	2021	%*	2020	%*	Increase (decrease)	%**
Product revenue	$ 2,932,602	*100.0*	$ 2,914,790	*100.0*	$ 17,812	*0.6*
Product cost of goods sold	1,545,269	*52.7*	1,573,791	*54.0*	(28,522)	*(1.8)*
Product gross profit	$ 1,387,333	*47.3*	$ 1,340,999	*46.0*	$ 46,334	*3.5*

* Denotes % of product revenue

** Denotes % change from 2020 to 2021

	Fiscal Year					
	2021	%*	2020	%*	Increase (decrease)	%**
Service revenue	$ 688,082	*100.0*	$ 617,367	*100.0*	$ 70,715	*11.5*
Service cost of goods sold	353,436	*51.4*	305,475	*49.5*	47,961	*15.7*
Service gross profit	$ 334,646	*48.6*	$ 311,892	*50.5*	$ 22,754	*7.3*

* Denotes % of service revenue

** Denotes % change from 2020 to 2021

- **Gross profit as a percentage of revenue** increased by $69.1 million. Gross profit as a percentage of total revenue ("gross margin") increased by 80 basis points. Our gross margin benefited from product cost reductions and a $7.0 million benefit from the CEWS program, partially offset by market-based price compression that we encountered during the period and a reduction in our services gross margin. Due to the impact of COVID-19 and related restrictions on sales and marketing activities described in "Overview" above, a higher proportion of our fiscal 2021 revenue consisted of sales of existing technology offerings deployed in the networks of existing customers, as compared to sales to new customers, early stage network deployments for recent design wins, or the introduction of new platforms, all of which tend to carry lower margins. We expect our future gross margins to reduce from these elevated short-term levels as the adverse impact of the pandemic on new business lessens and our overall revenue resumes a more typical composition of revenue from existing and new business. Moreover, as described in "Overview" above, we expect the current market shortage for semiconductor components and constrained supply environment to increase our costs of goods sold and to adversely impact our gross margin during fiscal 2022. We believe these supply chain challenges and their adverse impact on our business and financial results will persist, at least through the first half of calendar 2022, and may extend into periods thereafter.
- **Gross profit on products as a percentage of product revenue** increased by $46.3 million. Gross profit on products as a percentage of product revenue ("product gross margin") increased by 130 basis points, primarily due to product cost reductions and a $4.3 million benefit from the CEWS program, partially offset by market-based price compression we encountered during the period as mentioned above.
- **Gross profit on services as a percentage of services revenue** increased by $22.8 million. Gross profit on services as a percentage of service revenue ("service gross margin) decreased by 190 basis points, primarily due to lower installation and deployment margins. The lower margins on

installation and deployment services were primarily due to certain customer site readiness delays that caused cost inefficiencies. Lower service margins were also driven by higher compensation costs associated with our annual cash incentive compensation plan. These lower margins were partially offset by a $2.7 million benefit from the CEWS program.

Operating Expense

Currency Fluctuations

During fiscal 2021, approximately 49.4% of our operating expense was non-U.S. Dollar denominated, including Canadian Dollars, Indian Rupees, British Pounds and Euros. During fiscal 2021 as compared to fiscal 2020, the U.S. Dollar primarily weakened against these and other currencies. Consequently, our operating expense reported in U.S. Dollars increased by approximately $15.1 million, or 1.2%, net of hedging.

CEWS Program Benefits

In fiscal 2021, we recorded CEWS benefits of $34.3 million, net of certain fees, related to the particular line item within operating expense in our Consolidated Statement of Operations to which the grant activity related. For further information relating to our receipt of amounts under the CEWS program, see Note 3 to our Consolidated Financial Statements included in Item 8 of Part II of this report.

Operating expense increased in fiscal 2021 from the level reported for fiscal 2020 primarily due to an increase in certain variable compensation costs associated with our annual cash incentive compensation plan, offset by decreases in travel and entertainment costs as a result of the impact of COVID-19. We expect operating expense to continue to increase from the level reported in fiscal 2021 primarily due to planned investment in research and development to advance our strategy and our expectation that customer engagement and related travel and entertainment costs will begin to normalize.

Operating expense consists of the component elements described below.

- *Research and development expense* primarily consists of salaries and related employee expense (including share-based compensation expense), prototype costs relating to design, development, product testing, depreciation expense, and third-party consulting costs.

- *Selling and marketing expense* primarily consists of salaries, commissions and related employee expense (including share-based compensation expense) and sales and marketing support expense, including travel, demonstration units, trade show expense, and third-party consulting costs.

- *General and administrative expense* primarily consists of salaries and related employee expense (including share-based compensation expense) and costs for third-party consulting and other services.

- *Significant asset impairments and restructuring costs* primarily reflect actions we have taken to improve the alignment of our workforce, facilities and operating costs with perceived market opportunities, business strategies, changes in market and business conditions, the redesign of certain business processes and significant impairments of assets.

- *Amortization of intangible assets* primarily reflects the amortization of both purchased technology and the value of customer relationships derived from our acquisitions.

- *Acquisition and integration costs* primarily consist of employee-related costs associated with a three-year earn-out arrangement related to the acquisition of DonRiver Holdings, LLC ("DonRiver") in fiscal 2018 and other fees related to the acquisition of Centina Systems, Inc. ("Centina") in fiscal 2020.

The table below sets forth the changes in operating expense for the periods indicated (in thousands, except percentage data):

	Fiscal Year					
	2021	%*	2020	%*	Increase (decrease)	%**
Research and development	$ 536,666	*14.8*	$ 529,888	*15.0*	$ 6,778	*1.3*
Selling and marketing	452,214	*12.5*	416,425	*11.8*	35,789	*8.6*
General and administrative	181,874	*5.0*	169,548	*4.8*	12,326	*7.3*
Significant asset impairments and restructuring costs	29,565	*0.8*	22,652	*0.6*	6,913	*30.5*
Amortization of intangible assets	23,732	*0.7*	23,383	*0.7*	349	*1.5*
Acquisition and integration costs	2,572	*0.1*	4,031	*0.1*	(1,459)	*(36.2)*
Total operating expenses	$ 1,226,623	*33.9*	$ 1,165,927	*33.0*	$ 60,696	*5.2*

* Denotes % of total revenue

** Denotes % change from 2020 to 2021

- **Research and development expense** was adversely affected by $6.7 million as a result of foreign exchange rates, net of hedging, primarily due to the weakening of the U.S. Dollar in relation to the Canadian Dollar. Including the effect of foreign exchange rates, research and development expense increased by $6.8 million. This increase primarily reflects an increase in employee and compensation costs associated with higher headcount, and our annual cash incentive compensation plan, partially offset by $29.5 million received from the CEWS program and a decrease in professional services.

- **Selling and marketing expense** was adversely affected by $6.8 million as a result of foreign exchange rates, primarily due to the weakening of the U.S. Dollar in relation to the Canadian Dollar and Euro. Including the effect of foreign exchange rates, sales and marketing expense increased by $35.8 million. This increase primarily reflects an increase in employee and compensation costs associated with higher sales commissions, partially offset by decreases in travel and entertainment costs as a result of COVID-19.

- **General and administrative expense** was adversely affected by $1.6 million as a result of foreign exchange rates, primarily due to the weakening of the U.S. Dollar in relation to the Canadian Dollar and Euro. Including the effect of foreign exchange rates, general and administrative expense increased by $12.3 million. This increase primarily reflects an increase in employee and compensation costs associated with our annual cash incentive compensation plan and legal fees, partially offset by reduced bad debt expense.

- **Significant asset impairments and restructuring costs** reflect actions that we have taken to redesign certain business processes and align our global workforce and facilities as part of a business optimization strategy to improve gross margin and constrain operating expense.
- **Amortization of intangible assets** remained relatively unchanged.
- **Acquisition and integration costs** primarily reflect acquisition compensation associated with a three-year earn-out arrangement related to the acquisition of DonRiver in fiscal 2018 and other fees related to the acquisition of Centina in fiscal 2020.

Other Items

The table below sets forth the changes in other items for the periods indicated (in thousands, except percentage data):

	Fiscal Year									
		2021	%*		2020	%*		Increase (decrease)	%**
Interest and other income (loss), net	$	(1,768)	—	$	964	—	$	(2,732)	*(283.4)*
Interest expense	$	30,837	*0.9*	$	31,321	*0.9*	$	(484)	*(1.5)*
Loss on extinguishment/ modification of debt	$	—	—	$	(646)	—	$	(646)	*100.0*
Provision (benefit) for income taxes	$	(37,445)	*(1.0)*	$	94,670	*2.7*	$	(132,115)	*(139.6)*

* Denotes % of total revenue

** Denotes % change from 2020 to 2021

- **Interest and other income (loss), net** decreased, primarily reflecting lower interest income due to reduced interest rates on our investments, partially offset by the impact of foreign exchange rates on assets and liabilities denominated in a currency other than the relevant functional currency, net of hedging activity.
- **Interest expense** remained relatively unchanged.
- **Loss on extinguishment and modification of debt** reflects the refinance of our 2025 Term Loan. See Note 19 to our Consolidated Financial Statements in Item 8 of Part II of this report.
- **Provision (benefit) for income taxes** decreased, primarily due to the $119.3 million tax benefit associated with recording a deferred tax asset for fiscal 2021. The effective tax rate for fiscal 2021 was lower as compared to fiscal 2020, primarily due to the tax benefit associated with recording a deferred tax asset. For further discussion, see Note 23 to our Consolidated Financial Statements included in Item 8 of Part II of this report.

Segment Profit (Loss)

The table below sets forth the changes in our segment profit (loss) for the respective periods (in thousands, except percentage data):

	Fiscal Year			
	2021	2020	Increase (decrease)	%*
Segment profit (loss):				
Networking Platforms	$ 850,901	$ 827,105	$ 23,796	*2.9*
Platform Software and Services	$ 136,602	$ 105,609	$ 30,993	*29.3*
Blue Planet Automation Software and Services	$ (711)	$ (12,446)	$ 11,735	*(94.3)*
Global Services	$ 198,521	$ 202,735	$ (4,214)	*(2.1)*

* Denotes % change from 2020 to 2021

Segment profit (loss) includes CEWS benefits of $36.5 million in fiscal 2021, net of certain fees. For further discussion of benefits from the CEWS program, see Note 3 to our Consolidated Financial Statements included in Item 8 of Part II of this annual report.

- **Networking Platforms segment** profit increased, primarily due to higher sales volume, as described above, higher gross margin and a CEWS benefit of $30.4 million, offset by higher research and development costs.
- **Platform Software and Services segment** profit increased, primarily due to higher sales volume, as described above, higher gross margin, and lower research and development costs which benefited from a CEWS benefit of $2.6 million.
- **Blue Planet Automation Software and Services segment** loss decreased, primarily due to higher sales volume, as described above, higher gross margin on software revenue and lower research and development costs which partially benefited from a CEWS benefit of $1.2 million, partially offset by lower gross margin on software-related services.
- **Global Services segment** profit decreased, primarily due to lower gross margin, partially offset by higher sales volume, as described above and lower research and development costs which benefited from a CEWS benefit of $2.3 million.

Liquidity and Capital Resources

Overview. For the fiscal year ended October 30, 2021, we generated $541.6 million of cash from operations, as our net income (adjusted for non-cash charges) of $609.8 million exceeded our working capital requirements of $68.2 million. For additional details on our cash provided by operating activities, see the discussion below under the caption “Cash Provided By Operating Activities.”

Cash, cash equivalents and investments increased by $352.6 million during fiscal 2021. The cash from operations above was partially offset by the following: (i) cash used to fund our investing activities for capital expenditures totaling $79.6 million; (ii) cash used for stock repurchase under our stock repurchase program of $91.3 million; (iii) stock repurchased upon vesting of our stock unit awards to employees relating to tax withholding of $44.1 million; and (iv) cash used for payments on our term loan due September 28, 2025 (the “2025 Term Loan”) of $6.9 million. Proceeds from the issuance of equity under our employee stock purchase plans provided $28.5 million in cash during fiscal 2021.

See Notes 19 and 22 to our Consolidated Financial Statements included in Item 8 of Part II of this report for information relating to these transactions.

The following table sets forth changes in our cash and cash equivalents and investments in marketable debt securities (in thousands):

	October 30, 2021	October 31, 2020	Increase (decrease)
Cash and cash equivalents	$ 1,422,546	$ 1,088,624	$ 333,922
Short-term investments in marketable debt securities	181,483	150,667	30,816
Long-term investments in marketable debt securities	70,038	82,226	(12,188)
Total cash and cash equivalents and investments in marketable debt securities	$ 1,674,067	$ 1,321,517	$ 352,550

Principal Sources of Liquidity. Our principal sources of liquidity on hand include our cash and investments, which as of October 30, 2021 totaled $1.67 billion, as well as the senior secured asset-based revolving credit facility to which we and certain of our subsidiaries are parties (the "ABL Credit Facility"). The ABL Credit Facility, which we and certain of our subsidiaries entered into on October 28, 2019, replaced a predecessor senior secured asset-based revolving credit facility and provides for a total commitment of $300 million with a maturity date of October 28, 2024. We principally use the ABL Credit Facility to support the issuance of letters of credit that arise in the ordinary course of our business and thereby to reduce our use of cash required to collateralize these instruments. As of October 30, 2021, letters of credit totaling $87.4 million were outstanding under our ABL Credit Facility. There were no borrowings outstanding under the ABL Credit Facility as of October 30, 2021.

Foreign Liquidity. The amount of cash, cash equivalents and short-term investments held by our foreign subsidiaries was $432.3 million as of October 30, 2021. We intend to reinvest indefinitely our foreign earnings. If we were to repatriate these accumulated historical foreign earnings, the provisional amount of unrecognized deferred income tax liability related to foreign withholding taxes would be approximately $32.0 million. See Note 23 to our Consolidated Financial Statements included in Item 8 of Part II of this report.

Stock Repurchase Authorization. On December 13, 2018, we announced that our Board of Directors authorized a program to repurchase up to $500 million of our common stock, which replaced in its entirety the previous stock repurchase program authorized in fiscal 2018. We repurchased $92.1 million under this program during fiscal 2021. We did not repurchase any shares of our common stock under this program after October 30, 2021. On December 9, 2021, we announced that our Board of Directors authorized a program to repurchase up to $1.0 billion of our common stock, which replaced in its entirety the previous stock repurchase program authorized in fiscal 2019. On December 13, 2021, in connection with this repurchase program, we entered into an accelerated share repurchase agreement for the repurchase of $250.0 million of our common stock. The amount and timing of the remaining 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 28 to our Consolidated Financial Statements included in Item 8 of Part II of this report.

Liquidity Position. Based on past performance and current expectations, we believe that cash from operations, cash, cash equivalents, investments, and other sources of liquidity, including our ABL Credit Facility, will satisfy our currently anticipated working capital needs, capital expenditures, and other liquidity requirements associated with our operations through the next 12 months and the reasonably foreseeable future. We regularly evaluate our liquidity position, debt obligations, and anticipated cash needs to fund our operating or investment plans, and will continue to consider capital raising and other market opportunities that may be available to us. We regularly evaluate alternatives to manage our capital structure and market opportunities to enhance our liquidity and provide further operational and strategic flexibility. While the COVID-19 pandemic has not materially impacted our liquidity and capital resources to date, it has led to disruptions and volatility in capital markets and credit markets. Any potential further economic or market impact of the COVID-19 pandemic remains uncertain, and there can be no assurance that it will not have an adverse effect on our liquidity and capital resources, including our ability to access capital markets, in the future.

Cash Provided by Operating Activities

The following sections set forth the components of our $541.6 million of cash provided by operating activities for fiscal 2021:

Net Income (adjusted for non-cash charges)

The following table sets forth our net income (adjusted for non-cash charges) during fiscal 2021 (in thousands):

		Year Ended October 30, 2021
Net income	$	500,196
Adjustments for non-cash charges:		
Depreciation of equipment, building, furniture and fixtures, and amortization of leasehold improvements		96,233
Share-based compensation costs		84,336
Amortization of intangible assets		36,033
Deferred taxes		(156,469)
Provision for inventory excess and obsolescence		17,850
Provision for warranty		17,093
Other		14,525
Net income (adjusted for non-cash charges)	$	609,797

Working Capital

We used $68.2 million of cash for working capital during fiscal 2021. The following table sets forth the major components of the cash used in working capital (in thousands):

		Year Ended October 30, 2021
Cash used in accounts receivable	$	(174,377)
Cash used in inventories		(47,567)
Cash used in prepaid expenses and other		(19,691)
Cash provided by accounts payable, accruals and other obligations		162,134
Cash provided by deferred revenue		16,822
Cash used in operating lease assets and liabilities, net		(5,472)
Total cash used for working capital	$	(68,151)

As compared to the end of fiscal 2020:

- The $174.4 million of cash used in accounts receivable during fiscal 2021 reflects increased sales volume at the end of the fourth quarter of fiscal 2021;
- The $47.6 million of cash used in inventory during fiscal 2021 primarily reflects increases in raw materials inventory related to the steps we are taking to mitigate the impact of current supply chain constraints and the global market shortage of semiconductor parts described in “Overview” above;

- The $19.7 million of cash used in prepaid expenses and other during fiscal 2021 primarily reflects increases in contract assets for unbilled accounts receivable, capitalized commissions and foreign currency forward contracts, partially offset by decreases in upfront future discounts paid to customers and product demonstration equipment;
- The $162.1 million of cash provided by accounts payable, accruals and other obligations during fiscal 2021 primarily reflects higher provisions under our annual cash incentive compensation plan, and increased income taxes payable;
- The $16.8 million of cash provided by deferred revenue during fiscal 2021 represents an increase in advanced payments received from customers prior to revenue recognition; and
- The $5.5 million of cash used in operating lease assets and liabilities, net, during fiscal 2021 represents cash paid for operating lease payments in excess of operating lease costs. For more details, see Note 18 to our Consolidated Financial Statements in Item 8 of Part II of this report.

Our days sales outstanding ("DSOs") were 98 for fiscal 2021 as compared to 82 for fiscal 2020. Our inventory turns decreased from 4.6 turns during fiscal 2020 to 4.1 turns during fiscal 2021 due to the increase in inventory. The calculation of DSOs includes accounts receivable, net and contract assets for unbilled receivables, net included in prepaid expenses and other.

Cash Paid for Interest

The following table sets forth the cash paid for interest during fiscal 2021 (in thousands):

		Year Ended October 30, 2021
Term Loan due September 28, 2025[1]	$	12,960
Interest rate swaps[2]		10,087
ABL Credit Facilities[3]		1,935
Finance leases		4,882
Cash paid during period	$	29,864

[1] Interest on the New 2025 Term Loan is payable periodically based on the interest period selected for borrowing. The New 2025 Term Loan bears interest at LIBOR for the chosen borrowing period plus a spread of 1.75% subject to a minimum LIBOR rate of 0.00%. At the end of fiscal 2021, the interest rate on the New 2025 Term Loan was 1.84%.

[2] The interest rate swaps fix the LIBOR rate for $350.0 million of the New 2025 Term Loan at 2.957% through September 2023.

[3] During fiscal 2021, we utilized the ABL Credit Facility and its predecessor to collateralize certain standby letters of credit and paid $1.9 million in commitment fees, interest expense and other administrative charges relating to the ABL Credit Facility.

For additional information about our term loans, ABL Credit Facility and interest rate swaps, see Notes 16, 19 and 20 to our Consolidated Financial Statements included in Item 8 of Part II of this annual report and Item 7A of Part II of this annual report.

Contractual Obligations

Debt. As of October 30, 2021, we had $6.9 million outstanding principal associated with our 2025 Term Loan payable within 12 months. Interest on the 2025 Term Loan and payments due under the interest rate swaps is variable and is calculated using the rate in effect on the balance sheet date. Future interest payments associated with the 2025 Term Loan Notes total $49.0 million, with $12.6 million payable within 12 months. Future interest payments associated with the interest rate swaps total $19.5 million, with $10.2 million payable within 12 months. For additional information about our term loan and the interest rate swaps, see Notes 16 and 19 to our Consolidated Financial Statements included in Item 8 of Part II of this annual report and Item 7A of Part II of this annual report.

Purchase Order Obligations. As of October 30, 2021, we had $430.7 million in outstanding purchase order commitments to our contract manufacturers and component suppliers for inventory. In certain instances, we are permitted to cancel, reschedule or adjust these orders. Consequently, only a portion of this amount relates to firm, non-cancelable and unconditional obligations.

