UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, DC 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 December 31, 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: 001-34674

Calix, Inc.
(Exact Name of Registrant as Specified in Its Charter)

Delaware	**68-0438710**
(State or Other Jurisdiction of Incorporation or Organization)	**(I.R.S. Employer Identification No.)**
2777 Orchard Parkway San Jose, California (Address of Principal Executive Offices)	**95134 (Zip Code)**

Registrant's telephone number, including area code (408) 514-3000

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

Title of each class	Trading symbol	Name of each exchange on which registered
Common Stock, $0.025 par value	CALX	The New York Stock Exchange

Securities registered pursuant to section 12(g) of the Act:
None
(Title of class)

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 Exchange Act). Yes: ☐ No: ☒

The aggregate market value of the Common Stock held by non-affiliates of the registrant based upon the closing sale price on the New York Stock Exchange on July 2, 2021, the last business day of the Registrant's most recently completed second fiscal quarter, was approximately $2,532 million. Shares held by each executive officer, director and by each other person (if any) who owns more than 10% of the outstanding common stock have been excluded in that such persons may be deemed to be affiliates. This determination of affiliate status is not necessarily a conclusive determination for other purposes.

As of February 9, 2022, the number of shares of the registrant's common stock outstanding was 64,438,795.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's definitive proxy statement for its 2022 annual meeting of stockholders are incorporated by reference in Items 10, 11, 12, 13 and 14 of Part III.

Calix, Inc.

Form 10-K

TABLE OF CONTENTS

PART I

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

Calix, Inc., together with its subsidiaries, is referred to in this document as “Calix,” “we,” “our” or “us.” This report includes forward-looking statements that involve substantial risks and uncertainties. All statements other than statements of historical facts contained in this report, including statements regarding Calix’s future financial position, business strategy and plans, product projections, anticipated market and industry trends and objectives of management for future operations, are forward-looking statements. In some cases, you can identify forward-looking statements by terminology such as “believe,” “could,” “expect,” “may,” “estimate,” “continue,” “anticipate,” “intend,” “should,” “plan,” “predict,” “will,” “would,” “project,” “potential” or the negative of these terms or other similar expressions. Forward-looking statements include Calix’s expectations concerning the outlook for its business, productivity, plans and goals for future operational improvements and capital investments, operational performance, future market conditions or economic performance and developments in the capital and credit markets and expected future financial performance.

Forward-looking statements involve a number of risks, uncertainties and assumptions, and actual results or events may differ materially from those projected or implied in those statements. Important factors that could cause such differences include:

- our ability to predict our revenue and reduce and control costs related to our products or service offerings;
- fluctuations in our gross margin;
- our ability to manage our relationships with our third-party vendors, including contract manufacturers, or CMs, original design manufacturers, or ODMs, logistics providers, component suppliers and development partners;
- our ability to forecast our manufacturing requirements and manage our inventory;
- supply chain constraints and cost increases for components, shipping and logistics, which may continue to cause component shortages, longer lead times, supply interruptions and significant cost increases, and which may be exacerbated by the COVID-19 pandemic, our dependence on sole-, single- and limited-source suppliers, some of which are located primarily or solely in China, and other factors, including increasing demand for components for computing needs;
- our ability to build and sustain an adequate and secure information technology infrastructure;
- the quality of our products, including any undetected hardware and software defects or software bugs;
- our ability to ramp sales and achieve market acceptance of our new products and broadband service providers’, or BSPs’, willingness to deploy our new products;
- the capital spending patterns of BSPs, and any decrease or delay in capital spending by BSPs due to macro-economic conditions, regulatory uncertainties or other reasons;
- the impact of government-sponsored programs on our customers and the impact to our customers of a U.S. government shutdown;
- intense competition;
- our ability to develop new products or enhancements that support technological advances and meet changing BSP requirements;
- the length and unpredictability of our sales cycles and timing of orders;
- our lack of long-term, committed-volume purchase contracts with our customers;
- our ability to increase our sales to larger BSPs globally;
- our exposure to the credit risks of our customers;
- the interoperability of our products with BSP networks;
- our ability to estimate future warranty obligations due to product failure rates;
- our products’ compliance with industry standards;
- our ability to expand our international operations;
- our ability to protect our intellectual property, or IP, and the cost of doing so;
- our ability to obtain necessary third-party technology licenses at reasonable costs;
- the regulatory and physical impacts of climate change and other natural events;
- the attraction and retention of qualified employees and key management personnel; and
- our ability to maintain proper and effective internal controls.