Leases. We have lease arrangements for facilities including research and development centers, engineering facilities and smaller offices in regions throughout the world to support sales and services operations. Office facilities are leased under various non-cancelable operating or finance leases. As of October 30, 2021, we had fixed lease payment obligations of $160.2 million, with $28.2 million payable within 12 months. See Note 18 to our Consolidated Financial Statements included in Item 8 of Part II of this annual report.

Off-Balance Sheet Arrangements

We do not engage in any off-balance sheet financing arrangements. In particular, we do not have any equity interests in so-called limited purpose entities, which include special purpose entities (SPEs) and structured finance entities.

Critical Accounting Policies and Estimates

The preparation of our consolidated financial statements requires that we make estimates and judgments that affect the reported amounts of assets, liabilities, revenue and expense, and related disclosure of contingent assets and liabilities. Note 1 to our Consolidated Financial Statements included in Item 8 of Part II of this annual report describes the significant accounting policies and methods used in the preparation of the Consolidated Financial Statements. By their nature, these estimates and judgments are subject to an inherent degree of uncertainty. On an ongoing basis, we reevaluate our estimates, including those related to revenue recognition, share-based compensation, bad debts, inventories, intangible and other long-lived assets, goodwill, income taxes, warranty obligations, restructuring, derivatives and hedging, and contingencies and litigation. We base our estimates on historical experience and on various other assumptions that we believe to be reasonable. The inputs into certain of our judgments, assumptions, and estimates reflect, among other things, the information available to us regarding the economic implications of the COVID-19 pandemic, and expectations as to its impact on our business and on our critical and significant accounting estimates. Among other things, these estimates form the basis for judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ materially from these estimates under different assumptions or conditions. To the extent that there are material differences between our estimates and actual results, our consolidated financial statements will be affected. In addition, including because the duration and severity of COVID-19 pandemic are uncertain, certain of our estimates could require further judgment or modification and therefore carry a higher degree of variability and volatility. As events continue to evolve, our estimates may change materially in future periods.

We believe that the following critical accounting policies reflect those areas where significant judgments and estimates are used in the preparation of our consolidated financial statements.

Revenue Recognition

Revenue is allocated among performance obligations based on standalone selling price ("SSP"). SSP reflects the price at which we would expect to sell that product or service on a stand-alone basis at contract inception and that we would expect to be entitled to receive for the promised products or services. SSP is estimated for each distinct performance obligation, and judgment may be required in its determination. The best evidence of SSP is the observable price of a product or service when we sell the products separately in similar circumstances and to similar customers. In instances where SSP is not directly observable, we determine SSP using information that may include market conditions and other observable inputs.

We apply judgment in determining the transaction price, as we may be required to estimate variable consideration when determining the amount of revenue to recognize. Variable consideration can include various rebate, cooperative marketing, and other incentive programs that we offer to our distributors, partners and customers. When determining the amount of revenue to recognize, we estimate the expected usage of these programs, applying the expected value or most likely estimate and updates the estimate at each reporting period as actual utilization data becomes available. We also consider any customer right of return and any actual or potential payment of liquidated damages, contractual or similar penalties, or other claims for performance failures or delays in determining the transaction price, where applicable.

When transfer of control is judged to be over time for installation and professional service arrangements, we apply the input method to determine the amount of revenue to be recognized in a given period. Utilizing the input method, we recognize revenue based on the ratio of actual costs incurred to date to the total estimated costs expected to be incurred. Revenue for software subscription and maintenance is recognized ratably over the period during which the services are performed.

Our total deferred revenue for products was \$12.9 million and \$17.5 million as of October 30, 2021 and October 31, 2020, respectively. Our services revenue is deferred and recognized ratably over the period during which the services are to be performed. Our total deferred revenue for services was \$162.6 million and \$140.8 million as of October 30, 2021 and October 31, 2020, respectively.

Business Combinations

We record acquisitions using the purchase method of accounting. All of the assets acquired, liabilities assumed, contractual contingencies and contingent consideration are recognized at their fair value as of the acquisition date. The excess of the purchase price over the estimated fair values of the net tangible and net intangible assets acquired is recorded as goodwill. The application of the purchase method of accounting for business combinations requires management to make significant estimates and assumptions in the determination of the fair value of assets acquired and liabilities assumed in order to allocate purchase price consideration properly between assets that are depreciated and amortized from goodwill. These assumptions and estimates include a market participant's use of the asset and the appropriate discount rates for a market participant. Our estimates are based on historical experience, information obtained from the management of the acquired companies and, when appropriate, include assistance from independent third-party appraisal firms. Our significant assumptions and estimates can include, but are not limited to, the cash flows that an asset is expected to generate in the future, the appropriate weighted-average cost of capital, and the cost savings expected to be derived from acquiring an asset. These estimates are inherently uncertain and unpredictable. In addition, unanticipated events and circumstances may occur that may affect the accuracy or validity of such estimates. During fiscal 2020, we completed the Centina acquisition for a purchase price of \$34.0 million. See Note 4 to our Consolidated Financial Statements in Item 8 of Part II of this annual report for more information regarding this transaction.

Share-Based Compensation

We estimate the fair value of our restricted stock unit awards based on the fair value of our common stock on the date of grant. Our outstanding restricted stock unit awards are subject to service-based vesting conditions and/or performance-based vesting conditions. We recognize the estimated fair value of service-based awards as share-based expense ratably over the vesting period on a straight-line basis. Awards with performance-based vesting conditions require the achievement of certain financial or other performance criteria or targets as a condition to the vesting, or acceleration of vesting. We recognize the estimated fair value of performance-based awards as share-based expense over the performance period, using graded vesting, which considers each performance period or tranche separately, based on our determination of whether it is probable that the performance targets will be achieved. At the end of each reporting period, we reassess the probability of achieving the performance targets and the performance period required to meet those targets, and the expense is adjusted accordingly. Determining whether the performance targets will be achieved involves judgment, and the estimate of expense may be revised periodically based on changes in the probability of achieving the performance targets. Revisions are reflected in the period in which the estimate is changed. If any performance goals are not met, no compensation cost is ultimately recognized against that goal and, to the extent previously recognized, compensation cost is reversed.

Share-based compensation expense is taken into account based on awards granted. In the event of a forfeiture of an award, the expense related to the unvested portion of that award is reversed. Reversal of share-based compensation expense based on forfeitures can materially affect the measurement of estimated fair value of our share-based compensation. See Note 24 to our Consolidated Financial Statements in Item 8 of Part II of this annual report for information regarding our assumptions related to share-based compensation and the amount of share-based compensation expense we incurred for the periods covered in this report. As of October 30, 2021, total unrecognized compensation expense was $143.3 million, which relates to unvested restricted stock units and is expected to be recognized over a weighted-average period of 1.51 years.

We are required to record excess tax benefits or tax deficiencies related to stock-based compensation as income tax benefit or expense when share-based awards vest or are settled.

Reserve for Inventory Obsolescence

We make estimates about future customer demand for our products when establishing the appropriate reserve for excess and obsolete inventory. We write down inventory that has become obsolete or unmarketable by an amount equal to the difference between the cost of inventory and the estimated market value based on assumptions about future demand, which are affected by changes in our strategic direction, discontinuance of a product or introduction of newer versions of our products, declines in the sales of or forecasted demand for certain products, and general market conditions. Inventory write downs are a component of our product cost of goods sold. Upon recognition of the write down, a new lower cost basis for that inventory is established, and subsequent changes in facts and circumstances do not result in the restoration or increase in that newly established cost basis. In an effort to limit our exposure to delivery delays and to satisfy customer needs, we purchase inventory based on forecasted sales across our product lines. In addition, part of our research and development strategy is to promote the convergence of similar features and functionalities across our product lines. Each of these practices exposes us to the risk that our customers will not order products for which we have forecasted sales, or will purchase less than we have forecasted.

We recorded charges for excess and obsolete inventory of $17.9 million, $24.7 million and $28.1 million in fiscal 2021, 2020 and 2019, respectively. Our inventory, net of allowance for excess and obsolescence, was $374.3 million and $344.4 million as of October 30, 2021 and October 31, 2020, respectively.

Allowance for Credit Losses for Accounts Receivable and Contract Assets

We estimate our allowances for credit losses using relevant available information from internal and external sources. This information is related to past events, current conditions and reasonable and supportable forecasts. Historical credit loss experience provides the basis for the estimation of expected credit losses. When assessing for credit losses, we determine collectability by pooling assets with similar characteristics. The allowances for credit losses are each measured on a collective basis when similar risk characteristics exist. The allowances for credit losses are each measured by multiplying the exposure probability of default (the probability that asset will default within a given time frame) by the loss given default rate (the percentage of the asset not expected to be collected due to default) based on the pool of assets.

Probability of default rates is published by third-party credit rating agencies. Adjustments to our exposure probability may take into account a number of factors, including, but not limited to, various customer-specific factors, the potential sovereign risk of the geographic locations in which the customer is operating and macroeconomic conditions. These factors are updated regularly or when facts and circumstances indicate that an update is deemed necessary.

Our accounts receivable, net of allowance for credit losses, was $885.0 million and $719.4 million as of October 30, 2021 and October 31, 2020, respectively. Our allowance for credit losses was $10.9 million and $10.6 million as of October 30, 2021 and October 31, 2020, respectively.

Our contract assets for unbilled accounts receivable, net of allowance for credit losses, was $101.4 million and $85.8 million as of October 30, 2021 and October 31, 2020, respectively. Our allowance for credit losses was $0.1 million as of October 30, 2021. There was no allowance for credit losses as of October 31, 2020.

Goodwill

Our goodwill was generated from the acquisitions of (i) Cyan during fiscal 2015, (ii) the high-speed photonics components assets of TeraXion during fiscal 2016, (iii) Packet Design on July 2, 2018, (iv) DonRiver on October 1, 2018, and (v) Centina on November 2, 2019. The goodwill from these acquisitions is primarily related to expected economic synergies. Goodwill is the excess of the purchase price over the fair values assigned to the net assets acquired in a business combination. We test goodwill for impairment on an annual basis, which we have determined to be as of the last business day of fiscal September each year. We also test goodwill for impairment 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.

We test goodwill impairment by comparing the fair value of the reporting unit with the unit's carrying amount, including goodwill. Goodwill is allocated to reporting units based on relative fair value using a discounted cash flow model. If this test indicates that the fair value is less than the carrying value, then an impairment loss is recognized limited to the total amount of goodwill allocated to that reporting unit. A non-cash goodwill impairment charge would have the effect of decreasing earnings or increasing losses in such period. If we are required to take a substantial impairment charge, our operating results would be materially adversely affected in such period. As of October 30, 2021 and October 31, 2020, the goodwill balance was $311.6 million and $310.8 million, respectively. There were no goodwill impairments resulting from our fiscal 2021 and 2020 impairment tests and no reporting unit was determined to be at risk of failing the goodwill impairment test. See Note 14 to our Consolidated Financial Statements included in Item 8 of Part II of this annual report.

Long-lived Assets

Our long-lived assets include equipment, building, furniture and fixtures, operating ROU assets, finite-lived intangible assets and maintenance spares. As of October 30, 2021 and October 31, 2020 these assets totaled $450.3 million and $488.1 million, net, respectively. We test long-lived assets for impairment whenever triggering events or changes in circumstances indicate that the assets' carrying amount is not recoverable from its undiscounted cash flows. Our long-lived assets are assigned to asset groups which represent the lowest level for which we identify cash flows. We measure impairment loss as the amount by which the carrying amount of the asset or asset group exceeds its fair value.

Deferred Tax Assets

Pursuant to ASC Topic 740, Income Taxes, we maintain a valuation allowance for a deferred tax asset when it is deemed to be more likely than not that some or all of the deferred tax asset will not be realized. The ultimate realization of deferred tax assets is dependent on the generation of future taxable income (including the reversals of deferred tax liabilities) during the periods in which those deferred tax assets will become deductible. In evaluating whether a valuation allowance is required under such rules, we consider all available positive and negative evidence, including prior operating results, the nature and reason for any losses, our forecast of future taxable income, utilization of tax planning strategies, and the dates on which any deferred tax assets are expected to expire. These assumptions and estimates require a significant amount of judgment and are made based on current and projected circumstances and conditions.

Quarterly, we perform an analysis to determine the likelihood of realizing our deferred tax assets and whether sufficient evidence exists to support reversal of all or a portion of the valuation allowance. The valuation allowance balances at October 30, 2021 and October 31, 2020 were $159.6 million and $151.4 million, respectively. The corresponding net deferred tax assets were $800.2 million and $647.8 million, respectively. We will continue to evaluate future financial performance to determine whether such performance is both sustained and significant enough to provide sufficient evidence to support reversal of all or a portion of the remaining valuation allowance. The value of our net deferred tax asset may be subject to change in the future, depending on our generation or projections of future taxable income, as well as changes in tax policy or our tax planning strategy.

During fiscal 2021, we completed an internal transfer of certain of our non-U.S. intangible assets, which created amortizable tax basis resulting in the discrete recognition of a $119.3 million deferred tax asset with a corresponding tax benefit. The recognition of the deferred tax asset from the internal transfer of the non-U.S. intangible assets requires management to make estimates and assumptions to determine the fair value of the intangible assets transferred and significant judgments in evaluating the application of tax laws in the applicable jurisdictions, including where the deferred tax asset will be recovered. Estimates in valuing the intangible assets include, but are not limited to, internal revenue and expense forecasts, the estimated life of the intangible assets, and discount rates, which are affected by expectations about future market or economic conditions. Although we believe the assumptions and estimates that we have made are reasonable and appropriate, they are based, in part, on historical experience and are inherently uncertain.

For further discussion, see Note 23 to our Consolidated Financial Statements included in Item 8 of Part II of this annual report.

Warranty

Our liability for product warranties, included in accrued liabilities and other short-term obligations, was $48.0 million and $49.9 million as of October 30, 2021 and October 31, 2020, respectively. Our products are generally covered by a warranty for periods ranging from one to five years. We accrue for warranty costs as part of our cost of goods sold based on associated material costs, technical support labor costs and associated overhead. Material cost is estimated based primarily on historical trends in the volume of product returns within the warranty period and the cost to repair or replace the equipment. Technical support labor cost is estimated based primarily on historical trends and the cost to support customer repairs within the warranty period. The provision for product warranties, net of adjustments for previous years' provisions, was $17.1 million, $22.4 million and $23.1 million for fiscal 2021, 2020 and 2019, respectively. The provision for warranty claims may fluctuate on a quarterly basis depending on the mix of products and customers in that period. If actual product failure rates, material replacement costs, service or labor costs differ from our estimates, revisions to the estimated warranty provision would be required. See Note 15 to our Consolidated Financial Statements included in Item 8 of Part II of this annual report.

Effects of Recent Accounting Pronouncements

See Note 1 to our Consolidated Financial Statements included in Item 8 of Part II of this annual report for information relating to our discussion of the effects of recent accounting pronouncements.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

We are exposed to market risk related to changes in interest rates and foreign currency exchange rates. The following discussion about these market risks includes forward-looking statements. Actual results could differ materially from those projected in these forward-looking statements.

Interest Rate Sensitivity. We currently hold investments in U.S. government obligations with varying maturities. See Notes 7 and 8 to our Consolidated Financial Statements included in Item 8 of Part II of this annual report for information relating to investments and fair value. These investments are sensitive to interest rate movements, and their fair value will decline as interest rates rise and increase as interest rates decline. The estimated impact on these investments of a 100 basis point (1.0%) increase in interest rates across the yield curve from rates in effect as of the balance sheet date would be a $2.0 million decline in value.

Our earnings and cash flows from operations would be exposed to changes in interest rates because of the floating rate of interest in our 2025 Term Loan if such loan was not hedged using floating-to-fixed rate interest rate swaps. See Note 16 to our Consolidated Financial Statements included in Item 8 of Part II of this annual report. The 2025 Term Loan bears interest at LIBOR plus a spread of 1.75%, subject to a minimum LIBOR rate of 0.00%. We have entered into interest rate swap arrangements ("interest rate swaps") that fix the LIBOR rate of approximately $350.0 million of the 2025 Term Loan principal amount at 2.957% through September 2023. As such, a 100 basis point (1.0%) increase in the LIBOR rate as of our most recent LIBOR rate setting would increase our annualized interest expense by approximately $3.3 million on the unhedged portion of our 2025 Term Loan as recognized in our Consolidated Financial Statements. See Notes 16 and 19 to our Consolidated Financial Statements included in Item 8 of Part II of this annual report for information relating to our 2025 Term Loan.

Foreign Currency Exchange Risk. As a global concern, our business and results of operations are exposed to and can be impacted by movements in foreign currency exchange rates. Because we sell globally, some of our sales transactions and revenue are non-U.S. Dollar denominated, with the Euro, Canadian Dollar and Brazilian Real being our most significant foreign currency revenue exposures. If the U.S. Dollar strengthens against these currencies, our revenue for these transactions reported in U.S. Dollars would decline. For our U.S. Dollar denominated sales, an increase in the value of the U.S. Dollar would increase the real costs of our products to customers in markets outside the United States, which could impact our competitive position. During fiscal 2021, approximately 16.4% of revenue was non-U.S. Dollar denominated. During fiscal 2021 as compared to fiscal 2020, the U.S. Dollar weakened against a number of foreign currencies. Consequently, our revenue reported in U.S. Dollars slightly increased by approximately $21.8 million or 0.6%. As it relates to costs of goods sold, employee-related and facilities costs associated with certain manufacturing-related operations in Canada represent our primary exposure to foreign currency exchange risk.

With regard to operating expense, our primary exposure to foreign currency exchange risk relates to the Canadian Dollar, Indian Rupee, Brazilian Real, British Pound and Euro. During fiscal 2021, approximately 49.4% of our operating expense was non-U.S. Dollar denominated. If currencies strengthen against the U.S. Dollar, costs reported in U.S. Dollars will increase. During fiscal 2021 as compared to fiscal 2020, the U.S. Dollar primarily weakened against these and other currencies. Consequently, our operating expense reported in U.S. Dollars slightly increased by approximately $15.1 million, or 1.2%, net of hedging.

From time to time, we use foreign currency forward contracts to reduce variability in certain forecasted non-U.S. Dollar denominated cash flows. Generally, these derivatives have maturities of 24 months or less and are designated as cash flow hedges. At the inception of the cash flow hedge, and on an ongoing basis, we assess whether the forward contract has been effective in offsetting changes in cash flows attributable to the hedged risk during the hedging period. The derivative's net gain or loss is initially reported as a component of accumulated other comprehensive income (loss) and, upon the occurrence of the forecasted transaction, is subsequently reclassified to the line item in the Consolidated Statement of Operations to which the hedged transaction relates.

During fiscal 2021, we recorded $14.6 million in foreign currency exchange losses, as a result of monetary assets and liabilities that were transacted in a currency other than the entity's functional currency, and the re-measurement adjustments were recorded in interest and other income (loss), net on our Consolidated Statement of Operations. From time to time, we use foreign currency forwards to hedge these balance sheet exposures. These forwards are not designated as hedges for accounting purposes, and any net gain or loss associated with these derivatives is reported in interest and other income (loss), net. During fiscal 2021, we recorded a gain on non-hedge designated foreign currency forward contracts of $11.2 million. See Notes 1, 6 and 16 to our Consolidated Financial Statements included in Item 8 of Part II of this annual report.

Item 8. Financial Statements and Supplementary Data

The following is an index to the consolidated financial statements:

Report of Independent Registered Public Accounting Firm

To the Board of Directors and Stockholders of Ciena Corporation

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of Ciena Corporation and its subsidiaries (the "Company") as of October 30, 2021 and October 31, 2020, and the related consolidated statements of operations, of comprehensive income, of changes in stockholders' equity and of cash flows for each of the three years in the period ended October 30, 2021, including the related notes (collectively referred to as the "consolidated financial statements"). We also have audited the Company's internal control over financial reporting as of October 30, 2021, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of October 30, 2021 and October 31, 2020, and the results of its operations and its cash flows for each of the three years in the period ended October 30, 2021 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of October 30, 2021, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the COSO.

Changes in Accounting Principles

As discussed in Note 1 to the consolidated financial statements, the Company changed the manner in which it accounts for leases in 2020, and the manner in which it accounts for revenue from contracts with customers in 2019.

Basis for Opinions

The Company's management is responsible for these consolidated financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in the Report of Management on Internal Control Over Financial Reporting appearing under Item 9A. Our responsibility is to express opinions on the Company's consolidated financial statements and on the Company's internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the consolidated financial statements included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

Definition and Limitations of Internal Control over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Critical Audit Matters

The critical audit matters communicated below are matters arising from the current period audit of the consolidated financial statements that were communicated or required to be communicated to the audit committee and that (i) relate to accounts or disclosures that are material to the consolidated financial statements and (ii) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matters below, providing separate opinions on the critical audit matters or on the accounts or disclosures to which they relate.

Reserve for Excess and Obsolete Inventory

As described in Notes 1 and 10 to the consolidated financial statements, the Company's consolidated inventory balance, net of the allowance for excess and obsolescence, was $374.3 million as of October 30, 2021. Management records a provision for excess and obsolete inventory when an impairment has been identified and has a reserve for excess and obsolete inventory of $37.0 million as of October 30, 2021. Management writes down its inventory for estimated obsolescence or unmarketable inventory by an amount equal to the difference between the cost of inventory and the estimated net realizable value based on assumptions about future demand, which are affected by changes in the Company's strategic direction, discontinuance of a product or introduction of newer versions of products, declines in the sales of or forecasted demand for certain products, and general market conditions.

The principal considerations for our determination that performing procedures relating to the reserve for excess and obsolete inventory is a critical audit matter are the significant judgment by management when developing their estimate, which in turn led to a high degree of auditor judgment and effort to perform procedures and evaluate the audit evidence obtained relating to the assumptions regarding future demand.

Addressing the matter involved performing procedures and evaluating audit evidence in connection with forming our overall opinion on the consolidated financial statements. These procedures included testing the effectiveness of controls relating to the Company's evaluation of the reserve for excess and obsolete inventory, including controls over the assumptions used within the model. These procedures also included, among others, testing management's process for determining the reserve for excess and obsolete inventory.

This included evaluating the appropriateness of the inventory reserve model and the reasonableness of the significant assumptions relating to the future demand. Evaluating the assumptions related to future demand involved evaluating whether the assumptions used were reasonable considering historical sales and expectations regarding future sales. Testing management's process for determining future demand included procedures to evaluate the reliability, completeness and relevance of management's data used in the future demand assumption. Testing the relevance and reliability of the data included evaluating the reasonableness of the long-term sales forecasts and historical activity.

Internal Transfer of Certain Non-U.S. Intangible Assets

As described in Note 23 to the consolidated financial statements, the Company completed an internal transfer of certain of its non-U.S. intangible assets, which created amortizable tax basis resulting in the discrete recognition of a $119.3 million deferred tax asset with a corresponding tax benefit. As disclosed by management, the recognition of the deferred tax asset from the internal transfer of the non-U.S. intangible assets requires management to make estimates and assumptions to determine the fair value of the intangible assets transferred and significant judgments in evaluating the application of tax laws in the applicable jurisdictions, including where the deferred tax asset will be recovered.

The principal considerations for our determination that performing procedures relating to the internal transfer of certain non-U.S. intangible assets is a critical audit matter are the significant judgment by management in evaluating the application of tax laws in the applicable jurisdictions, which in turn led to a high degree of auditor judgment, subjectivity, and effort to perform procedures and evaluate the audit evidence obtained relating to accounting for the internal transfer and recovery of certain non-U.S. intangible assets based on management’s application of tax laws in the applicable jurisdictions. In addition, the audit effort involved the use of professionals with specialized skill and knowledge.

Addressing the matter involved performing procedures and evaluating audit evidence in connection with forming our overall opinion on the consolidated financial statements. These procedures included testing the effectiveness of controls relating to the accounting for the internal transfer of the non-U.S. intangible assets, including controls over management’s review of the underlying agreements and management’s application of the tax laws to the transfer and recovery of the non-U.S. intangible assets. These procedures also included, among others, (i) examining the underlying agreements, (ii) evaluating the tax laws applicable to the transfer and recovery of certain non-U.S. intangible assets, and (iii) testing the calculation of the deferred tax asset, including testing the completeness and accuracy of the data used. Professionals with specialized skill and knowledge were used to assist in the evaluation of management’s determination of the applicability of the relevant tax laws in the applicable jurisdictions.

/s/ PricewaterhouseCoopers LLP
Baltimore, Maryland
December 17, 2021

We have served as the Company’s auditor since 1992.

CIENA CORPORATION
CONSOLIDATED BALANCE SHEETS
(in thousands, except share data)

	October 30, 2021	October 31, 2020
ASSETS		
Current assets:		
Cash and cash equivalents	$ 1,422,546	$ 1,088,624
Short-term investments	181,483	150,667
Accounts receivable, net	884,958	719,405
Inventories, net	374,265	344,379
Prepaid expenses and other	325,654	308,084
Total current assets	3,188,906	2,611,159
Long-term investments	70,038	82,226
Equipment, building, furniture and fixtures, net	284,968	272,377
Operating right-of-use assets	44,285	57,026
Goodwill	311,645	310,847
Other intangible assets, net	65,314	96,647
Deferred tax asset, net	800,180	647,805
Other long-term assets	99,891	102,830
Total assets	$ 4,865,227	$ 4,180,917
LIABILITIES AND STOCKHOLDERS’ EQUITY (DEFICIT)		
Current liabilities:		
Accounts payable	$ 356,176	$ 291,904
Accrued liabilities and other short-term obligations	409,285	334,132
Deferred revenue	118,007	108,700
Operating lease liabilities	18,632	19,035
Current portion of long-term debt	6,930	6,930
Total current liabilities	909,030	760,701
Long-term deferred revenue	57,457	49,663
Other long-term obligations	166,803	123,185
Long-term operating lease liabilities	41,564	61,415
Long-term debt, net	670,355	676,356
Total liabilities	$ 1,845,209	$ 1,671,320
Commitments and contingencies (Note 27)		
Stockholders’ equity:		
Preferred stock — par value $0.01; 20,000,000 shares authorized; zero shares issued and outstanding	—	—
Common stock — par value $0.01; 290,000,000 shares authorized; 154,858,981 and 154,563,005 shares issued and outstanding	1,549	1,546
Additional paid-in capital	6,803,162	6,826,531
Accumulated other comprehensive income (loss)	439	(35,358)
Accumulated deficit	(3,785,132)	(4,283,122)
Total stockholders’ equity	3,020,018	2,509,597
Total liabilities and stockholders’ equity	$ 4,865,227	$ 4,180,917

The accompanying notes are an integral part of these consolidated financial statements.

CIENA CORPORATION
CONSOLIDATED STATEMENTS OF OPERATIONS
(in thousands, except per share data)

	Year Ended		
	October 30, 2021	October 31, 2020	November 2, 2019
Revenue:			
Products	$ 2,932,602	$ 2,914,790	$ 2,983,815
Services	688,082	617,367	588,316
Total revenue	3,620,684	3,532,157	3,572,131
Cost of goods sold:			
Products	1,545,269	1,573,791	1,716,358
Services	353,436	305,475	313,707
Total cost of goods sold	1,898,705	1,879,266	2,030,065
Gross profit	1,721,979	1,652,891	1,542,066
Operating expenses:			
Research and development	536,666	529,888	548,139
Selling and marketing	452,214	416,425	423,046
General and administrative	181,874	169,548	174,399
Significant asset impairments and restructuring costs	29,565	22,652	24,538
Amortization of intangible assets	23,732	23,383	21,808
Acquisition and integration costs	2,572	4,031	3,370
Total operating expenses	1,226,623	1,165,927	1,195,300
Income from operations	495,356	486,964	346,766
Interest and other income (loss), net	(1,768)	964	3,876
Interest expense	(30,837)	(31,321)	(37,452)
Loss on extinguishment and modification of debt	—	(646)	—
Income before income taxes	462,751	455,961	313,190
Provision (benefit) for income taxes	(37,445)	94,670	59,756
Net income	$ 500,196	$ 361,291	$ 253,434
Basic net income per common share	$ 3.22	$ 2.34	$ 1.63
Diluted net income per potential common share	$ 3.19	$ 2.32	$ 1.61
Weighted average basic common shares outstanding	155,279	154,287	155,720
Weighted average diluted potential common shares outstanding	156,743	155,955	157,612

The accompanying notes are an integral part of these consolidated financial statements.

CIENA CORPORATION
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME
(in thousands)

	Year Ended		
	October 30, 2021	October 31, 2020	November 2, 2019
Net income	$ 500,196	$ 361,291	$ 253,434
Change in unrealized gain (loss) on available-for-sale securities, net of tax	(209)	(107)	577
Change in unrealized gain (loss) on foreign currency forward contracts, net of tax	6,435	(1,144)	3,985
Change in unrealized gain (loss) on forward starting interest rate swaps, net of tax	9,356	(7,849)	(20,103)
Change in accumulated translation adjustments	20,215	(4,174)	(763)
Other comprehensive income gain (loss)	35,797	(13,274)	(16,304)
Total comprehensive income	$ 535,993	$ 348,017	$ 237,130

The accompanying notes are an integral part of these consolidated financial statements.

CIENA CORPORATION
CONSOLIDATED STATEMENTS OF CHANGES IN STOCKHOLDERS' EQUITY
(in thousands, except share data)

	Common Stock Shares	Par Value	Additional Paid-in-Capital	Accumulated Other Comprehensive Income (Loss)	Accumulated Deficit	Total Stockholders' Equity
Balance at November 3, 2018	154,318,531	$ 1,543	$ 6,881,223	$ (5,780)	$ (4,947,652)	$ 1,929,334
Net income	—	—	—	—	253,434	253,434
Other comprehensive loss	—	—	—	(16,304)	—	(16,304)
Repurchases of common stock - repurchase program	(3,838,466)	(38)	(150,038)	—	—	(150,076)
Issuance of shares from employee equity plans	3,112,916	31	22,916	—	—	22,947
Share-based compensation expense	—	—	59,736	—	—	59,736
Settlement of debt conversion liability	1,585,140	16	52,928	—	—	52,944
Shares repurchased for tax withholdings on vesting of stock unit awards	(774,271)	(8)	(29,051)	—	—	(29,059)
Effect of adoption of new accounting standard	—	—	—	—	49,805	49,805
Balance at November 2, 2019	154,403,850	1,544	6,837,714	(22,084)	(4,644,413)	2,172,761
Net income	—	—	—	—	361,291	361,291
Other comprehensive loss	—	—	—	(13,274)	—	(13,274)
Repurchases of common stock - repurchase program	(1,872,446)	(19)	(74,516)	—	—	(74,535)
Issuance of shares from employee equity plans	2,787,011	29	28,039	—	—	28,068
Share-based compensation expense	—	—	67,758	—	—	67,758
Shares repurchased for tax withholdings on vesting of stock unit awards	(755,410)	(8)	(32,464)	—	—	(32,472)
Balance at October 31, 2020	154,563,005	1,546	6,826,531	(35,358)	(4,283,122)	2,509,597
Net income	—	—	—	—	500,196	500,196
Other comprehensive income	—	—	—	35,797	—	35,797
Repurchases of common stock - repurchase program	(1,696,949)	(17)	(92,071)	—	—	(92,088)
Issuance of shares from employee equity plans	2,826,399	28	28,429	—	—	28,457
Share-based compensation expense	—	—	84,336	—	—	84,336
Shares repurchased for tax withholdings on vesting of stock unit awards	(833,474)	(8)	(44,063)	—	—	(44,071)
Effect of adoption of new accounting standard (Note 1)	—	—	—	—	(2,206)	(2,206)
Balance at October 30, 2021	154,858,981	$ 1,549	$ 6,803,162	$ 439	$ (3,785,132)	$ 3,020,018

The accompanying notes are an integral part of these consolidated financial statements.

CIENA CORPORATION
CONSOLIDATED STATEMENTS OF CASH FLOWS
(in thousands)

	Year Ended		
	October 30, 2021	October 31, 2020	November 2, 2019
Cash flows provided by operating activities:			
Net income	$ 500,196	$ 361,291	$ 253,434
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation of equipment, building, furniture and fixtures, and amortization of leasehold improvements	96,233	93,908	87,576
Share-based compensation costs	84,336	67,758	59,736
Amortization of intangible assets	36,033	38,619	35,136
Deferred taxes	(156,469)	64,339	19,865
Provision for inventory excess and obsolescence	17,850	24,701	28,085
Provision for warranty	17,093	22,417	23,105
Other	14,525	20,483	5,830
Changes in assets and liabilities:			
Accounts receivable	(174,377)	(17,299)	65,712
Inventories	(47,567)	(25,044)	(112,941)
Prepaid expenses and other	(19,691)	(38,998)	(96,618)
Operating right-of-use assets	16,632	16,787	—
Accounts payable, accruals and other obligations	162,134	(117,931)	27,740
Deferred revenue	16,822	2,519	16,480
Short and long-term operating lease liabilities	(22,104)	(19,896)	—
Net cash provided by operating activities	541,646	493,654	413,140
Cash flows provided by (used in) investing activities:			
Payments for equipment, furniture, fixtures and intellectual property	(79,550)	(82,667)	(62,579)
Purchase of available for sale securities	(172,778)	(223,196)	(158,074)
Proceeds from maturities of available for sale securities	152,253	110,390	248,748
Proceeds from sale of equity investment	4,678	—	—
Purchase of equity investment	—	—	(2,667)
Settlement of foreign currency forward contracts, net	4,680	3,531	(1,351)
Acquisition of businesses, net of cash acquired	—	(28,300)	—
Net cash provided by (used in) investing activities	(90,717)	(220,242)	24,077
Cash flows used in financing activities:			
Payment of long-term debt	(6,929)	(5,198)	(7,000)
Payment for debt conversion liability	—	—	(111,268)
Payment of debt issuance costs	—	(382)	(1,191)
Payment of finance lease obligations	(3,004)	(2,703)	(3,319)
Shares repurchased for tax withholdings on vesting of stock unit awards	(44,071)	(32,472)	(29,059)
Repurchases of common stock - repurchase program	(91,288)	(74,535)	(150,076)
Proceeds from issuance of common stock	28,457	28,068	22,947
Net cash used in financing activities	(116,835)	(87,222)	(278,966)
Effect of exchange rate changes on cash, cash equivalents and restricted cash	(198)	(1,643)	476
Net increase in cash, cash equivalents and restricted cash	333,896	184,547	158,727
Cash, cash equivalents and restricted cash at beginning of fiscal year	1,088,708	904,161	745,434
Cash, cash equivalents and restricted cash at end of fiscal year	$ 1,422,604	$ 1,088,708	$ 904,161
Supplemental disclosure of cash flow information			
Cash paid during the fiscal year for interest	$ 29,864	$ 32,837	$ 39,579
Cash paid during the fiscal year for income taxes, net	$ 73,127	$ 53,076	$ 33,570
Operating lease payments	$ 24,058	$ 22,089	$ —
Non-cash investing and financing activities			
Purchase of equipment in accounts payable	$ 10,138	$ 7,854	$ 16,549
Repurchase of common stock in accrued liabilities from repurchase program	$ 800	$ —	$ —
Conversion of debt conversion liability into 1,585,140 shares of common stock	$ —	$ —	$ 52,944
Operating lease right-of-use assets subject to lease liability	$ 4,356	$ 24,160	$ —
Unrealized gain on equity investment	$ —	$ 2,681	$ —

The accompanying notes are an integral part of these consolidated financial statements.

CIENA CORPORATION
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

(1) CIENA CORPORATION AND SIGNIFICANT ACCOUNTING POLICIES AND ESTIMATES

Description of Business

Ciena Corporation ("Ciena" or the "Company") is 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. Ciena provides hardware, software and services that enable the transport, routing, switching, aggregation, service delivery and management of video, data and voice traffic on communications networks. Ciena's solutions are used by communications service providers, cable and multiservice operators, Web-scale providers, submarine network operators, governments, enterprises, research and education institutions and emerging network operators.

Ciena's portfolio is designed to enable what Ciena refers to as the Adaptive Network™, Ciena's vision for a network end state that emphasizes a programmable and scalable network infrastructure, software control and automation capabilities, network analytics and intelligence, and related advanced services. By transforming network infrastructures into a dynamic, programmable environment driven by automation and analytics, network operators can realize greater business agility, dynamically adapt to changing end user service demands and rapidly introduce new revenue-generating services. They can also gain valuable real-time network insights, allowing them to optimize network operation and maximize the return on their network infrastructure investment.

Ciena's solutions include Networking Platforms, including Ciena's Converged Packet Optical and Routing and Switching portfolios, which can be applied from the network core to end-user access points, and which allow network operators to scale capacity, increase transmission speeds, allocate traffic efficiently and adapt dynamically to changing end-user service demands. Ciena's Converged Packet Optical portfolio includes products that support the connection of content to content, including in long haul and regional, submarine and data center interconnect networks, and users to content, including in metro and edge networks. Ciena's Routing and Switching portfolio includes products and solutions that enable efficient internet protocol ("IP") transport in next-generation metro, edge, access and aggregation networks, connecting users to content in applications that include 5G and Internet of Things ("IoT"), mobile backhaul, optical access, virtualization and enterprise services.

To complement Networking Platforms, Ciena offers Platform Software, which includes a wide array of software solutions that deliver operations, administration, maintenance, and provisioning ("OAM&P") functionality, as well as domain control, orchestration, operational support systems ("OSS") and service assurance to achieve closed loop automation across multi-vendor and multi-domain network environments. Through Ciena's Blue Planet® Software suite, Ciena enables customers to accelerate the digital transformation of their networks through service lifecycle automation.

In addition to Ciena's systems and software, Ciena also offers a broad range of services that help its customers build, operate and improve their networks and associated operational environments. These include network transformation, consulting, implementation, systems integration, maintenance, network operations center ("NOC") management, and optimization services.

Basis of Presentation

The accompanying consolidated financial statements include the accounts of Ciena and its wholly owned subsidiaries. All intercompany accounts and transactions have been eliminated in consolidation.

Ciena has a 52 or 53-week fiscal year, which ends on the Saturday nearest to the last day of October in each year (October 30, 2021, October 31, 2020 and November 2, 2019 for the periods reported). Fiscal 2021, fiscal 2020 and fiscal 2019 each consisted of a 52-week fiscal year.

Business Combinations

Ciena records acquisitions using the purchase method of accounting. All of the assets acquired, liabilities assumed, contractual contingencies and contingent consideration are recognized at their fair value as of the acquisition date. The excess of the purchase price over the estimated fair values of the net tangible and net intangible assets acquired is recorded as goodwill. The application of the purchase method of accounting for business combinations requires management to make significant estimates and assumptions in the determination of the fair value of assets acquired and liabilities assumed, in order to properly allocate purchase price consideration between assets that are depreciated and amortized from goodwill. These assumptions and estimates include a market participant's use of the asset and the appropriate discount rates for a market participant. Ciena's estimates are based on historical experience, information obtained from the management of the acquired companies and, when appropriate, include assistance from independent third-party appraisal firms. Significant assumptions and estimates can include, but are not limited to, the cash flows that an asset is expected to generate in the future, the appropriate weighted-average cost of capital and the cost savings expected to be derived from acquiring an asset. These estimates are inherently uncertain and unpredictable. In addition, unanticipated events and circumstances may occur which may affect the accuracy or validity of such estimates.

Use of Estimates

The preparation of the financial statements and related disclosures in conformity with Generally Accepted Accounting Principles ("GAAP") requires management to make estimates and judgments that affect the amounts reported in the consolidated financial statements and accompanying notes. Estimates are used for selling prices for multiple element arrangements, shared-based compensation, bad debts, valuation of inventories and investments, recoverability of intangible assets, other long-lived assets and goodwill, income taxes, warranty obligations, restructuring liabilities, derivatives, contingencies and litigation. Ciena bases its estimates on historical experience and assumptions that it believes are reasonable. Actual results may differ materially from management's estimates.

Cash and Cash Equivalents

Ciena considers all highly liquid investments purchased with original maturities of three months or less to be cash equivalents. Any restricted cash collateralizing letters of credit is included in other current assets and other long-term assets depending on the duration of the restriction.