We caution you against placing undue reliance on forward-looking statements, which reflect our current beliefs and are based on information currently available to us as of the date a forward-looking statement is made. Forward-looking statements set forth in this Annual Report on Form 10-K speak only as of the date of its filing. We undertake no obligation to revise forward-looking statements to reflect future events, changes in circumstances or changes in beliefs. In the event that we do update any forward-looking statements, no inference should be made that we will make additional updates with respect to that statement, related matters or any other forward-looking statements.

PART I

ITEM 1. Business

Company Overview

Calix was founded in 1999. We develop and market cloud and software platforms, systems and services that enable BSPs of all types and sizes to innovate and transform their business. For our customers to successfully transform their businesses into the winning broadband providers of the future, they require actionable data for critical business functions such as network operations, customer support and marketing. However, this data is often trapped in disparate systems or departmental silos. Our Calix Cloud platform gathers, analyzes and applies machine learning to deliver real-time insights seamlessly to each key business function. Our customers utilize these data and insights to simplify network operations, marketing and customer support and deliver experiences that excite their subscribers. This enables BSPs to grow their brand through increased subscriber acquisition, loyalty and revenue and to reduce their operating costs, creating value for their businesses and the communities they serve.

This is our mission; to enable BSPs of all sizes to simplify, excite and grow.

We believe our platforms offer a competitive edge to BSPs at a critical time of increasing competition from direct-to-consumer device providers as they expand their reach and focus on owning the connected home experience. For example, these competing device providers are entering the home by offering Wi-Fi enabled devices, and then leveraging behavioral insights to expand their direct relationship and brand with the subscriber by offering additional consumer services. Over time, we expect this competition can erode a BSP’s brand and relationship with their subscribers, by reducing broadband to an easy-to-replace commodity, which can increase churn and reduce revenue. Our platforms enable BSPs to compete with higher value managed services offerings for their subscribers.

Innovative BSPs, who are embracing our platforms, understand this competitive threat and that their brand’s central position in the home is strategic. As such, they must protect and expand continually. Our Intelligent Access EDGE network solution and Revenue EDGE subscriber solution are designed to allow BSPs to simplify their business and reduce operating costs, while launching exciting new services in a matter of days and weeks instead of months and years. Our role-based clouds enable BSP teams, such as marketing, operations and support, to leverage real-time behavioral analytics to anticipate the subscriber’s needs, whether that is optimized broadband speed or a new, differentiated service offering. The BSP’s teams can then utilize these insights to offer new and innovative services to those subscribers who have the propensity to buy, thereby growing revenue as they deliver a connected home experience at significantly lower operating costs. To expand our reach in the market, we will continue to pursue strategic technology and distribution relationships that align with BSPs’ strategic priorities. At the same time, we offer our Calix Customer Success and Support Services along with a growing portfolio of market activation resources that provide the BSP with best practices and programs to strengthen and grow their brand with their subscribers, thereby increasing subscriber loyalty and opportunities to grow their subscriber base.

Strategy Overview

Our strategy is to position Calix as the key partner providing cloud and software platforms, systems and services to enable and facilitate the transformation of BSP networks into networks that utilize real-time data generated in the access network and subscriber home network in order to provide an exceptional broadband experience for their subscribers. Most BSPs will require significant transformation of their business and operations to become an essential provider of data-driven, high-value managed services to their subscribers. The principal elements of our strategy are:

Starting with the data – The principal way we gather, analyze and deliver actionable insights for BSPs is via the Calix Cloud. Our role-based Cloud platforms enable critical functions within a BSP’s business, such as marketing, operations and support, to leverage real-time data to continually understand and optimize the experience for their subscribers.

Building and evolving our platforms – Our product strategy centers on our strategic platforms. These platforms simplify BSPs’ businesses by delivering intelligence and automation across the entire subscriber facing network – from the data center edge to the subscriber’s devices. Our strategy is to continually augment and extend these platforms with features and services directly or through partners to allow our customers to deliver cutting-edge services to their subscribers.

Engaging Directly with Customers – We continue to invest in our direct sales capabilities so that we can engage deeply with our customers to help them understand the differentiable value that our platforms provide. As we deploy new solutions, we are building the expertise of our team by adding specialized resources in areas such as marketing, cloud platforms and network operations. Our direct model is complemented with selective programs for our channel partners, who have established local market expertise and have demonstrated the ability to generate new market opportunities and support sales of cutting-edge technologies for BSPs.