Investments

Ciena's investments in debt securities are classified as available-for-sale and reported at fair value, with unrealized gains and losses recorded in accumulated other comprehensive income (loss). Ciena recognizes losses in the income statement when it determines that declines in the fair value of its investments below their cost basis are other-than-temporary. In determining whether a decline in fair value is other-than-temporary, Ciena considers various factors, including market price (when available), investment ratings, the financial condition and near-term prospects of the investee, the length of time and the extent to which the fair value has been less than Ciena's cost basis, and Ciena's intent and ability to hold the investment until maturity or for a period of time sufficient to allow for any anticipated recovery in market value. Ciena considers all marketable debt securities that it expects to convert to cash within one year or less to be short-term investments, with all others considered to be long-term investments.

Ciena has minority equity investments in privately held technology companies that are classified in other long-term assets. These investments are carried at cost because Ciena owns less than 20% of the voting equity and does not have the ability to exercise significant influence over the company. Ciena monitors these investments for impairment and makes appropriate reductions to the carrying value when necessary. As of October 30, 2021, the combined carrying value of these investments was $8.6 million. Ciena elects to estimate the fair value at cost minus impairment, if any, plus or minus observable price changes in orderly transactions for identical or similar investments of the same issuer. Ciena evaluates these investments for impairment or observable price changes quarterly and records adjustments to interest and other income (loss), net on the Consolidated Statements of Operations.

Inventories

Inventories are stated at the lower of cost or market, with cost computed using standard cost, which approximates actual cost, on a first-in, first-out basis. Ciena records a provision for excess and obsolete inventory when an impairment has been identified.

Segment Reporting

Ciena's chief operating decision maker, its chief executive officer, evaluates the Company's performance and allocates resources based on multiple factors, including measures of segment profit (loss). Operating segments are defined as components of an enterprise that engage in business activities that may earn revenue and incur expense, for which discrete financial information is available, and for which such information is evaluated regularly by the chief operating decision maker for purposes of allocating resources and assessing performance. Ciena has the following operating segments for reporting purposes: (i) Networking Platforms; (ii) Platform Software and Services; (iii) Blue Planet Automation Software and Services; and (iv) Global Services. See Note 25 below.

Goodwill

Goodwill is the excess of the purchase price over the fair values assigned to the net assets acquired in a business combination. Ciena tests goodwill for impairment on an annual basis, which it has determined to be the last business day of fiscal September each year. Ciena also tests goodwill for impairment 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.

Ciena tests goodwill impairment by comparing the fair value of the reporting unit with the unit's carrying amount, including goodwill. If this test indicates that the fair value is less than the carrying value, then an impairment loss is recognized limited to the total amount of goodwill allocated to that reporting unit. A non-cash goodwill impairment charge would have the effect of decreasing earnings or increasing losses in such period. If Ciena is required to take a substantial impairment charge, its operating results would be materially adversely affected in such period.

Long-lived Assets

Long-lived assets include: equipment, building, furniture and fixtures, operating ROU assets, finite-lived intangible assets and maintenance spares. Ciena tests long-lived assets for impairment whenever triggering events or changes in circumstances indicate that the asset's carrying amount is not recoverable from its undiscounted cash flows. An impairment loss is measured as the amount by which the carrying amount of the asset or asset group exceeds its fair value. Ciena's long-lived assets are assigned to asset groups that represent the lowest level for which cash flows can be identified.

Equipment, Building, Furniture and Fixtures and Internal Use Software

Equipment, building, furniture and fixtures are recorded at cost. Depreciation and amortization are computed using the straight-line method over useful lives of two years to five years for equipment and furniture and fixtures and the shorter of useful life or lease term for leasehold improvements.

Qualifying internal use software and website development costs incurred during the application development stage, which consist primarily of outside services and purchased software license costs, are capitalized and amortized straight-line over the estimated useful lives of two years to five years.

Leases

At the inception of a contract, Ciena must determine whether the contract is or contains a lease. The contract is or contains a lease if the contract conveys the right to control the use of the property, plant, or equipment for a designated term in exchange for consideration. Ciena's evaluation of its contracts follows the assessment of whether there is a right to obtain substantially all of the economic benefits from the use and the right to direct the use of the identified asset in the contract. Operating leases are included in the Operating right-of-use assets ("Operating ROU assets"), Operating lease liabilities and Long-term operating lease liabilities in the Consolidated Balance Sheets. Finance leases are included in Equipment, building, furniture and fixtures, net ("Finance ROU assets"), Accrued liabilities and other short-term obligations and Other long-term obligations in the Consolidated Balance Sheets.

Ciena has operating and finance leases that primarily relate to real property. Ciena has elected not to capitalize leases with a term of 12 months or less without a purchase option that it is likely to exercise. Ciena has elected not to separate lease and non-lease components of operating and finance leases. Lease components are payment items directly attributable to the use of the underlying asset, while non-lease components are explicit elements of a contract not directly related to the use of the underlying asset, including pass-through operating expenses like common area maintenance and utilities.

Operating ROU assets and lease liabilities and Finance ROU assets and lease liabilities are recognized on the Consolidated Balance Sheets at the present value of the future lease payments over the life of the lease term. Ciena uses discount rates based on incremental borrowing rates, on a collateralized basis, for the respective underlying assets, for terms similar to the respective leases when implicit rates for leases are not determinable. Operating lease costs are included as rent expense in the Consolidated Statements of Operations. Fixed base payments on operating leases paid directly to the lessor are recorded as lease expense on a straight-line basis. Related variable payments based on usage, changes in an index, or market rate are expensed as incurred. Finance ROU assets are generally amortized on a straight-line basis over the lease term with the interest expense on the lease liability recorded using the interest method. The amortization and interest expense are recorded separately in the Consolidated Statements of Operations.

Intangible Assets

Ciena has recorded finite-lived intangible assets as a result of several acquisitions. Finite-lived intangible assets are carried at cost less accumulated amortization. Amortization is computed using the straight-line method over the expected economic lives of the respective assets, up to seven years, which approximates the use of intangible assets.

Maintenance Spares

Maintenance spares are recorded at cost. Spares usage cost is expensed ratably over four years.

Concentrations

Substantially all of Ciena's cash and cash equivalents are maintained at a small number of major U.S. financial institutions. The majority of Ciena's cash equivalents consist of money market funds. Deposits held with banks may exceed the amount of insurance provided on such deposits. Because these deposits generally may be redeemed upon demand, management believes that they bear minimal risk.

Historically, a significant percentage of Ciena's revenue has been concentrated among sales to a small number of large communications service providers and Web-scale providers. Consolidation among Ciena's customers has increased this concentration. Consequently, Ciena's accounts receivable are concentrated among these customers. See Note 2 below.

Additionally, Ciena's access to certain materials or components is dependent on sole or limited source suppliers. The inability of any of these suppliers to fulfill Ciena's supply requirements, or significant changes in supply cost, could affect future results. Ciena relies on a small number of contract manufacturers to perform the majority of the manufacturing for its products. If Ciena cannot effectively manage these manufacturers or forecast future demand, or if these manufacturers fail to deliver products or components on time, Ciena's business and results of operations may suffer.

Revenue Recognition

Ciena recognizes revenue when control of the promised products or services is transferred to its customer, in an amount that reflects the consideration to which Ciena expects to be entitled in exchange for those products or services.

Ciena determines revenue recognition by applying the following five-step approach:

- identification of the contract, or contracts, with a customer;
- identification of the performance obligations in the contract;
- determination of the transaction price;
- allocation of the transaction price to the performance obligations in the contract; and
- recognition of revenue when, or as, Ciena satisfies a performance obligation.

Generally, Ciena makes sales pursuant to purchase orders placed by customers under framework agreements that govern the general commercial terms and conditions of the sale of Ciena's products and services. These purchase orders under framework agreements are used to determine the identification of the contract or contracts with this customer. Purchase orders typically include the description, quantity, and price of each product or service purchased. Purchase orders may include one-line bundled pricing for both products and services. Accordingly, purchase orders can include various combinations of products and services that are generally distinct and accounted for as separate performance obligations. Ciena evaluates each promised product and service offering to determine whether it represents a distinct performance obligation. In doing so, Ciena considers, among other things, customary business practices, whether the customer can benefit from the product or service on its own or together with other resources that are readily available, and whether Ciena's commitment to transfer the product or service to the customer is separately identifiable from other obligations in the purchase order. For transactions where Ciena delivers the product or services, Ciena is typically the principal and records revenue and costs of goods sold on a gross basis.

Purchase orders are invoiced based on the terms set forth either in the purchase order or the framework agreement, as applicable. Generally, sales of products and software licenses are invoiced upon shipment or delivery. Maintenance and software subscription services are invoiced quarterly or annually in advance of the service term. Ciena's other service offerings are generally invoiced upon completion of the service. Payment terms and cash received typically range from 30 to 90 days from the invoicing date. Historically, Ciena has not provided any material financing arrangements to its customers. As a practical expedient, Ciena does not adjust the amount of consideration it will receive for the effects of a significant financing component as it expects, at contract inception, that the period between Ciena's transfer of the products or services to the customer and customer payment for the products or services will be one year or less. Shipping and handling fees invoiced to customers are included in revenue, with the associated expense included in product cost of goods sold. Ciena records revenue net of any associated sales taxes.

Ciena recognizes revenue upon the transfer of control of promised products or services to a customer. Transfer of control occurs once the customer has the contractual right to use the product, generally upon shipment or delivery to the customer. Transfer of control can also occur over time for services such as software subscription, maintenance, installation, and various professional services as the customer receives the benefit over the contract term.

Significant Judgments

Revenue is allocated among performance obligations based on standalone selling price ("SSP"). SSP reflects the price at which Ciena would expect to sell that product or service on a stand-alone basis at contract inception and that Ciena would expect to be entitled to receive for the promised products or services. SSP is estimated for each distinct performance obligation, and judgment may be required in its determination. The best evidence of SSP is the observable price of a product or service when Ciena sells the products separately in similar circumstances and to similar customers. In instances where SSP is not directly observable, Ciena determines SSP using information that may include market conditions and other observable inputs.

Ciena applies judgment in determining the transaction price, as Ciena may be required to estimate variable consideration when determining the amount of revenue to recognize. Variable consideration can include various rebate, cooperative marketing, and other incentive programs that Ciena offers to its distributors, partners and customers. When determining the amount of revenue to recognize, Ciena estimates the expected usage of these programs, applying the expected value or most likely estimate and updates the estimate at each reporting period as actual utilization data becomes available. Ciena also considers any customer right of return and any actual or potential payment of liquidated damages, contractual or similar penalties, or other claims for performance failures or delays in determining the transaction price, where applicable.

When transfer of control is judged to be over time for installation and professional service arrangements, Ciena applies the input method to determine the amount of revenue to be recognized in a given period. Utilizing the input method, Ciena recognizes revenue based on the ratio of actual costs incurred to date to the total estimated costs expected to be incurred. Revenue for software subscription and maintenance is recognized ratably over the period during which the services are performed.

Capitalized Contract Acquisition Costs

Ciena has considered the impact of the guidance in ASC 340-40, *Other Assets and Deferred Costs; Contracts with Customers*, and the interpretations of the Financial Accounting Standards Board ("FASB") Transition Resource Group for Revenue Recognition with respect to capitalization and amortization of incremental costs of obtaining a contract. In conjunction with this interpretation, Ciena considers each customer purchase in combination with the corresponding framework agreement, if applicable, as a contract. Ciena has elected to implement the practical expedient, which allows for incremental costs to be recognized as an expense when incurred if the period of the asset recognition is one year or less. If the period of the asset recognition is greater than one year, Ciena amortizes these costs over the period of performance. Ciena considers sales commissions incurred upon receipt of purchase orders placed by customers as incremental costs to obtain such purchase orders. The practical expedient method is applied to the purchase order as a whole and thus the capitalized costs of obtaining a purchase order is applied even if the purchase order contains more than one performance obligation. In cases where a purchase order includes various distinct products or services with both short-term (one year or less) and long-term (more than a year) performance periods, the cost of commissions incurred for the total value of the purchase order is capitalized and subsequently amortized as each performance obligation is recognized.

For the additional disclosures on capitalized contract acquisition costs, see Note 2 below.

Warranty Accruals

Ciena provides for the estimated costs to fulfill customer warranty obligations upon recognition of the related revenue. Estimated warranty costs include estimates for material costs, technical support labor costs and associated overhead. Warranty is included in cost of goods sold and is determined based on actual warranty cost experience, estimates of component failure rates and management's industry experience. Ciena's sales contracts do not permit the right of return of the product by the customer after the product has been accepted.

Allowance for Credit Losses for Accounts Receivable and Contract Assets

Ciena estimates its allowances for credit losses using relevant available information from internal and external sources, related to past events, current conditions and reasonable and supportable forecasts. Historical credit loss experience provides the basis for the estimation of expected credit losses. When assessing for credit losses, Ciena determines collectability by pooling assets with similar characteristics. The allowances for credit losses are each measured on a collective basis when similar risk characteristics exist. The allowances for credit losses are each measured by multiplying the exposure probability of default (the probability the asset will default within a given time frame) by the loss given default rate (the percentage of the asset not expected to be collected due to default) based on the pool of assets.

Probability of default rates are published by third-party credit rating agencies. Adjustments to Ciena's exposure probability may take into account a number of factors, including, but not limited to, various customer-specific factors, the potential sovereign risk of the geographic locations in which the customer is operating and macroeconomic conditions. These factors are updated regularly or when facts and circumstances indicate that an update is deemed necessary.

Research and Development

Ciena charges all research and development costs to expense as incurred. Types of expense incurred in research and development include employee compensation, prototype equipment, consulting and third-party services, depreciation, facility costs and information technology.

Government Grants

Ciena accounts for proceeds from government grants as a reduction of expense when there is reasonable assurance that Ciena has met the required conditions associated with the grant and that grant proceeds will be received. Grant benefits are recorded to the particular line item of the Consolidated Statement of Operations to which the grant activity relates. See Notes 3 and 27 below.

Advertising Costs

Ciena expenses all advertising costs as incurred.

Legal Costs

Ciena expenses legal costs associated with litigation as incurred.

Share-Based Compensation Expense

Ciena measures and recognizes compensation expense for share-based awards and employee stock purchases related to Employee Stock Purchase Plan (the "ESPP") based on estimated fair values on the date of grant. Ciena estimates the fair value of employee stock purchases related to the ESPP using the Black-Scholes option-pricing model. Ciena recognizes the estimated fair value of restricted stock units subject only to service-based vesting conditions by multiplying the number of shares underlying the award by the closing price per share of Ciena common stock on the grant date. In each case, Ciena only recognizes expense in its Consolidated Statement of Operations for those restricted stock units that ultimately vest. Awards with performance-based vesting conditions (i) require the achievement of certain operational, financial or other performance criteria or targets or (ii) vest based on Ciena's total shareholder return as compared to an index of peer companies, in whole or in part. Ciena recognizes the estimated fair value of restricted stock units subject to performance-based vesting conditions other than total shareholder return by assuming the satisfaction of any performance-based objectives at the "target" level and multiplying the corresponding number of shares earned based upon such achievement by the closing price per share of Ciena common stock on the grant date. Ciena recognizes the estimated fair value of performance based awards subject to total shareholder return as compared to an index of peer companies using a Monte Carlo simulation valuation model on the date of grant. At the end of each reporting period, Ciena reassesses the probability of achieving the performance targets and the performance period required to meet those targets. See Note 24 below.

Stock Repurchase Program

Shares repurchased pursuant to Ciena's share repurchase program are immediately retired upon purchase. Repurchased common stock is reflected as a reduction of stockholders' equity. Ciena's accounting policy related to its share repurchases is to reduce its common stock based on the par value of the shares and to reduce its capital surplus for the excess of the repurchase price over the par value. Since the inception of its share repurchase programs, Ciena has had an accumulated deficit balance; therefore, the excess over the par value has been applied to additional paid-in capital. Once Ciena has retained earnings, the excess will be charged entirely to retained earnings.

Income Taxes

Ciena accounts for income taxes using an asset and liability approach. This approach recognizes deferred tax assets and liabilities ("DTA") for the expected future tax consequences attributable to differences between the carrying amounts of assets and liabilities for financial reporting purposes and their respective tax bases, and for operating loss and tax credit carryforwards. In estimating future tax consequences, Ciena considers all expected future events other than the enactment of changes in tax laws or rates. Valuation allowances are provided if, based on the weight of the available evidence, it is more likely than not that some or all of the deferred tax assets will not be realized.

In the ordinary course of business, transactions occur for which the ultimate outcome may be uncertain. In addition, tax authorities periodically audit Ciena's income tax returns. These audits examine significant tax filing positions, including the timing and amounts of deductions and the allocation of income tax expenses among tax jurisdictions. Ciena is currently under audit in India for 2012 through 2020, in Canada for 2013 through 2015, and in the United Kingdom for 2016 through 2019. Management does not expect the outcome of these audits to have a material adverse effect on Ciena's consolidated financial position, results of operations or cash flows. Ciena's major tax jurisdictions and the earliest open tax years are as follows: United States (2018), United Kingdom (2016), Canada (2013), and India (2012). Limited adjustments can be made to federal U.S. tax returns in earlier years in order to reduce net operating loss carryforwards. Ciena classifies interest and penalties related to uncertain tax positions as a component of income tax expense.

Ciena has not provided for U.S. deferred income taxes on the cumulative unremitted earnings of its non-U.S. affiliates, as it plans to indefinitely reinvest these foreign earnings outside the U.S. As of October 30, 2021, the cumulative amount of such temporary differences for which a deferred tax liability has not been recognized totaled approximately $475.0 million. If these earnings were distributed to the U.S. in the form of dividends, or otherwise, or if the shares of the relevant foreign subsidiaries were sold or otherwise transferred, Ciena would be subject to additional U.S. income taxes (subject to an adjustment for foreign tax credits) and foreign withholding taxes. Ciena would also be subject to additional foreign withholding taxes of approximately $32.0 million. Additionally, there are no other significant temporary differences for which a deferred tax liability has not been recognized.

Ciena is required to record excess tax benefits or tax deficiencies related to stock-based compensation as income tax benefit or expense when share-based awards vest or are settled.

The Tax Cuts and Jobs Act (the "Tax Act") includes provisions that affected Ciena in fiscal 2019, fiscal 2020 and fiscal 2021, including a provision designed to tax global intangible low-taxed income ("GILTI"). An accounting policy choice is allowed to either treat taxes due on future U.S. inclusions related to GILTI in taxable income as a current-period expense when incurred (the "period cost method") or factor such amounts into the measurement of deferred taxes (the "deferred method"). The calculation of the deferred balance with respect to the GILTI tax provisions will depend, in part, on analyzing global income to determine whether future U.S. inclusions in taxable income are expected related to GILTI and, if so, what the impact is expected to be. Ciena is electing to use the period cost method for future GILTI inclusions. Additionally, Ciena is electing to use the incremental cash tax savings approach when determining whether a valuation allowance needs to be recorded against the U.S. net operating loss ("NOL") due to the GILTI inclusions.

The Tax Act also introduced an alternative tax known as the base erosion and anti-abuse tax ("BEAT"). An accounting policy choice has been made to consider BEAT as a period cost when incurred.

Loss Contingencies

Ciena is subject to the possibility of various losses arising in the ordinary course of business. These may relate to disputes, litigation and other legal actions. Ciena considers the likelihood of loss or the incurrence of a liability, as well as Ciena's ability to estimate the amount of loss reasonably, in determining loss contingencies. An estimated loss contingency is accrued when it is probable that a liability has been incurred and the amount of loss can be reasonably estimated. Ciena regularly evaluates current information available to it in order to determine whether any accruals should be adjusted and whether new accruals are required.

Fair Value of Financial Instruments

The carrying value of Ciena's cash and cash equivalents, accounts receivable, accounts payable and accrued liabilities approximates fair market value due to the relatively short period of time to maturity. For information related to the fair value of Ciena's term loan, see Note 19 below.

Fair value for the measurement of financial assets and liabilities is defined as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. As such, fair value is a market-based measurement that should be determined based on assumptions that market participants would use in pricing an asset or liability. Ciena utilizes a valuation hierarchy for disclosure of the inputs for fair value measurement. This hierarchy prioritizes the inputs into three broad levels as follows:

- Level 1 inputs are unadjusted quoted prices in active markets for identical assets or liabilities;

- Level 2 inputs are quoted prices for identical or similar assets or liabilities in less active markets or model-derived valuations in which significant inputs are observable for the asset or liability, either directly or indirectly through market corroboration, for substantially the full term of the financial instrument; and

- Level 3 inputs are unobservable inputs based on Ciena's assumptions used to measure assets and liabilities at fair value. The fair values are determined based on model-based techniques using inputs Ciena could not corroborated with market data.

By distinguishing between inputs that are observable in the marketplace, and therefore more objective, and those that are unobservable, and therefore more subjective, the hierarchy is designed to indicate the relative reliability of the fair value measurements. A financial asset's or liability's classification within the hierarchy is determined based on the lowest level input that is significant to the fair value measurement.

Restructuring

From time to time, Ciena takes actions to align its workforce, facilities and operating costs with perceived market opportunities, business strategies and changes in market and business conditions and redesign business processes. Ciena recognizes a liability for the cost associated with an exit or disposal activity in the period in which the liability is incurred, except for one-time employee termination benefits related to a service period, typically of more than 60 days, which are accrued over the service period. See Note 5 below.

Foreign Currency

Certain of Ciena's foreign branch offices and subsidiaries use the U.S. Dollar as their functional currency because Ciena Corporation, as the U.S. parent entity, exclusively funds the operations of these branch offices and subsidiaries. For those subsidiaries using the local currency as their functional currency, assets and liabilities are translated at exchange rates in effect at the balance sheet date, and the statement of operations is translated at a monthly average rate. Resulting translation adjustments are recorded directly to a separate component of stockholders' equity. Where the monetary assets and liabilities are transacted in a currency other than the entity's functional currency, re-measurement adjustments are recorded in interest and other income (loss), net on the Consolidated Statement of Operations. See Note 6 below.

Derivatives

From time to time, Ciena uses foreign currency forward contracts to reduce variability in certain forecasted non-U.S. Dollar denominated cash flows. Generally, these derivatives have maturities of 24 months or less. Ciena also has interest rate swap arrangements to reduce variability in certain forecasted interest expense associated with its term loan. All of these derivatives are designated as cash flow hedges. At the inception of the cash flow hedge, and on an ongoing basis, Ciena assesses whether the derivative has been effective in offsetting changes in cash flows attributable to the hedged risk during the hedging period. The derivative's net gain or loss is initially reported as a component of accumulated other comprehensive income (loss), and upon occurrence of the forecasted transaction, is subsequently reclassified to the line item in the Consolidated Statement of Operations to which the hedged transaction relates.

Ciena records derivative instruments in the Consolidated Statements of Cash Flows within operating, investing, or financing activities consistent with the cash flows of the hedged items.

From time to time, Ciena uses foreign currency forward contracts to hedge certain balance sheet foreign exchange exposures. These forward contracts are not designated as hedges for accounting purposes, and any net gain or loss associated with these derivatives is reported in interest and other income (loss), net on the Consolidated Statement of Operations.

See Notes 8 and 16 below.

Computation of Net Income per Share

Ciena calculates basic earnings per share by dividing earnings attributable to common stock by the weighted average number of common shares outstanding for the period. Diluted net income per potential common share ("Diluted EPS") includes other potential dilutive shares that would be outstanding if securities or other contracts to issue common stock were exercised or converted into common stock. Ciena uses a dual presentation of basic net income per common share ("Basic EPS") and Diluted EPS on the face of its income statement. A reconciliation of the numerator and denominator used for the Basic EPS and Diluted EPS computations is set forth in Note 21 below.

Software Development Costs

Ciena develops software for sale to its customers. GAAP requires the capitalization of certain software development costs that are incurred subsequent to the date technological feasibility is established and prior to the date the product is generally available for sale. The capitalized cost is then amortized using the straight-line method over the estimated life of the product. Ciena defines technological feasibility as being attained at the time a working model is completed. To date, the period between Ciena achieving technological feasibility and the general availability of such software has been short, and software development costs qualifying for capitalization have been insignificant. Accordingly, Ciena has not capitalized any software development costs.

Newly Issued Accounting Standards - Effective

In June 2016, the Financial Accounting Standards Board (the ”FASB”) issued Accounting Standards Update No. 2016-13 (“ASU 2016-13”), Financial Instruments - Credit Losses, which requires measurement and recognition of expected credit losses for financial assets held based on historical experience, current conditions, and reasonable and supportable forecasts that affect the collectability of the reported amount. Ciena adopted ASU 2016-13 on a modified retrospective basis in the first quarter of fiscal year 2021 through a cumulative-effect adjustment at the beginning of the period of adoption and did not restate prior periods. The standard primarily impacts the value of Ciena’s accounts receivable, net and contract assets for unbilled accounts receivable, net. Adoption of ASU 2016-13 did not have a material effect on Ciena’s financial position or results of operations.

In February 2016, the FASB issued ASC 842, Leases, which requires an entity to recognize assets and liabilities on the balance sheet for the rights and obligations created by leased assets and to provide additional disclosures. Effective November 3, 2019, Ciena adopted ASC 842, which requires right-of-use ("ROU") assets and lease liabilities to be recorded on the balance sheet, on a modified retrospective basis, such that related amounts in prior periods have not been restated.

In May 2014, the FASB issued ASC 606, Revenue from Contracts with Customers, an accounting standard related to revenue recognition. Upon adopting ASC 606 at the beginning of fiscal 2019, the cumulative effect adjustment reduced accumulated deficit by approximately $49.8 million.

Newly Issued Accounting Standards - Not Yet Effective

In November 2021, the FASB issued ASU No. 2021-10 (“ASU 2021-10”), Government Assistance, to increase transparency of government assistance including the disclosure of (1) the types of assistance, (2) an entity’s accounting for the assistance, and (3) the effect of the assistance on an entity’s financial statements. ASU 2021-10 is effective for annual periods beginning after December 15, 2021. Early adoption is permitted. Ciena is currently evaluating the impact of this accounting standard update on its consolidated financial statements and related disclosures.

In October 2021, the FASB issued ASU No. 2021-08 (“ASU 2021-08”), Business Combinations (Topic 805): Accounting for Contract Assets and Contract Liabilities from Contracts with Customers to improve the accounting for acquired revenue contracts with customers in a business combination to address recognition of an acquired contract liability and payment terms and their effect on subsequent revenue recognized by the acquirer. ASU 2021-08 is effective for annual periods beginning after December 15, 2022 on a prospective basis. Early adoption is permitted. Ciena is currently evaluating the impact of this accounting standard update on its consolidated financial statements and related disclosures.

In March 2020, the FASB issued ASU No. 2020-04 (“ASU 2020-04”), Reference Rate Reform (Topic 848): Facilitation of the Effects of Reference Rate Reform on Financial Reporting. ASU 2020-04 provides temporary optional guidance on contract modifications and hedging accounting to ease the financial reporting burdens of the expected market transition from the London Interbank Offered Rate (“LIBOR”) to alternative reference rates. In January 2021, the FASB issued ASU 2021-01, which refines the scope of Topic 848 and clarifies some of its guidance as part of the FASB’s monitoring of global reference rate activities. The new guidance was effective upon issuance, and Ciena is allowed to elect to apply the amendments prospectively through December 31, 2022. Ciena is currently evaluating the impact of this accounting standard update on its consolidated financial statements and related disclosures.

In December 2019, the FASB issued ASU No. 2019-12 (“ASU 2019-12”), Income Taxes (ASC 740): Simplifying the Accounting for Income Taxes, which simplifies the accounting for income taxes by removing certain exceptions to the general principles in ASC 740. The amendments also improve consistent application of and simplify GAAP for other areas of ASC 740 by clarifying and amending existing guidance. Most amendments within this standard are required to be applied on a prospective basis, while certain amendments must be applied on a retrospective or modified retrospective basis. ASU 2019-12 is effective for Ciena beginning in the first quarter of fiscal year 2022. Ciena does not expect adoption of ASU 2019-12 to have a material impact on its consolidated financial statements and related disclosures.

(2) REVENUE

Disaggregation of Revenue

Ciena's disaggregated revenue represents similar groups that depict the nature, amount, and timing of revenue and cash flows for Ciena's various offerings. The sales cycle, contractual obligations, customer requirements, and go-to-market strategies may differ for each of its product categories, resulting in different economic risk profiles for each category. Effective as of the beginning of fiscal 2021, Ciena renamed its "Packet Networking" product line to "Routing and Switching." This change, affecting only the presentation of such information, was made on a prospective basis and does not impact comparability of previous financial results. References to prior reported "Packet Networking" product line have been changed herein to "Routing and Switching."

The tables below set forth Ciena's disaggregated revenue for the respective period (in thousands):

	Year Ended October 30, 2021				
	Networking Platforms	Platform Software and Services	Blue Planet Automation Software and Services	Global Services	Total
Product lines:					
Converged Packet Optical	$2,553,509	$ —	$ —	$ —	$2,553,509
Routing and Switching	271,796	—	—	—	271,796
Platform Software and Services	—	229,588	—	—	229,588
Blue Planet Automation Software and Services	—	—	77,247	—	77,247
Maintenance Support and Training	—	—	—	283,350	283,350
Installation and Deployment	—	—	—	171,489	171,489
Consulting and Network Design	—	—	—	33,705	33,705
Total revenue by product line	$2,825,305	$ 229,588	$ 77,247	$ 488,544	$3,620,684
Timing of revenue recognition:					
Products and services at a point in time	$2,825,305	$ 80,359	$ 27,621	$ 14,923	$2,948,208
Products and services transferred over time	—	149,229	49,626	473,621	672,476
Total revenue by timing of revenue recognition	$2,825,305	$ 229,588	$ 77,247	$ 488,544	$3,620,684

	Year Ended October 31, 2020				
	Networking Platforms	Platform Software and Services	Blue Planet Automation Software and Services	Global Services	Total
Product lines:					
Converged Packet Optical	$2,547,647	$ —	$ —	$ —	$2,547,647
Routing and Switching	267,416	—	—	—	267,416
Platform Software and Services	—	197,809	—	—	197,809
Blue Planet Automation Software and Services	—	—	62,632	—	62,632
Maintenance Support and Training	—	—	—	269,354	269,354
Installation and Deployment	—	—	—	152,003	152,003
Consulting and Network Design	—	—	—	35,296	35,296
Total revenue by product line	$2,815,063	$ 197,809	$ 62,632	$ 456,653	$3,532,157
Timing of revenue recognition:					
Products and services at a point in time	$2,815,063	$ 69,099	$ 19,583	$ 14,363	$2,918,108
Products and services transferred over time	—	128,710	43,049	442,290	614,049
Total revenue by timing of revenue recognition	$2,815,063	$ 197,809	$ 62,632	$ 456,653	$3,532,157

	Year Ended November 2, 2019				
	Networking Platforms	Platform Software and Services	Blue Planet Automation Software and Services	Global Services	Total
Product lines:					
Converged Packet Optical	$2,562,841	$ —	$ —	$ —	$2,562,841
Routing and Switching	348,477	—	—	—	348,477
Platform Software and Services	—	155,376	—	—	155,376
Blue Planet Automation Software and Services	0	0	54555	0	54555
Maintenance Support and Training	—	—	—	261,337	261,337
Installation and Deployment	—	—	—	148,233	148,233
Consulting and Network Design	—	—	—	41,312	41,312
Total revenue by product line	$2,911,318	$ 155,376	$ 54.555	$ 450,882	$3,517,630.5
Timing of revenue recognition:					
Products and services at a point in time	$2,911,318	$ 55,530	$ 17,697	$ 18,802	$3,003,347
Products and services transferred over time	—	99,846	36,858	432,080	568,784
Total revenue by timing of revenue recognition	2911318 000	1553760 00	5455500 0	4508820 00	3572131 000

Ciena reports its sales geographically around the following markets: (i) Americas; (ii) EMEA; and (iii) APAC. Americas includes activities in North America and South America. Within each geographic area, Ciena maintains 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. The following table reflects Ciena's geographic distribution of revenue principally based on the relevant location for Ciena's delivery of products and performance of services.

For the periods below, Ciena's geographic distribution of revenue was as follows (in thousands):

	Year Ended		
	October 30, 2021	October 31, 2020	November 2, 2019
Geographic distribution:			
Americas	$ 2,525,619	$ 2,469,278	$ 2,503,913
EMEA	670,462	591,468	566,718
APAC	424,603	471,411	501,500
Total revenue by geographic distribution	$ 3,620,684	$ 3,532,157	$ 3,572,131

Ciena's revenue includes United States revenue of $2.27 billion for fiscal 2021 and $2.25 billion for both fiscal 2020 and 2019. No other country accounted for 10% or more of total revenue for the periods presented above.

For the periods below, the only customers that accounted for at least 10% of Ciena's revenue were as follows (in thousands):

	October 30, 2021	October 31, 2020	November 2, 2019
AT&T	$ 447,403	$ 373,163	$ 388,704
Verizon	n/a	n/a	459,787
Web-scale provider	n/a	n/a	370,577
Total	$ 447,403	$ 373,163	$ 1,219,068

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n/a Denotes revenue representing less than 10% of total revenue for the period

The Web-scale provider noted in the above table purchased products from each of Ciena's operating segments excluding Blue Planet® Automation Software and Services. The other customers identified above purchased products and services from each of Ciena's operating segments.

While Ciena has benefited from the diversification of its business and customer base, its ten largest customers contributed 55.5% of fiscal 2021 revenue, 54.5% of fiscal 2020 revenue and 59.3% of fiscal 2019 revenue.

- *Networking Platforms* revenue reflects sales of Ciena's Converged Packet Optical and Routing and Switching product lines.
    - Converged Packet Optical - includes the 6500 Packet-Optical Platform, the Waveserver® stackable interconnect system, the 6500 Reconfigurable Line System (RLS), the 5400

family of Packet-Optical Platforms, and the Coherent ELS open line system (OLS). This product line also includes sales of the Z-Series Packet-Optical Platform.

- Routing and Switching - includes the 3900 family of service delivery platforms and the 5000 family of service aggregation. This product line also includes the 6500 Packet Transport System (PTS), which combines packet switching, control plane operation, and integrated optics, the 8100 Coherent IP networking platforms, and the 8700 Packetwave Platform.

The Networking Platforms segment also includes sales of operating system software and enhanced software features embedded in each of the product lines above. Revenue from this segment is included in product revenue on the Consolidated Statements of Operations. Operating system software and enhanced software features embedded in Ciena hardware are each considered distinct performance obligations for which the revenue is generally recognized upfront at a point in time upon transfer of control.

- *Platform Software and Services* provides analytics, data, and planning tools to assist customers in managing Ciena's Networking Platforms products in their networks. Ciena's platform software includes its Manage, Control and Plan (MCP) domain controller solution and its OneControl Unified Management System, as well as planning tools and a number of legacy software solutions that support Ciena's installed base of network solutions. Platform software-related services revenue includes sales of subscription, installation, support, and consulting services related to Ciena's software platforms, operating system software and enhanced software features embedded in each of the Networking Platforms product lines above. Revenue from the software portion of this segment is included in product revenue on the Consolidated Statements of Operations. Revenue from services portions of this segment is included in services revenue on the Consolidated Statements of Operations.

- *Blue Planet® Automation Software and Services* is a comprehensive, micro-services, standards-based open software suite, together with related services, that enables customers to implement large-scale software and IT-led operations support system (OSS) transformations by transforming legacy networks into "service ready" networks, accelerating the creation, delivery and lifecycle management of new, cloud-based services. Ciena's Blue Planet Automation Platform includes multi-domain service orchestration (MDSO), inventory management (BPI), route optimization and analysis (ROA), network function virtualization orchestration (NFVO), and unified assurance and analytics (UAA). Services revenue includes sales of subscription, installation, support, consulting and design services related to Ciena's Blue Planet Automation Platform. Revenue from the software portion of this segment is included in product revenue on the Consolidated Statements of Operations. Revenue from services portions of this segment is included in services revenue on the Consolidated Statements of Operations.

Ciena's software platform revenue typically reflects either perpetual or term-based software licenses, and these sales are considered distinct performance obligations where revenue is generally recognized upfront at a point in time upon transfer of control. Revenue from software subscription and support is recognized ratably over the period during which the services are performed. Revenue from professional services for solution customization, software and solution support services, consulting and design, and build-operate-transfer services relating to Ciena's software offerings is recognized over time with Ciena applying the input method to determine the amount of revenue to be recognized in a given period.

- *Global Services* revenue reflects sales of a broad range of Ciena's services for maintenance support and training, installation and deployment, and consulting and network design activities.

Revenue from this segment is included in services revenue on the Consolidated Statements of Operations.

Ciena's Global Services are considered a distinct performance obligation where revenue is generally recognized over time. Revenue from maintenance support is recognized ratably over the period during which the services are performed. Revenue from installation and deployment services and consulting and network design services is recognized over time with Ciena applying the input method to determine the amount of revenue to be recognized in a given period. Revenue from training services is generally recognized at a point in time upon completion of the service.

Contract Balances

The following table provides information about receivables, contract assets and contract liabilities (deferred revenue) from contracts with customers (in thousands):

	Balance at October 30, 2021		Balance at October 31, 2020	
Accounts receivable, net	$	884,958	$	719,405
Contract assets for unbilled accounts receivable, net	$	101,355	$	85,843
Deferred revenue	$	175,464	$	158,363

Ciena's contract assets represent unbilled accounts receivable, net, where transfer of a product or service has occurred but invoicing is conditional upon completion of future performance obligations. These amounts are primarily related to installation and deployment and professional services arrangements where transfer of control has occurred, but Ciena has not yet invoiced the customer. Contract assets are included in prepaid expenses and other current assets in the Consolidated Balance Sheets. See Note 11 below.

Contract liabilities consist of deferred revenue and represent advanced payments against non-cancelable customer orders received prior to revenue recognition. Ciena recognized approximately $106.5 million and $101.9 million of revenue during fiscal 2021 and 2020, respectively, that was included in the deferred revenue balance at October 31, 2020 and November 2, 2019, respectively. Revenue recognized due to changes in transaction price from performance obligations satisfied or partially satisfied in previous periods was immaterial during fiscal 2021 and 2020.

Capitalized Contract Acquisition Costs

Capitalized contract acquisition costs consist of deferred sales commissions and were $27.6 million and $15.3 million as of October 30, 2021 and October 31, 2020, respectively, and are included in prepaid expenses and other and other long-term assets. The amortization expense associated with these costs was $24.6 million and $22.4 million during fiscal 2021 and fiscal 2020, respectively, and are included in sales and marketing expense.

Remaining Performance Obligations

Remaining Performance Obligations ("RPO") are comprised of non-cancelable customer purchase orders for products and services that are awaiting transfer of control for revenue recognition under the applicable contract terms. As of October 30, 2021, the aggregate amount of RPO was $1.6 billion. As of October 30, 2021, Ciena expects approximately 85% of the RPO to be recognized as revenue within the next twelve months.

(3) CANADIAN EMERGENCY WAGE SUBSIDY

In April 2020, the Canadian government introduced the Canada Emergency Wage Subsidy (“CEWS”) to help employers offset a portion of their employee wages for a limited period in response to the COVID-19 outbreak, retroactive to March 15, 2020. The CEWS program expired October 2021. The subsidy covers employers of all sizes and across all sectors.

Ciena accounts for proceeds from government grants as a reduction of expense when there is reasonable assurance that Ciena has met the required conditions associated with the grant and that grant proceeds will be received. Grant benefits are recorded to the particular line item of the Consolidated Statement of Operations to which the grant activity relates. Amounts from the CEWS program positively impacted Ciena’s operating expense and measures of profit in the year ended October 30, 2021. For the fiscal year ended October 30, 2021, Ciena recorded a CAD$52.2 million ($41.3 million) benefit, net of certain fees, related to CEWS for claim periods beginning March 15, 2020, including CAD$43.9 million ($35.4 million) related to employee wages during fiscal 2020. As of October 30, 2021, no amounts were receivable from this subsidy.

The following table summarizes CEWS for the periods indicated (in thousands):

	Year Ended	
	October 30, 2021	October 31, 2020
Product	$ 4,283	$ —
Service	2,667	—
CEWS benefit in cost of goods sold	6,950	—
Research and development	29,519	—
Sales and marketing	2,604	—
General and administrative	2,207	—
CEWS benefit in operating expense	34,330	—
Total CEWS benefit	$ 41,280	$ —

(4) BUSINESS COMBINATIONS

Centina Systems, Inc. Acquisition

On November 2, 2019, Ciena acquired Centina Systems, Inc. (“Centina”), a provider of service assurance analytics and network performance management solutions, for approximately $34.0 million in cash. This transaction has been accounted for as the acquisition of a business.