Expanding Customer Footprint Across Our Total Addressable Market – Our total addressable market includes BSPs of any type and size, including local and competitive exchange carriers, cable multiple system operators, or cable MSOs, wireless internet service providers, or WISPs, fiber overbuilders such as municipalities and electric cooperatives and hospitality providers. In 2021, we added 130 BSP customers purchasing directly or through our partners. Our diverse and growing customer footprint is a critical source of our future growth as we expand our portfolio and sell additional platforms to both new and existing customers. Our platforms expand our total addressable market and recurring revenue streams by allowing us to address the needs of not only traditional wireline-focused BSPs, but also emerging service providers. As such, we intend to continue to engage emerging providers that are creating entirely new customer segments, including fiber overbuilders, utilities and municipalities. We will also continue to pursue service provider segments where our current share is relatively low, such as cable MSOs, large CSPs and international markets.

Extending Portfolio of Calix Services – Our services team, Calix Services, supports our BSPs as they define their transformation strategies, build new skills, implement new technologies and deploy new subscriber services. Calix Services' capabilities address the BSP's entire network and service delivery lifecycle. These services allow BSPs to benefit directly from our deep expertise working with service providers to optimize their operations and leverage our advanced analytics to improve the operational efficiency of their teams.

Pursuing Strategic Relationships – We will continue to pursue strategic technology and distribution relationships that help us align with BSPs' strategic priorities. We continue to invest to provide interoperability across the ecosystems that support our customers' most critical business processes through our partner programs. By adding new solutions to our platform ecosystem, we significantly enhance the value that our platforms deliver to BSPs. In addition, we are expanding our relationships with organizations that help our customers plan and execute in market. Examples of these partners are Conexon Connect, LLC, CCI Systems, Inc. and The Pivot Group, LLC.

Product Overview

Our product strategy centers on increasing the market adoption of our three product platforms - Calix Cloud®, which comes in three role-base editions: Calix Marketing Cloud, Calix Support Cloud and Calix Operations Cloud; EXOS®, which is marketed as the Experience Innovation Platform; and AXOS®, which is marketed as the Network Innovation Platform. These platforms are sold independently and are also offered as two strategic solutions that make BSP adoption simple and quick: the "Revenue EDGE" and the "Intelligent Access EDGE."

The Revenue EDGE

The Revenue EDGE is a subscriber experience solution designed to enable BSPs to rapidly deploy new subscriber services to grow their business. The solution is built on EXOS, our carrier-class premises operating system, and fully integrated with our GigaSpire® family of systems to be ready for deployment as a complete subscriber experience solution for a BSP's residential and business subscribers.

The Revenue EDGE also integrates real-time subscriber insights via our Calix Marketing Cloud, Calix Support Cloud and Calix Operations Cloud offerings, which are configurable to display role-based insights. These insights enable BSPs to anticipate and target new revenue-generating services and applications through our mobile application, CommandIQ®, and expanding EDGE Suites offerings. Our Cloud offerings are also being integrated with other market leading platforms and solutions like Facebook, Mailchimp and HubSpot to further simplify BSP processes and accelerate their time to market.

We offer additional cloud-based services with the Revenue EDGE, which we refer to as EDGE Suites. Today they include features for network security and parental controls. We continue to expand these services with integrated third-party cloud offerings from our ecosystem Revenue EDGE partners such as Arlo Technologies, Inc., or Arlo, and Service Lee Technologies Private Limited, or Servify.

Finally, we offer Revenue EDGE Enablement resources to provide BSP teams with resources to quickly deploy, manage and monetize the services that they provide to subscribers. These resources include marketing content that can be easily customized with on-line tools, training programs, success services and professional services.

The Intelligent Access EDGE

The Intelligent Access EDGE solution is built on the award-winning Calix AXOS software platform and redefines the access edge of the network by simplifying its architecture and operations. AXOS is implemented in our E-Series family of modular, non-blocking systems, enabling BSPs to meet a wide variety of deployment scenarios.

The Intelligent Access EDGE allows BSPs to collapse multiple network elements in the access network into a single system and by using specialized software modules to add functionality and remove complexity, the solution reduces the total cost of ownership and the time to market for new services.