The following table summarizes the final purchase price allocation related to the acquisition based on the estimated fair value of the acquired assets and assumed liabilities (in thousands):

		Amount
Cash and cash equivalents	$	5,718
Accounts receivable		610
Prepaid expenses and other		536
Equipment, furniture and fixtures		17
Goodwill		13,055
Customer relationships and contracts		400
Developed technology		22,200
Accounts payable		(47)
Accrued liabilities		(286)
Deferred revenue		(1,493)
Deferred tax liability		(6,692)
Total purchase consideration	$	34,018

Customer relationships and contracts represent agreements with existing Centina customers and have an estimated useful life of two years.

Developed technology represents purchased technology that has reached technological feasibility and for which Centina had substantially completed development as of the date of acquisition. Fair value was determined using future discounted cash flows related to the projected income stream of the developed technology for a discrete projection period. Cash flows were discounted to their present value as of the closing date. Developed technology is amortized on a straight-line basis over its estimated useful life of five years.

The goodwill generated from the acquisition of Centina is primarily related to expected economic synergies. The total goodwill amount was recorded in the Blue Planet Automation Software and Services segment. The goodwill is not deductible for income tax purposes.

Pro forma disclosures have not been included due to immateriality.

(5) RESTRUCTURING COSTS

Ciena has undertaken a number of restructuring activities intended to reduce expense and align its workforce and costs with market opportunities, product development and business strategies. The following table sets forth the restructuring activity and balance of the restructuring liability accounts, which are included in Accrued liabilities and other short-term obligations on Ciena’s Consolidated Balance Sheets, for the fiscal years indicated (in thousands):

	Workforce reduction		Other restructuring activities		Total
Balance at November 3, 2018	$ 2,108		$ 1,739		$ 3,847
Charges	13,779	(1)	10,759	(4)	24,538
Cash payments	(11,904)		(1,338)		(13,242)
Balance at November 2, 2019	3,983		11,160		15,143
Charges	7,282	(2)	15,370	(5)	22,652
Adjustments related to ASC 842	—		(11,160)	(6)	(11,160)
Cash payments	(8,350)		(15,370)		(23,720)
Balance at October 31, 2020	2,915		—		2,915
Charges	5,938	(3)	23,627	(7)	29,565
Cash payments	(8,072)		(23,627)		(31,699)
Balance at October 30, 2021	$ 781		$ —		$ 781
Current restructuring liabilities	$ 781		$ —		$ 781

(1) During fiscal 2019, Ciena recorded a charge of $13.8 million of severance and other employee-related costs associated with a workforce reduction of approximately 283 employees.

(2) During fiscal 2020, Ciena recorded a charge of $7.3 million of severance and other employee-related costs associated with a workforce reduction of approximately 149 employees.

(3) During fiscal 2021, Ciena recorded a charge of $5.9 million of severance and other employee-related costs associated with a workforce reduction of approximately 133 employees.

(4) Reflects unfavorable lease commitments in connection with a portion of facilities located in Alpharetta, Georgia, Spokane, Washington, Durham, North Carolina and Hanover, Maryland.

(5) Primarily represents costs and imputed interest expense related to restructured facilities and the redesign of certain business processes.

(6) Represents restructuring reserve liability recognized as a reduction to Operating ROU assets, net in relation to adoption of ASC 842.

(7) Primarily represents the redesign of certain business processes associated with Ciena's supply chain and distribution structure reorganization, and costs related to restructured facilities.

(6) INTEREST AND OTHER INCOME (LOSS), NET

The components of interest and other income (loss), net, were as follows (in thousands):

	Year Ended		
	October 30, 2021	October 31, 2020	November 2, 2019
Interest income	$ 2,051	$ 6,860	$ 14,410
Gain on non-hedge designated foreign currency forward contracts	11,172	5,551	3
Foreign currency exchange losses	(14,622)	(13,022)	(9,800)
Other	(369)	1,575	(737)
Interest and other income (loss), net	$ (1,768)	$ 964	$ 3,876

Ciena Corporation, as the U.S. parent entity, uses the U.S. Dollar as its functional currency; however, some of its foreign branch offices and subsidiaries use the local currency as their functional currency. During fiscal 2021, 2020 and 2019, Ciena recorded $14.6 million, $13.0 million and $9.8 million, respectively, in exchange rate losses, as a result of monetary assets and liabilities that were transacted in a currency other than the entity's functional currency, and the related remeasurement adjustments were recorded in interest and other income (loss), net. From time to time, Ciena uses foreign currency forwards to hedge certain of these balance sheet exposures. These forwards are not designated as hedges for accounting purposes, and any net gain or loss associated with these derivatives is also reported in interest and other income (loss), net. During fiscal 2019, Ciena recorded minimal gains from non-hedge designated foreign currency forward contracts. For fiscal 2021 and fiscal 2020, Ciena recorded gains of $11.2 million and $5.6 million, respectively, from non-hedge designated foreign currency forward contracts.

(7) SHORT-TERM AND LONG-TERM INVESTMENTS

As of the dates indicated, investments are comprised of the following (in thousands):

	October 30, 2021			
	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Estimated Fair Value
U.S. government obligations:				
Included in short-term investments	$ 181,488	$ 5	$ (10)	$ 181,483
Included in long-term investments	70,225	—	(187)	70,038
	$ 251,713	$ 5	$ (197)	$ 251,521

	October 31, 2020			
	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Estimated Fair Value
U.S. government obligations:				
Included in short-term investments	$ 150,559	$ 109	$ (1)	$ 150,667
Included in long-term investments	82,252	—	(26)	82,226
	$ 232,811	$ 109	$ (27)	$ 232,893

The following table summarizes the legal maturities of debt investments at October 30, 2021 (in thousands):

	October 30, 2021	
	Amortized Cost	Estimated Fair Value
Less than one year	$ 181,488	$ 181,483
Due in 1-2 years	70,225	70,038
	$ 251,713	$ 251,521

(8) FAIR VALUE MEASUREMENTS

As of the dates indicated, the following tables summarize the fair value of assets and liabilities that were recorded at fair value on a recurring basis (in thousands):

	October 30, 2021			
	Level 1	Level 2	Level 3	Total
Assets:				
Money market funds	$ 1,120,851	$ —	$ —	$ 1,120,851
Bond mutual fund	75,425	—	—	75,425
Time deposits	30,036	—	—	30,036
Deferred compensation plan assets	12,968	—	—	12,968
U.S. government obligations	—	251,521	—	251,521
Foreign currency forward contracts	—	14,935	—	14,935
Total assets measured at fair value	$ 1,239,280	$ 266,456	$ —	$ 1,505,736
Liabilities:				
Foreign currency forward contracts	$ —	$ 716	$ —	$ 716
Forward starting interest rate swaps	—	15,928	—	15,928
Total liabilities measured at fair value	$ —	$ 16,644	$ —	$ 16,644

	October 31, 2020			
	Level 1	Level 2	Level 3	Total
Assets:				
Money market funds	$ 889,293	$ —	$ —	$ 889,293
Bond mutual fund	50,361	—	—	$ 50,361
Deferred compensation plan assets	8,213	—	—	8,213
U.S. government obligations	—	232,893	—	232,893
Foreign currency forward contracts	—	82	—	82
Total assets measured at fair value	$ 947,867	$ 232,975	$ —	$ 1,180,842
Liabilities:				
Foreign currency forward contracts	$ —	$ 681	$ —	$ 681
Forward starting interest rate swaps	—	28,513	—	28,513
Total liabilities measured at fair value	$ —	$ 29,194	$ —	$ 29,194

As of the dates indicated, the assets and liabilities above were presented on Ciena’s Consolidated Balance Sheet as follows (in thousands):

	October 30, 2021			
	Level 1	Level 2	Level 3	Total
Assets:				
Cash equivalents	$ 1,226,312	$ —	$ —	$ 1,226,312
Short-term investments	—	181,483	—	181,483
Prepaid expenses and other	—	14,935	—	14,935
Long-term investments	—	70,038	—	70,038
Other long-term assets	12,968	—	—	12,968
Total assets measured at fair value	$ 1,239,280	$ 266,456	$ —	$ 1,505,736
Liabilities:				
Accrued liabilities and other short-term obligations	$ —	$ 716	$ —	$ 716
Other long-term obligations	—	15,928	—	15,928
Total liabilities measured at fair value	$ —	$ 16,644	$ —	$ 16,644

	October 31, 2020			
	Level 1	Level 2	Level 3	Total
Assets:				
Cash equivalents	$ 939,654	$ —	$ —	$ 939,654
Short-term investments	—	150,667	—	150,667
Prepaid expenses and other	—	82	—	82
Other long-term assets	8,213	82,226	—	90,439
Total assets measured at fair value	$ 947,867	$ 232,975	$ —	$ 1,180,842
Liabilities:				
Accrued liabilities and other short-term obligations	$ —	$ 681	$ —	$ 681
Other long-term obligations	—	28,513	—	28,513
Total liabilities measured at fair value	$ —	$ 29,194	$ —	$ 29,194

Ciena did not have any transfers between Level 1 and Level 2 fair value measurements during the periods presented.

As of October 30, 2021, none of Ciena's existing liabilities were classified as Level 3.

(9) ACCOUNTS RECEIVABLE

As of October 30, 2021, two customers accounted for 15.0% and 10.0% of net accounts receivable, respectively. As of October 31, 2020, no customer accounted for 10.0% of net accounts receivable. Ciena has not historically experienced a significant amount of bad debt expense. The following table summarizes the activity in Ciena's allowance for credit losses for the fiscal years indicated (in thousands):

Year Ended	Beginning Balance	Effect of adoption of new accounting standard (Note 1)	Provisions	Net Deductions	Ending Balance
November 2, 2019	$ 17,378	$ —	$ 6,740	$ 4,017	$ 20,101
October 31, 2020 [(1)]	$ 20,101	$ —	$ 8,855	$ 18,358	$ 10,598
October 30, 2021	$ 10,598	$ 2,206	$ 2,346	$ 4,238	$ 10,912

[(1)]The reduction in Ciena's allowance for credit losses as of October 31, 2020 compared to November 2, 2019 is primarily due to the final settlement from a significant asset impairment of $12.2 million for a trade receivable related to a single customer in the APAC region recorded in fiscal 2017.

(10) INVENTORIES

As of the dates indicated, inventories are comprised of the following (in thousands):

	October 30, 2021	October 31, 2020
Raw materials	$ 175,399	$ 119,481
Work-in-process	10,260	13,738
Finished goods	180,800	210,050
Deferred cost of goods sold	44,765	40,747
	411,224	384,016
Reserve for excess and obsolescence	(36,959)	(39,637)
	$ 374,265	$ 344,379

Ciena writes down its inventory for estimated obsolescence or unmarketable inventory by an amount equal to the difference between the cost of inventory and the estimated net realizable value based on assumptions about future demand, which are affected by changes in Ciena's strategic direction, discontinuance of a product or introduction of newer versions of products, declines in the sales of or forecasted demand for certain products, and general market conditions. During fiscal 2021, fiscal 2020 and fiscal 2019, Ciena recorded a provision for excess and obsolescence of $17.9 million, $24.7 million, and $28.1 million, respectively, primarily related to a decrease in the forecasted demand for certain Networking Platforms products. Deductions from the provision for excess and obsolete inventory relate to disposal activities.

The following table summarizes the activity in Ciena's reserve for excess and obsolete inventory for the fiscal years indicated (in thousands):

Year Ended	Beginning Balance	Provisions	Disposals	Ending Balance
November 2, 2019	$ 50,938	$ 28,085	$ 31,701	$ 47,322
October 31, 2020	$ 47,322	$ 24,701	$ 32,386	$ 39,637
October 30, 2021	$ 39,637	$ 17,850	$ 20,528	$ 36,959

(11) PREPAID EXPENSES AND OTHER

As of the dates indicated, prepaid expenses and other are comprised of the following (in thousands):

		October 30, 2021		October 31, 2020
Contract assets for unbilled accounts receivable, net	$	101,355	$	85,843
Prepaid VAT and other taxes		77,388		72,838
Prepaid expenses		62,189		70,647
Product demonstration equipment, net		29,362		44,793
Capitalized contract acquisition costs		21,753		11,296
Other non-trade receivables		18,408		21,981
Derivative assets		14,935		82
Deferred deployment expense		264		604
	$	325,654	$	308,084

Depreciation of product demonstration equipment was $9.8 million, $9.0 million and $8.8 million for fiscal 2021, 2020 and 2019, respectively.

For further discussion on contract assets and capitalized contract acquisition costs, see Note 2 above.

(12) EQUIPMENT, BUILDING, FURNITURE AND FIXTURES

As of the dates indicated, equipment, building, furniture and fixtures are comprised of the following (in thousands):

		October 30, 2021		October 31, 2020
Equipment, furniture and fixtures	$	599,672	$	523,231
Building subject to finance lease		76,123		70,791
Leasehold improvements		100,270		89,407
		776,065		683,429
Accumulated depreciation and amortization		(491,097)		(411,052)
	$	284,968	$	272,377

During fiscal 2021, fiscal 2020 and fiscal 2019, Ciena recorded depreciation of equipment, building, furniture and fixtures, and amortization of leasehold improvements of $86.5 million, $84.9 million and $78.8 million, respectively.

(13) INTANGIBLE ASSETS

As of the dates indicated, intangible assets are comprised of the following (in thousands):

	October 30, 2021			October 31, 2020		
	Gross Intangible	Accumulated Amortization	Net Intangible	Gross Intangible	Accumulated Amortization	Net Intangible
Developed technology	$ 395,726	$ (359,828)	$ 35,898	$ 395,726	$ (335,512)	$ 60,214
Patents and licenses	7,815	(3,321)	4,494	3,565	(2,529)	1,036
Customer relationships, covenants not to compete, outstanding purchase orders and contracts	375,329	(350,407)	24,922	374,659	(339,262)	35,397
Total intangible assets	$ 778,870	$ (713,556)	$ 65,314	$ 773,950	$ (677,303)	$ 96,647

The aggregate amortization expense of intangible assets was $36.0 million, $38.6 million and $35.1 million for fiscal 2021, fiscal 2020 and fiscal 2019, respectively. Expected future amortization of intangible assets for the fiscal years indicated is as follows (in thousands):

Fiscal Year	Amount
2022	$ 29,935
2023	15,125
2024	12,074
2025	6,865
2026	607
Thereafter	708
	$ 65,314

(14) GOODWILL

The following table presents the goodwill allocated to Ciena’s operating segments as of October 30, 2021 and October 31, 2020, as well as the changes to goodwill during fiscal 2021 (in thousands):

	Balance at October 31, 2020	Acquisitions	Impairments	Translation	Balance at October 30, 2021
Platform Software and Services	$ 156,191	$ —	$ —	$ —	$ 156,191
Blue Planet Automation Software and Services	89,049	—	—	—	89,049
Networking Platforms	65,607	—	—	798	66,405
Total	$ 310,847	$ —	$ —	$ 798	$ 311,645

(15) OTHER BALANCE SHEET DETAILS

As of the dates indicated, other long-term assets are comprised of the following (in thousands):

	October 30, 2021	October 31, 2020
Maintenance spares inventory, net	$ 55,696	$ 62,077
Deferred compensation plan assets	12,968	8,213
Cost method equity investments	8,578	13,408
Capitalized contract acquisition costs	5,803	4,001
Deferred debt issuance costs, net[1]	1,188	1,596
Restricted cash	58	84
Other	15,600	13,451
	$ 99,891	$ 102,830

[1] Deferred debt issuance costs relate to Ciena's senior secured asset-based revolving credit facility (the "ABL Credit Facility") entered into during fiscal 2019 and its predecessor credit facility (described in Note 20 below). The amortization of deferred debt issuance costs for the ABL Credit Facility and its predecessor is included in interest expense, and was $0.4 million for fiscal 2021 and fiscal 2020, and $0.3 million for fiscal 2019.

As of the dates indicated, accrued liabilities and other short-term obligations are comprised of the following (in thousands):

	October 30, 2021	October 31, 2020
Compensation, payroll related tax and benefits	$ 201,119	$ 135,462
Warranty	48,019	49,868
Vacation	31,200	26,945
Income taxes payable	13,577	6,348
Finance lease liabilities	3,620	2,836
Interest payable	598	672
Other	111,152	112,001
	$ 409,285	$ 334,132

The following table summarizes the activity in Ciena's accrued warranty for the fiscal years indicated (in thousands):

Year Ended	Beginning Balance	Current Year Provisions	Settlements	Ending Balance
November 2, 2019	$ 44,740	$ 23,105	$ 19,347	$ 48,498
October 31, 2020	$ 48,498	$ 22,417	$ 21,047	$ 49,868
October 30, 2021	$ 49,868	$ 17,093	$ 18,942	$ 48,019

As of the dates indicated, deferred revenue is comprised of the following (in thousands):

	October 30, 2021	October 31, 2020
Products	$ 12,859	$ 17,534
Services	162,605	140,829
	175,464	158,363
Less current portion	(118,007)	(108,700)
Long-term deferred revenue	$ 57,457	$ 49,663

As of the dates indicated, other long-term obligations are comprised of the following (in thousands):

	October 30, 2021	October 31, 2020
Finance lease liabilities	$ 62,583	$ 61,565
Interest rate swap liability	15,928	28,513
Income tax liability	63,412	16,386
Deferred compensation plan liability	12,877	8,172
Other	12,003	8,549
	$ 166,803	$ 123,185

(16) DERIVATIVE INSTRUMENTS

Foreign Currency Derivatives

During fiscal 2021 and fiscal 2020, Ciena entered into forward contracts to hedge its foreign exchange exposure from its forecasted cash flows in order to reduce the variability in its Canadian Dollar- and Indian Rupee-denominated expense, which principally relates to research and development activities. The notional amount of these contracts was approximately $288.6 million and $254.9 million as of October 30, 2021 and October 31, 2020, respectively. These foreign exchange contracts have maturities of 24 months or less and have been designated as cash flow hedges.

During fiscal 2021 and fiscal 2020, Ciena had forward contracts to hedge its foreign exchange exposure in order to reduce the variability in various currencies of certain balance sheet items. The notional amount of these contracts was approximately $296.1 million and $212.0 million as of October 30, 2021 and October 31, 2020. These foreign exchange contracts have maturities of 12 months or less and have not been designated as hedges for accounting purposes.

Interest Rate Derivatives

Ciena is exposed to floating rates of LIBOR interest on its term loan borrowings (see Note 19 below) and has hedged such risk by entering into floating to fixed interest rate swap arrangements ("interest rate swaps"). The interest rate swaps fix the LIBOR rate of approximately $350.0 million of the principal amount of the New 2025 Term Loan at 2.957% through September 2023. The total notional amount of these interest rate swaps in effect as of October 30, 2021 was $350.0 million.

Ciena expects the variable rate payments to be received under the terms of the interest rate swaps to offset exactly the forecasted variable rate payments on the equivalent notional amounts of the term loan. These derivative contracts have been designated as cash flow hedges.

Other information regarding Ciena's derivatives is immaterial for separate financial statement presentation. See Notes 6 and 8 above.

(17) ACCUMULATED OTHER COMPREHENSIVE INCOME (LOSS)

The following table summarizes the changes in accumulated balances of other comprehensive income ("AOCI"), net of tax (in thousands):

	Unrealized Gain/(Loss) on			Cumulative	
	Available-for-Sale Securities	Foreign Currency Forward Contracts	Forward Starting Interest Rate Swaps	Foreign Currency Translation Adjustment	Total
Balance at November 3, 2018	$ (425)	$ (3,060)	$ 6,417	$ (8,712)	$ (5,780)
Other comprehensive gain (loss) before reclassifications	577	14	(18,948)	(763)	(19,120)
Amounts reclassified from AOCI	—	3,971	(1,155)	—	2,816
Balance at November 2, 2019	152	925	(13,686)	(9,475)	(22,084)
Other comprehensive loss before reclassifications	(107)	(3,891)	(12,302)	(4,174)	(20,474)
Amounts reclassified from AOCI	—	2,747	4,453	—	7,200
Balance at October 31, 2020	45	(219)	(21,535)	(13,649)	(35,358)
Other comprehensive gain (loss) before reclassifications	(209)	16,856	(261)	20,215	36,601
Amounts reclassified from AOCI	—	(10,421)	9,617	—	(804)
Balance at October 30, 2021	$ (164)	$ 6,216	$ (12,179)	$ 6,566	$ 439

All amounts reclassified from AOCI related to settlement (gains) losses on foreign currency forward contracts designated as cash flow hedges impacted revenue, research and development expense or sales and marketing expense on the Consolidated Statements of Operations. All amounts reclassified from AOCI related to settlement (gains) losses on forward starting interest rate swaps designated as cash flow hedges impacted interest and other income (loss), net on the Consolidated Statements of Operations.

(18) LEASES

Ciena leases over 1.3 million square feet of facilities globally. Ciena's principal executive offices are located in Hanover, Maryland. Ciena's largest facilities are research and development centers located in Ottawa, Canada and Gurgaon, India. Ciena also has engineering facilities located in San Jose, California; Alpharetta, Georgia; Quebec, Canada; and Pune and Bangalore, India. In addition, Ciena leases various smaller offices in regions throughout the world to support sales and services operations. Office facilities are leased under various non-cancelable operating or finance leases. Ciena's current leases have remaining terms that vary up to 11 years. Certain leases provide for options to extend up to ten years and/or options to terminate within five years.

Leases included in the Consolidated Balance Sheets for the fiscal periods indicated were as follows (in thousands):

	Classification	Balance as of October 30, 2021	Balance as of October 31, 2020
Operating leases:			
Operating ROU Assets	Operating right-of-use assets	$ 44,285	$ 57,026
Operating lease liabilities	Operating lease liabilities and Long-term operating lease liabilities	60,196	80,450
Finance leases:			
Buildings, gross	Equipment, building, furniture and fixtures, net	$ 76,123	$ 70,791
Less: accumulated depreciation	Equipment, building, furniture and fixtures, net	(24,027)	(17,837)
Buildings, net		$ 52,096	$ 52,954
Finance lease liabilities	Accrued liabilities and other short-term obligations and other long-term obligations	$ 66,203	$ 64,401

ROU assets that involve subleased or vacant space aggregate $3.5 million as of October 30, 2021. These assets may become impaired if tenants are unable to service their obligations under the sublease, and/or if the estimates as to occupancy are not realized, either of which may be more likely as COVID-19 impacts evolve.

For the periods indicated, the components of lease expense included in the Consolidated Statement of Operations were as follows (in thousands):

	Classification	Year Ended October 30, 2021	Year Ended October 31, 2020
Operating lease costs	Operating expense	$ 16,602	$ 17,544
Finance lease cost:			
Amortization of finance ROU asset	Operating expense	4,773	4,465
Interest on finance lease liabilities	Interest expense	4,882	4,777
Total finance lease cost		9,655	9,242
Non-capitalized lease cost	Operating expense	1,152	2,976
Variable lease cost(1)	Operating expense	5,690	5,185
Net lease cost(2)		$ 33,099	$ 34,947

(1) Variable lease costs include expenses relating to insurance, taxes, maintenance and other costs required by the applicable operating lease. Variable lease costs are determined by whether they are to be included in base rent and if amounts are based on a consumer price index.

(2) Excludes other operating expense of $8.8 million and $11.0 million for the fiscal years ended October 30, 2021 and October 31, 2020, respectively, related to amortization of leasehold improvements.

Future minimum lease payments and the present value of minimum lease payments related to operating and finance leases as of October 30, 2021 were as follows (in thousands):

	Operating Leases	Finance Leases	Total
2022	$ 19,882	$ 8,338	$ 28,220
2023	15,153	8,557	23,710
2024	12,264	8,557	20,821
2025	7,935	8,730	16,665
2026	4,408	8,764	13,172
Thereafter	3,860	53,714	57,574
Total lease payments	63,502	96,660	160,162
Less: Imputed interest	(3,306)	(30,457)	(33,763)
Present value of lease liabilities	60,196	66,203	126,399
Less: Current portion of present value of minimum lease payments	18,632	3,620	22,252
Long-term portion of present value of minimum lease payments	$ 41,564	$ 62,583	$ 104,147

The weighted average remaining lease terms and weighted average discount rates for operating and finance leases were as follows (in thousands):

Weighted-average remaining lease term in years:	As of October 30, 2021	As of October 31, 2020
Operating leases	4.06	4.87
Finance leases	10.71	11.71
Weighted-average discount rates:		
Operating leases	2.49 %	2.82 %
Finance leases	7.56 %	7.56 %

(19) SHORT-TERM AND LONG-TERM DEBT

2025 Term Loan

On January 23, 2020, Ciena entered into a Refinancing Amendment to Credit Agreement pursuant to which Ciena refinanced the entire outstanding amount of its then existing senior secured term loan and incurred a new senior secured term loan in an aggregate principal amount of $693.0 million and maturing on September 28, 2025 (the “2025 Term Loan”).

The net carrying value of Ciena’s term loan was comprised of the following for the fiscal periods indicated (in thousands):

	October 30, 2021				October 31, 2020
	Principal Balance	Unamortized Discount	Deferred Debt Issuance Costs	Net Carrying Value	Net Carrying Value
2025 Term Loan	$ 680,873	$ (1,250)	$ (2,338)	$ 677,285	$ 683,286

Deferred debt issuance costs deducted from the carrying amount of the term loan totaled $2.3 million at October 30, 2021 and $2.9 million at October 31, 2020. Deferred debt issuance costs are amortized using the straight-line method, which approximates the effect of the effective interest rate method, through the maturity of the term loan. The amortization of deferred debt issuance costs for this term loan is included in interest expense, and was $0.6 million during each of fiscal 2021 and fiscal 2020.

As of October 30, 2021, the estimated fair value of the term loan was $680.0 million. Ciena's term loan is categorized as Level 2 in the fair value hierarchy. Ciena estimated the fair value of its term loan using a market approach based on observable inputs, such as current market transactions involving comparable securities.

(20) ABL CREDIT FACILITY

Ciena Corporation and certain of its subsidiaries are parties to the ABL Credit Facility, which provides for a total commitment of $300 million with a maturity date of October 28, 2024. The ABL Credit Facility was entered into on October 28, 2019 and replaced a predecessor senior secured asset-based revolving credit facility. Ciena principally uses the ABL Credit Facility to support the issuance of letters of credit that arise in the ordinary course of its business and thereby to reduce its use of cash required to collateralize these instruments.

As of October 30, 2021, letters of credit totaling $87.4 million were outstanding under the ABL Credit Facility. There were no borrowings outstanding under the ABL Credit Facility as of October 30, 2021.

(21) EARNINGS PER SHARE CALCULATION

Basic net income per common share ("Basic EPS") is computed using the weighted average number of common shares outstanding. Diluted net income per potential common share ("Diluted EPS") is computed using the weighted average number of the following, in each case, to the extent the effect is not anti-dilutive: (i) common shares outstanding, (ii) shares issuable upon vesting of stock unit awards; and (iii) shares issuable under Ciena's employee stock purchase plan and upon exercise of outstanding stock options, using the treasury stock method.

The following table presents the calculation of basic and diluted EPS (in thousands except per share amounts):

	Year Ended		
	October 30, 2021	October 31, 2020	November 2, 2019
Net income	$ 500,196	$ 361,291	$ 253,434
Basic weighted average shares outstanding	155,279	154,287	155,720
Effect of dilutive potential common shares	1,464	1,668	1,892
Diluted weighted average shares	156,743	155,955	157,612
Basic EPS	$ 3.22	$ 2.34	$ 1.63
Diluted EPS	$ 3.19	$ 2.32	$ 1.61
Antidilutive employee share-based awards, excluded	110	263	234

(22) STOCKHOLDERS' EQUITY

Stock Repurchase Program

On December 13, 2018, Ciena announced that its Board of Directors authorized a program to repurchase up to $500 million of Ciena's common stock. After temporarily suspending repurchases of

Ciena's common stock during fiscal 2020, Ciena reinstituted its stock repurchase program in the first quarter of 2021. See Note 28 for further information regarding updates to our share repurchase program.

The following table summarizes activity of the stock repurchase program, reported based on trade date:

	Shares Repurchased	Weighted-Average Price per Share	Amount Repurchased (in thousands)
Cumulative balance at November 2, 2019	3,838,466	$ 39.10	$ 150,076
Repurchase of common stock under the stock repurchase program	1,872,446	$ 39.81	74,535
Cumulative balance at October 31, 2020	5,710,912	$ 39.33	$ 224,611
Repurchase of common stock under the stock repurchase program	1,696,949	$ 54.27	92,088
Cumulative balance at October 30, 2021	7,407,861	$ 42.75	$ 316,699

The purchase price for the shares of Ciena's stock repurchased is reflected as a reduction of common stock and additional paid-in capital.

Stock Repurchases Related to Restricted Stock Unit Tax Withholdings

Ciena repurchases shares of common stock to satisfy employee tax withholding obligations due upon vesting of stock unit awards. The purchase price of $44.1 million for the shares of Ciena's stock repurchased is reflected as a reduction to stockholders' equity. Ciena is required to allocate the purchase price of the repurchased shares as a reduction of common stock and additional paid-in capital.

(23) INCOME TAXES

For the periods indicated, the provision (benefit) for income taxes consists of the following (in thousands):

	Year Ended		
	October 30, 2021	October 31, 2020	November 2, 2019
Provision (benefit) for income taxes:			
Current:			
Federal	$ 72,603	$ 4,363	$ 13,143
State	21,400	13,328	16,945
Foreign	25,021	12,640	9,816
Total current	119,024	30,331	39,904
Deferred:			
Federal	(21,942)	60,679	31,872
State	(11,546)	4,607	(9,159)
Foreign	(122,981)	(947)	(2,861)
Total deferred	(156,469)	64,339	19,852
Provision (benefit) for income taxes	$ (37,445)	$ 94,670	$ 59,756

For the periods indicated, income before provision (benefit) for income taxes consists of the following (in thousands):

	Year Ended		
	October 30, 2021	October 31, 2020	November 2, 2019
United States	$ 298,514	$ 387,697	$ 256,461
Foreign	164,237	68,264	56,729
Total	$ 462,751	$ 455,961	$ 313,190

Ciena's foreign income tax as a percentage of foreign income may appear disproportionate compared to the expected tax based on the U.S. federal statutory rate and is dependent on the mix of earnings and tax rates in foreign jurisdictions.

For the periods indicated, the tax provision reconciles to the amount computed by multiplying income before income taxes by the U.S. federal statutory rate of 21% for fiscal 2021, fiscal 2020 and fiscal 2019 as follows:

	Year Ended		
	October 30, 2021	October 31, 2020	November 2, 2019
Provision at statutory rate	21.00 %	21.00 %	21.00 %
Intercompany IP Restructuring Transaction	(25.85)%	— %	— %
Base Erosion and Anti-Abuse Tax	— %	(1.02)%	3.60 %
State taxes	3.73 %	2.21 %	2.18 %
Foreign taxes	2.76 %	0.51 %	(0.37)%
Research and development credit	(7.99)%	(7.74)%	(7.53)%
Non-deductible compensation	1.68 %	1.79 %	1.01 %
Foreign Derived Intangible Income	(1.82)%	(2.07)%	— %
Transition tax	— %	0.02 %	0.29 %
Rate Change	(4.33)%	3.04 %	(0.41)%
Valuation allowance	1.77 %	3.58 %	(2.13)%
Other	0.96 %	(0.56)%	1.44 %
Effective income tax rate	(8.09)%	20.76 %	19.08 %

Our future income tax provisions and deferred tax balances may be affected by the amount of pre-tax income, the jurisdictions where it is earned, the existence and utilizability of tax attributes and changes in tax laws and business reorganizations. Ciena continues to monitor these items and will adopt strategies to address their impact as appropriate.

In fiscal 2021, Ciena began implementing a plan to reorganize its global supply chain and distribution structure more substantially, which includes a legal entity reorganization and related system upgrade. Ciena completed the first phase of this plan in fiscal 2021, and expects to continue to implement the plan during the first half of fiscal 2022. As part of this reorganization, Ciena completed an internal transfer of certain of its non-U.S. intangible assets, which created amortizable tax basis resulting in the discrete recognition of a $119.3 million deferred tax asset with a corresponding tax benefit. The impact of this transfer is reflected in Ciena's effective tax rate for the year ended October 30, 2021, which had a significant, one-time impact on its net income for the period.

Ciena is also required to make accounting policy elections as a result of the Tax Act. These include whether a valuation allowance is recorded for the estimated effect of the application of GILTI and BEAT or if these will be treated as period costs when incurred. Ciena had made the incremental cash tax cost policy election with respect to analyzing the impact of GILTI on the assessment of the realizability of net operating losses. The realizability of U.S. tax carryforwards is not impacted by the BEAT, and the BEAT is a period cost when incurred. Ciena is also required to elect to treat taxes due on future GILTI inclusions in U.S. taxable income either as a current period expense when incurred or reflect such portion of the future GILTI inclusions in U.S. taxable income that relate to existing basis differences in Ciena's current measurement of deferred taxes. Ciena's accounting policy election is to treat the taxes due on future U.S. inclusions in taxable income under GILTI as a period cost when incurred.

The significant components of DTA are as follows (in thousands):

	Year Ended	
	October 30, 2021	October 31, 2020
Deferred tax assets:		
Reserves and accrued liabilities	$ 69,950	$ 73,825
Depreciation and amortization	677,729	504,233
NOL and credit carry forward	165,087	188,157
Other	47,048	33,017
Gross deferred tax assets	959,814	799,232
Valuation allowance	(159,634)	(151,427)
Deferred tax asset, net of valuation allowance	$ 800,180	$ 647,805

A reconciliation of the beginning and ending amount of unrecognized tax benefits, excluding interest and penalties, is as follows (in thousands):

	Amount
Unrecognized tax benefits at November 3, 2018	$ 96,363
Increase related to positions taken in current period	1,959
Reductions related to settlements with taxing authorities	(1,224)
Reductions related to expiration of statute of limitations	(2,494)
Unrecognized tax benefits at November 2, 2019	94,604
Increase related to positions taken in prior period	653
Increase related to positions taken in current period	1,151
Reductions related to expiration of statute of limitations	(660)
Unrecognized tax benefits at October 31, 2020	95,748
Decrease related to positions taken in prior period	(22,854)
Reductions related to settlements with taxing authorities	(654)
Increase related to positions taken in current period	5,510
Reductions related to expiration of statute of limitations	(659)
Unrecognized tax benefits at October 30, 2021	$ 77,091

As of October 30, 2021 and October 31, 2020, Ciena had accrued \$3.8 million and \$3.9 million of interest and penalties, respectively, related to unrecognized tax benefits included in other long-term obligations in the Consolidated Balance Sheets. Interest and penalties of \$0.1 million and \$1.0 million were recorded as a net benefit to the provision for income taxes during fiscal 2021 and fiscal 2019, respectively. During fiscal 2020, Ciena recorded a provision for interest and penalties in its provision for income taxes of $0.9 million. If recognized, the entire balance of unrecognized tax benefits would impact the effective tax rate. Over the next 12 months, Ciena does not estimate any material changes in unrecognized income tax benefits.

Ciena has not provided for U.S. deferred income taxes on the cumulative unremitted earnings of its non-U.S. affiliates, as it plans to indefinitely reinvest these foreign earnings outside the U.S. As of October 30, 2021, the cumulative amount of such temporary differences for which a deferred tax liability has not been recognized is an estimated $475.0 million. If these earnings were distributed to the U.S., Ciena would be subject to additional foreign withholding taxes of approximately $32.0 million. Additionally, there are no other significant temporary differences for which a deferred tax liability has not been recognized.

As of October 30, 2021, Ciena continues to maintain a valuation allowance of $159.6 million against its against gross deferred tax assets primarily. The valuation allowance is primarily related to state and foreign net operating losses and credits that Ciena estimates it will not be able to use.

The following table summarizes the activity in Ciena's valuation allowance against its gross deferred tax assets (in thousands):

Year Ended	Beginning Balance	Additions	Deductions	Ending Balance
November 2, 2019	$ 142,650	$ 27,459	$ 34,131	$ 135,978
October 31, 2020	$ 135,978	$ 25,749	$ 10,300	$ 151,427
October 30, 2021	$ 151,427	$ 17,897	$ 9,690	$ 159,634

(24) SHARE-BASED COMPENSATION EXPENSE

Ciena has outstanding equity awards issued under its 2017 Omnibus Incentive Plan (the "2017 Plan"), its 2008 Omnibus Incentive Plan, and certain legacy equity plans and equity plans assumed as a result of previous acquisitions. All equity awards granted on or after March 23, 2017 are made exclusively from the 2017 Plan. Ciena also makes shares of its common stock available for purchase under its Amended and Restated 2003 Employee Stock Purchase Plan (the "ESPP"). Each of the 2017 Plan and the ESPP are described below.

2017 Plan

The 2017 Plan has a ten-year term and authorizes the issuance of awards including stock options, restricted stock units (RSUs), restricted stock, unrestricted stock, stock appreciation rights (SARs) and other equity and/or cash performance incentive awards to employees, directors and consultants of Ciena. Subject to certain restrictions, the Compensation Committee of the Board of Directors has broad discretion to establish the terms and conditions for awards under the 2017 Plan, including the number of shares, vesting conditions, and the required service or performance criteria. Options and SARs have a maximum term of ten years, and their exercise price may not be less than 100% of fair market value on the date of grant. Repricing of stock options and SARs is prohibited without stockholder approval. Certain change in control transactions may cause awards granted under the 2017 Plan to vest, unless the awards are continued or substituted for in connection with the transaction.

The 2017 Plan authorizes and reserves 21.1 million shares for issuance. The number of shares available under the 2017 Plan will also be increased from time to time by: (i) the number of shares subject to outstanding awards granted under Ciena's prior equity compensation plans that are forfeited, expire or are canceled without delivery of common stock following the effective date of the 2017 Plan, and (ii) the number of shares subject to awards assumed or substituted in connection with the acquisition of another company. As of October 30, 2021, the total number of shares authorized for issuance under the 2017 Plan was 21.1 million and approximately 12.0 million shares remained available for issuance thereunder.

Stock Options

There were no stock options granted by Ciena during fiscal 2021, fiscal 2020 or fiscal 2019. Outstanding stock option awards granted to employees in prior periods are generally subject to service-based vesting conditions and vest over a four-year period. The following table is a summary of Ciena's stock option activity for the periods indicated (shares in thousands):

	Shares Underlying Options Outstanding	Weighted Average Exercise Price
Balance as of October 31, 2020	107	$ 31.41
Granted	—	—
Exercised	(19)	$ 30.13
Canceled	(5)	$ 18.22
Balance as of October 30, 2021	83	$ 32.46

The total intrinsic value of options exercised during fiscal 2021, fiscal 2020 and fiscal 2019 was $0.5 million, $1.3 million and $0.8 million, respectively.

The following table summarizes information with respect to stock options outstanding at October 30, 2021, based on Ciena's closing stock price on the last trading day of Ciena's fiscal 2021 (shares and intrinsic value in thousands):

Range of Exercise Price	Options Outstanding and Vested at October 30, 2021			
	Number of Underlying Shares	Weighted Average Remaining Contractual Life (Years)	Weighted Average Exercise Price	Aggregate Intrinsic Value
$ 11.34 — $ 18.22	33	1.61	$ 14.36	$ 1,334
$ 32.06 — $ 55.63	50	1.46	$ 44.69	487
$ 11.34 — $ 55.63	83	1.52	$ 32.46	$ 1,821

Assumptions for Option-Based Awards

Ciena recognizes the fair value of stock options as share-based compensation expense on a straight-line basis over the requisite service period. Ciena did not grant any option-based awards during fiscal 2021, fiscal 2020 or fiscal 2019.

Restricted Stock Units

A restricted stock unit is a stock award that entitles the holder to receive shares of Ciena common stock as the unit vests. Ciena's outstanding restricted stock unit awards are subject to service-based vesting conditions and/or performance-based vesting conditions. Awards subject to service-based conditions typically vest in increments over a three or four-year period. However, the 2017 Plan permits Ciena to grant service-based stock awards with a minimum one-year vesting period. Awards with performance-based vesting conditions (i) require the achievement of certain operational, financial or other performance criteria or targets or (ii) vest based on Ciena's total shareholder return as compared to an index of peer companies, in whole or in part.