In addition, insights delivered through Calix Operations Cloud enable BSPs to more effectively monitor network performance and more efficiently address performance issues. Intelligent Access EDGE Enablement services are designed to ensure BSP teams are fully enabled to deploy and manage next generation networks. We offer a range of training, professional and success services to assist BSPs in every domain of network management from strategy to deployment and management.

Traditional Products

We continue to support and offer customers our traditional family of EXA and GigaCenter® Systems that are widely deployed in customer networks, primarily in North America. We expect that these products will continue to be utilized in our customers' networks for many years to come.

Customers

We market and sell our cloud and software platforms, systems and services to BSPs of all types and sizes. To date, we have focused primarily on BSPs in the North American market. Our customers span all sizes of broadband subscriber count from a few hundred to more than six million. Our customers include: ALLO Communications; CityFibre Holdings Limited; Cox Communications; Gibson Connect, LLC; Jade Communications; Lumen Technologies, Inc. (formerly known as CenturyLink, Inc.), or Lumen; Silver Star Communications; TDS Telecommunications LLC; Windstream Holdings, Inc., or Windstream; and Verizon Communications, Inc.

We classify BSPs into large, medium and small based on the number of broadband subscribers they serve. Large BSPs are those with wide geographic footprints and broadband subscribers of 2.5 million or more. Medium BSPs also operate typically within a wide geographic footprint but are smaller in scale with broadband subscribers that range from 250,000 to 2.5 million. Small BSPs consist primarily of over 1,000 predominantly local independent operating companies, or IOCs, typically focused on a single community or a cluster of communities. They include a growing number of municipalities, electric cooperatives, fiber overbuilders and WISPs. These entities range in size from a few hundred to 250,000 broadband subscribers.

Historically, Lumen has accounted for more than 10% of total revenue, representing 11% in 2020 and 15% in 2019. Our efforts to grow our product platforms, add new CSP customers and shift away from low value deployment services have all contributed to Lumen representing less than 10% of our total revenue in 2021. No other customer represented more than 10% of total revenue in 2021, 2020 and 2019. Sales to customers outside the United States represented 17% of our revenue in 2021, 13% of our revenue in 2020 and 14% of our total revenue in 2019. Our sales outside the United States have been and are currently predominantly to customers in the Americas and Europe.

Customer Engagement Model

We market, sell and support the success of our cloud and software platforms, systems and services predominantly through our direct sales force, supported by marketing, product management and customer success personnel. We have expanded this model to include select channel partners in North America and more than 40 international channel partners. Even in circumstances where a channel partner is involved, our sales and marketing personnel are generally selling side-by-side with the channel partner. We believe that our direct customer engagement approach provides us with significant differentiation in the customer sales process and customer engagement programs by aligning us more closely with our customers' changing needs and successful implementation of our solutions.

Research and Development

Continued investment in research and development is critical to our business. We have made significant investments in our product portfolio, and we intend to continue to dedicate significant resources to research and development to develop, enhance and deliver new platform features and capabilities, including investments in innovative technologies that support our business strategy. Our research and development team is composed of engineers with expertise in software and cloud platforms, optics, wireless technologies and systems engineering. Our research and development team is responsible for designing, developing and enhancing our cloud and software platforms and systems, performing product and quality assurance testing and ensuring the compatibility of our products with third-party hardware and software products. Increasingly, our engineers are focused on enhancements to our cloud and software platforms. Our teams of engineers currently remain concentrated in San Jose and Petaluma, California; Bangalore, India; Minneapolis, Minnesota; Nanjing, China; and Richardson, Texas. We also outsource a portion of our software and cloud development to domestic and international third parties, and we depend on these partners to meet our development plans. In particular, certain of our research and development efforts may be extended by co-development partnerships with third-party developers such as Infosys whereby we can utilize their substantially larger product development teams to bring cutting edge, software-based products to market while creating new revenue opportunities for both parties.