Assumptions for Restricted Stock Unit Awards

Ciena recognizes the estimated fair value of restricted stock units subject only to service-based vesting conditions by multiplying the number of shares underlying the award by the closing price per share of Ciena common stock on the grant date. Share-based expense for service-based restricted stock unit awards is recognized ratably over the vesting period on a straight-line basis.

Ciena recognizes the estimated fair value of restricted stock units subject to performance-based vesting conditions other than total shareholder return, by assuming the satisfaction of any performance-based objectives at the “target” level and multiplying the corresponding number of shares earned based upon such achievement by the closing price per share of Ciena common stock on the grant date. Share-based compensation expense is recognized over the performance period, using graded vesting, which considers each performance period or tranche separately, based on Ciena’s determination of whether it is probable that the performance targets will be achieved. At the end of each reporting period, Ciena reassesses the probability of achieving the performance targets and the performance period required to meet those targets. The estimation of whether the performance targets will be achieved involves judgment. Revisions are reflected in the period in which the estimate is changed. If any performance goals are not met, no compensation cost is ultimately recognized against that goal and, to the extent previously recognized, compensation expense is reversed.

Share-based compensation expense for restricted stock units subject only to service-based vesting conditions and restricted stock units subject to performance-based vesting conditions other than total shareholder return, is recognized only for those awards that ultimately vest. In the event of a forfeiture of an award, the expense related to the unvested portion of that award is reversed. Reversal of share-based compensation expense based on forfeitures can materially affect the measurement of estimated fair value of Ciena’s share-based compensation.

Ciena recognizes the estimated fair value of performance based awards subject to total shareholder return as compared to an index of peer companies using a Monte Carlo simulation valuation model. Ciena reverses share-based compensation expense on performance based awards subject to total shareholder return only when the requisite service period is not reached. Assumptions for awards granted during fiscal 2021, fiscal 2020 and fiscal 2019 included the following:

	Year Ended		
	October 30, 2021	October 31, 2020	November 2, 2019
Expected volatility of Ciena common stock, which is a weighted average of implied volatility and historical volatility	41.00%	31.77%	34.10%
Historical volatility of Ciena common stock	42.80%	36.29%	36.80%
Historical volatility of S&P Networking Index	27.30%	18.40%	17.39%
Correlation coefficient	0.6800	0.5891	0.6251
Expected life in years	2.87	2.87	2.87
Risk-free interest rate	0.17%	1.65%	2.62%
Expected dividend yield	0.0%	0.0%	0.0%

The following table is a summary of Ciena’s restricted stock unit activity for the period indicated, with the aggregate fair value of the balance outstanding at the end of each period, based on Ciena’s closing stock price on the last trading day of the relevant period (shares and aggregate fair value in thousands):

	Restricted Stock Units Outstanding	Weighted Average Grant Date Fair Value Per Share	Aggregate Fair Value
Balance as of October 31, 2020	4,049	$ 35.08	$ 159,498
Granted	2,350		
Vested	(2,079)		
Canceled or forfeited	(236)		
Balance as of October 30, 2021	4,084	$ 43.67	$ 221,733

As of October 30, 2021 and October 31, 2020, 0.3 million and 0.4 million of the total restricted stock units outstanding are performance based awards subject to total shareholder return, respectively. The total fair value of restricted stock units that vested and were converted into common stock during fiscal 2021, fiscal 2020 and fiscal 2019 was $110.0 million, $83.5 million and $79.2 million, respectively. The weighted average fair value of each restricted stock unit granted by Ciena during fiscal 2021, fiscal 2020 and fiscal 2019 was $48.70, $41.61 and $34.53, respectively.

Amended and Restated ESPP

Ciena makes shares of its common stock available for purchase under its Amended and Restated Ciena Corporation Employee Stock Purchase Plan (the "ESPP"). Under the ESPP, eligible employees may enroll in a twelve-month offer period that begins in December and June of each year. Each offer period includes two six-month purchase periods. Employees may purchase a limited number of shares of Ciena common stock at 85% of the fair market value on either the day immediately preceding the offer date or the purchase date, whichever is lower. The ESPP is considered compensatory for purposes of share-based compensation expense. On January 29, 2021, Ciena's Board of Directors adopted an amendment and restatement of the ESPP to increase the number of shares available for issuance thereunder by 8.7 million and to eliminate the evergreen mechanism thereunder, which became effective upon its approval by Ciena's stockholders on April 1, 2021. Unless earlier terminated, the ESPP will terminate on April 1, 2031.

During fiscal 2021, fiscal 2020 and fiscal 2019, Ciena issued 0.7 million, 0.7 million and 1.0 million shares under the ESPP, respectively. At October 30, 2021, 12.9 million shares remained available for issuance under the ESPP.

Share-Based Compensation Expense

The following table summarizes share-based compensation expense for the periods indicated (in thousands):

	Year Ended		
	October 30, 2021	October 31, 2020	November 2, 2019
Products	$ 3,408	$ 3,182	$ 2,868
Services	5,181	3,853	3,175
Share-based compensation expense included in cost of goods sold	8,589	7,035	6,043
Research and development	21,863	16,987	14,321
Sales and marketing	25,152	20,194	16,474
General and administrative	28,804	23,424	22,841
Share-based compensation expense included in operating expense	75,819	60,605	53,636
Share-based compensation expense capitalized in inventory, net	(72)	118	57
Total share-based compensation	$ 84,336	$ 67,758	$ 59,736

As of October 30, 2021, total unrecognized share-based compensation expense was $143.3 million which relates to unvested restricted stock units and is expected to be recognized over a weighted-average period of 1.51 years.

(25) SEGMENT AND ENTITY WIDE DISCLOSURES

Segment Reporting

Ciena has the following operating segments for reporting purposes: (i) Networking Platforms; (ii) Platform Software and Services; (iii) Blue Planet Automation Software and Services; and (iv) Global Services.

Ciena's long-lived assets, including equipment, building, furniture and fixtures, operating ROU assets, finite-lived intangible assets, and maintenance spares, are not reviewed by Ciena's chief operating decision maker for purposes of evaluating performance and allocating resources. As of October 30, 2021, equipment, building, furniture and fixtures, net, totaled $285.0 million, and operating ROU assets totaled $44.3 million both of which support asset groups within Ciena's four operating segments and unallocated selling and general and administrative activities. As of October 30, 2021, finite-lived intangible assets, goodwill and maintenance spares are assigned to asset groups within the following segments (in thousands):

	October 30, 2021				
	Networking Platforms	Platform Software and Services	Blue Planet Automation Software and Services	Global Services	Total
Other intangible assets, net	$ 8,336	$ —	$ 56,978	$ —	$ 65,314
Goodwill	$ 66,405	$ 156,191	$ 89,049	$ —	$ 311,645
Maintenance spares, net	$ —	$ —	$ —	$ 55,696	$ 55,696

Segment Profit (Loss)

Segment profit (loss) is determined based on internal performance measures used by Ciena's chief executive officer to assess the performance of each operating segment in a given period. In connection with that assessment, the chief executive officer excludes the following items: selling and marketing costs; general and administrative costs; significant asset impairments and restructuring costs; amortization of intangible assets; acquisition and integration costs; interest and other income (loss), net; interest expense; loss on extinguishment and modification of debt and provision (benefit) for income taxes.

The table below sets forth Ciena's segment profit (loss) and the reconciliation to consolidated net income for the respective periods indicated (in thousands):

	Year Ended		
	October 30, 2021	October 31, 2020	November 2, 2019
Segment profit (loss):			
Networking Platforms	$ 850,901	$ 827,105	$ 759,244
Platform Software and Services	136,602	105,609	64,210
Blue Planet Automation Software and Services	(711)	(12,446)	(17,769)
Global Services	198,521	202,735	188,242
Total segment profit	1,185,313	1,123,003	993,927
Less: non-performance operating expenses			
Selling and marketing	452,214	416,425	423,046
General and administrative	181,874	169,548	174,399
Significant asset impairments and restructuring costs	29,565	22,652	24,538
Amortization of intangible assets	23,732	23,383	21,808
Acquisition and integration costs	2,572	4,031	3,370
Add: other non-performance financial items			
Interest and other income (loss), net	(1,768)	964	3,876
Interest expense	(30,837)	(31,321)	(37,452)
Loss on extinguishment and modification of debt	—	(646)	—
Less: Provision (benefit) for income taxes	(37,445)	94,670	59,756
Consolidated net income	$ 500,196	$ 361,291	$ 253,434

Entity Wide Reporting

The following table reflects Ciena's geographic distribution of equipment, building, furniture and fixtures, net, and operating ROU assets, with any country accounting for at least 10% of total equipment, building, furniture and fixtures, net, and operating ROU assets specifically identified. Equipment, building, furniture and fixtures, net, and operating ROU assets attributable to geographic regions outside of the United States and Canada are reflected as "Other International." For the periods below, Ciena's geographic distribution of equipment, building, furniture and fixtures, net, and operating ROU assets was as follows (in thousands):

	October 30, 2021	October 31, 2020
Canada	$ 240,968	$ 214,188
United States	50,744	65,321
Other International	37,541	49,894
Total	$ 329,253	$ 329,403

(26) OTHER EMPLOYEE BENEFIT PLANS

Ciena has a Defined Contribution Pension Plan that covers a majority of its Canada-based employees. The plan covers all Canada-based employees who are not part of an excluded group. Total contributions (employee and employer) cannot exceed the lesser of 18% of participant earnings and an annual dollar limit (CAD$27,830 (approximately $22,469) for 2021). This plan includes a required employer contribution of 1% for all participants and an employer matching contribution equal to 50% of the first 6% an employee contributes each pay period. During fiscal 2021, 2020 and 2019, Ciena made matching contributions of approximately CAD$8.3 million (approximately $6.7 million), CAD$7.0 million (approximately $5.7 million) and CAD$5.2 million (approximately $4.2 million), respectively.

Ciena has a 401(k) defined contribution profit sharing plan. Participants may contribute up to 60% of base pay through pre-tax or Roth contributions, subject to certain limitations. The plan includes an employer matching contribution equal to 50% of the first 8% an employee contributes each pay period. Ciena may also make discretionary annual profit contributions up to the IRS regulated limit. Ciena has made no profit sharing contributions to date. During fiscal 2021, 2020 and 2019, Ciena made matching contributions of approximately $8.4 million, $7.5 million and $5.9 million, respectively.

(27) COMMITMENTS AND CONTINGENCIES

Canadian Grant

During fiscal 2018, Ciena entered into agreements related to the Evolution of Networking Services through a Corridor in Quebec and Ontario for Research and Innovation (ENCQOR) project with the Canadian federal government, the government of the province of Ontario and the government of the province of Quebec. The purpose of these agreements were to develop a 5G technology corridor between Quebec and Ontario to promote research and development, small business enterprises and entrepreneurs in Canada. Under these agreements, Ciena can receive up to an aggregate CAD$57.6 million (approximately $46.5 million) in reimbursement from the three Canadian government entities for eligible costs over a period commencing on February 20, 2017 and ending on March 31, 2022. Ciena anticipates receiving recurring disbursements over this period. Amounts received under the agreements are subject to recoupment in the event that Ciena fails to achieve certain minimum investment, employment and project milestones. As of October 30, 2021, Ciena has recorded CAD$51.0 million (approximately $41.2 million) in cumulative benefits as a reduction in research and development expense on the Consolidated Statements of Operations, of which CAD$10.4 million (approximately $8.3 million) was recorded in fiscal 2021. As of October 30, 2021, amounts receivable from this grant were CAD$6.1 million (approximately $4.9 million) included in prepaid expenses and other in the Consolidated Balance Sheets.

Tax Contingencies

Ciena is subject to various tax liabilities arising in the ordinary course of business. Ciena does not expect that the ultimate settlement of these tax liabilities will have a material effect on its results of operations, financial position or cash flows.

Litigation

Ciena is subject to various legal proceedings, claims and other matters arising in the ordinary course of business, including those that relate to employment, commercial, tax and other regulatory matters. Ciena is also subject to intellectual property related claims, including claims against third parties that may involve contractual indemnification obligations on the part of Ciena. Ciena does not expect that the ultimate costs to resolve such matters will have a material effect on its results of operations, financial position or cash flows.

(28) SUBSEQUENT EVENTS

Vyatta Routing and Switching Technology Acquisition

On August 31, 2021, Ciena entered into a definitive agreement with AT&T to acquire its Vyatta virtual routing and switching technology. The acquisition reflects Ciena's continued investment in its Routing and Switching solutions roadmap and resources. Ciena plans to integrate the engineering personnel hired through this transaction into its Routing and Switching research and development (R&D) organization. The transaction closed during Ciena's first quarter of fiscal 2022.

Stock Repurchase Program and Accelerated Share Repurchase Agreement

On December 9, 2021, Ciena announced that its Board of Directors authorized a program to repurchase up to $1.0 billion of its common stock. On December 13, 2021, Ciena entered into an accelerated share repurchase agreement (the "ASR Agreement") with Goldman, Sachs & Co. ("Goldman") to repurchase $250.0 million (the "Repurchase Price") of its common stock as part of the repurchase program. Under the terms of the ASR Agreement, Ciena will pay the Repurchase Price to Goldman, and will receive an initial share delivery of approximately 2.7 million shares of its common stock from Goldman, representing approximately 80% of the expected share repurchases under the ASR agreement, based on the closing price of Ciena's common stock of $74.12 on December 13, 2021. The exact number of shares of common stock Ciena will repurchase under the ASR Agreement will be based generally on the average of the daily volume-weighted average prices of the common stock during the repurchase period under the ASR Agreement, less a discount and subject to adjustments pursuant to the terms and conditions of the ASR Agreement. At settlement, under certain circumstances, Goldman may be required to deliver additional shares of common stock to Ciena, or, under certain circumstances, Ciena may be required to make a cash payment or to deliver shares of its common stock to Goldman. Final settlement of the transactions under the ASR Agreement is expected to occur during the fiscal quarter ending April 30, 2022.

The amount and timing of the remaining 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. This program terminates and replaces in its entirety the previous stock repurchase program authorized in fiscal 2019. From the end of the fiscal year ending October 30, 2021 through December 17, 2021, Ciena did not repurchase shares of its common stock under this prior stock repurchase program.

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure

None.

Item 9A. Controls and Procedures

Disclosure Controls and Procedures

As of the end of the period covered by this report, we carried out an evaluation under the supervision and with the participation of management, including our Chief Executive Officer and Chief Financial Officer, of our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act). Based on this evaluation, our Chief Executive Officer and Chief Financial Officer concluded that our disclosure controls and procedures were effective as of the end of the period covered by this report.

Changes in Internal Control over Financial Reporting

There was no change in our internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Securities Exchange Act of 1934, as amended) during the most recently completed fiscal quarter that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Report of Management on Internal Control Over Financial Reporting

The management of Ciena Corporation is responsible for establishing and maintaining adequate internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Securities Exchange Act of 1934).

The internal control over financial reporting at Ciena Corporation was designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with accounting principles generally accepted in the United States of America. Internal control over financial reporting includes those policies and procedures that:

- pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of Ciena Corporation;
- provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with accounting principles generally accepted in the United States of America;
- provide reasonable assurance that receipts and expenditures of Ciena Corporation are being made only in accordance with authorization of management and directors of Ciena Corporation; and
- provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of assets that could have a material effect on the consolidated financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements.

Management of Ciena Corporation assessed the effectiveness of the Company's internal control over financial reporting as of October 30, 2021. Management based this assessment on criteria for effective internal control over financial reporting described in "COSO 2013 Internal Control — Integrated Framework" issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on this assessment, management determined that, as of October 30, 2021, Ciena Corporation maintained effective internal control over financial reporting. Management reviewed the results of its assessment with the Audit Committee of our Board of Directors.

PricewaterhouseCoopers LLP, independent registered public accounting firm, who audited and reported on the consolidated financial statements of Ciena Corporation included in this annual report, has also audited the effectiveness of Ciena Corporation’s internal control over financial reporting as of October 30, 2021, as stated in its report appearing in Item 8 of Part II of this annual report.

/s/ Gary B. Smith	/s/ James E. Moylan, Jr.
Gary B. Smith	James E. Moylan, Jr.
President and Chief Executive Officer	Senior Vice President and Chief Financial Officer
December 17, 2021	December 17, 2021

Item 9B. Other Information

None.

Item 9C. Disclosure Regarding Foreign Jurisdictions that Prevent Inspection

Not applicable.

PART III

Item 10. Directors, Executive Officers and Corporate Governance

Information relating to our directors and executive officers is set forth in Part I of this annual report under the caption "Item 1. Business—Information About Our Directors and Executive Officers."

Additional information responsive to this item concerning our Audit Committee and regarding compliance with Section 16(a) of the Exchange Act is incorporated herein by reference from our definitive proxy statement with respect to our 2022 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the fiscal year covered by this Form 10-K.

As part of our system of corporate governance, our board of directors has adopted a code of ethics that is specifically applicable to our chief executive officer and senior financial officers. This Code of Ethics for Senior Financial Officers, as well as our Code of Business Conduct and Ethics, applicable to all directors, officers and employees, are available on the "Corporate Governance" page of our website at www.ciena.com. We intend to satisfy any disclosure requirement under Item 5.05 of Form 8-K regarding an amendment to, or waiver from, a provision of the Code of Ethics for Senior Financial Officers by posting such information on our website at the address above.

Item 11. Executive Compensation

Information responsive to this item is incorporated herein by reference from our definitive proxy statement with respect to our 2022 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the fiscal year covered by this Form 10-K.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters

Information responsive to this item is incorporated herein by reference from our definitive proxy statement with respect to our 2022 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the fiscal year covered by this Form 10-K.

Item 13. Certain Relationships and Related Transactions, and Director Independence

Information responsive to this item is incorporated herein by reference from our definitive proxy statement with respect to our 2022 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the fiscal year covered by this Form 10-K.

Item 14. Principal Accountant Fees and Services

Information responsive to this item is incorporated herein by reference from our definitive proxy statement with respect to our 2022 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the fiscal year covered by this Form 10-K.

PART IV

Item 15. Exhibits and Financial Statement Schedules

(a) 1. The information required by this item is included in Item 8 of Part II of this annual report.

2. The information required by this item is included in Item 8 of Part II of this annual report.

3. Exhibits: See Index to Exhibits, which is incorporated by reference in this Item. The Exhibits listed in the accompanying Index to Exhibits are filed herewith or incorporated by reference as part of this annual report.

(b) Exhibits. See Index to Exhibits, which is incorporated by reference in this Item. The Exhibits listed in the accompanying Index to Exhibits are filed herewith or incorporated by reference as part of this annual report.

(c) Not applicable.

Item 16. Form 10-K Summary

None.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized on the 17th day of December 2021.

Ciena Corporation

By: /s/ Gary B. Smith

Gary B. Smith

President, Chief Executive Officer and Director

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the date indicated.

Signatures	Title	Date
/s/ Patrick H. Nettles, Ph.D. Patrick H. Nettles, Ph.D.	Executive Chairman of the Board of Directors	December 17, 2021
/s/ Gary B. Smith Gary B. Smith (Principal Executive Officer)	President, Chief Executive Officer and Director	December 17, 2021
/s/ James E. Moylan, Jr. James E. Moylan, Jr. (Principal Financial Officer)	Sr. Vice President, Finance and Chief Financial Officer	December 17, 2021
/s/ Andrew C. Petrik Andrew C. Petrik (Principal Accounting Officer)	Vice President, Controller	December 17, 2021
/s/ Hassan M. Ahmed, Ph.D. Hassan M. Ahmed, Ph.D.	Director	December 17, 2021
/s/ Bruce L. Claflin Bruce L. Claflin	Director	December 17, 2021
/s/ Lawton W. Fitt Lawton W. Fitt	Director	December 17, 2021
/s/ Patrick T. Gallagher Patrick T. Gallagher	Director	December 17, 2021
/s/ Devinder Kumar Devinder Kumar	Director	December 17, 2021
/s/ T. Michael Nevens T. Michael Nevens	Director	December 17, 2021
/s/ Judith M. O’Brien Judith M. O’Brien	Director	December 17, 2021
/s/ Joanne B. Olsen Joanne B. Olsen	Director	December 17, 2021