Manufacturing and Supply Chain

We rely on contract manufacturers, original design manufacturers, original equipment manufacturers and third-party logistics partners for the supply and distribution of our products. Our global supply chain management organization oversees these third parties to source and procure materials, manufacture and deliver our products. Our global supply chain management organization consists of planning, sourcing, logistics, test and manufacturing engineers and new product introduction personnel. We tightly integrate our supply chain management and new product introduction activities with the activities outsourced to these third parties. We believe that our relationships with and our reliance on third parties allow us to improve new product introduction time, conserve working capital, reduce product costs and minimize delivery lead times while maintaining high product quality as well as the ability to scale quickly to handle increased order volume. Over the past three years, we have reorganized our global supply chain to better align with our platform strategy as well as to reduce the impact from the imposition by the U.S. government of tariffs on goods imported from China. Such changes include the transition of manufacturing previously conducted in China to different manufacturing partners outside China in Taiwan and Vietnam as well as shifting a higher proportion of hardware systems design, management of raw materials used for manufacture and transition of specific supply chain operations to our ODM partners. Order fulfillment is performed primarily by our logistics provider located in Texas. We continue to qualify and utilize other vendors for various portions of our supply chain from time to time.

As a result of the current semiconductor and other component shortages, global restrictions and uncertainty related to the COVID-19 pandemic, we have experienced product supply delays as we and our supply chain partners experience longer lead times and shortages of components and materials. We believe the impact of these shortages along with the COVID-19 pandemic and government responses to the pandemic will continue to impact the ability of our third-party manufacturers to supply products to us at the cost and in the time frames and volumes required by us. We also continue to face challenges in managing global logistics and transport services for our products.

Seasonality

Fluctuations in our revenue occur due to many factors, including the varying budget cycles and seasonal buying patterns of our customers. More specifically, our customers tend to spend less in the first fiscal quarter as they are finalizing their annual capital spending budgets, and in certain regions, customers are also challenged by winter weather conditions that inhibit outside fiber deployment. Over the last couple of years, as our revenue from our large customers decreased, we have seen a reduction in year-end budgetary spending. This combined with an increase in recurring revenue, has resulted in smaller seasonal fluctuations, and we expect this trend to continue.

Competition

The communications software and systems equipment markets are highly competitive. Competition is largely based on any one or a combination of the following factors: functionality and features, price, existing business and customer relationships, product quality, installation capability, service and support, long-term returns, scalability, development and manufacturing capability.

We compete with several companies within the markets that we serve, and we anticipate that competition will intensify. Vendors with which we compete include: ADTRAN, Inc.; Casa Systems, Inc.; Ciena Corporation; Cisco Systems, Inc.; CommScope Inc.; DZS Inc.; eero (an Amazon company); Huawei Technologies Co., Ltd.; Juniper Networks, Inc.; Nest (a Google company); Plume Design, Inc.; Nokia Corporation and ZTE Corporation. In various geographic or vertical markets, there are also several smaller companies with which we compete. As we expand into adjacent markets, we expect to encounter new competitors. Many of our competitors have the financial resources to offer competitive products at a below market price, which could prevent us from competing effectively.

Intellectual Property

We rely on a combination of IP rights, including patents, trade secrets, copyrights and trademarks as well as customary contractual protections. These rights and protections are accomplished through a combination of internal and external controls, including contractual protections with employees, contractors, customers and partners, and through a combination of U.S. and international IP laws.

As of December 31, 2021, we held 107 U.S. patents and had two pending U.S. patent applications. As of December 31, 2021, we had no pending international patent applications. U.S. patents generally have a term of twenty years from filing. The remaining terms on our individual patents vary from less than a year to 17 years. U.S. patent, copyright and trade secret laws afford us only limited protection, and the laws of some foreign countries do not protect proprietary rights to the same extent.

We believe that the frequency of assertions of patent infringement has and continues to increase in our industry. Any claim of infringement from a third party, even claims without merit, could cause us to incur substantial costs defending against such claims, could require us to pay substantial damages or include an injunction or other court order that could prevent us from selling our products. In addition, we might be required to seek a license which may not be available on commercially reasonable terms or at all. Alternatively, we may be required to develop non-infringing technology, which would require significant effort and expense.

Human Capital

We employed 954 employees globally as of December 31, 2021, with 74% employees located in the United States and 24% primarily in Canada, China and India. Except for one employee located in France and subject to customarily local collective bargaining arrangements, we do not have any employees represented by a labor union with respect to their employment with us. We have not experienced any work stoppages and consider our relations with our employees to be good. We consider our talent to be very important to our operations and execution of our business strategy as well as the overall success of our business. As such, we invest significant management attention, time and resources to attract, engage, develop and retain our talent. Our talent strategy focuses on our culture and core values, our talent programs and the overall wellbeing and safety of our talent.

Our culture and core values. We believe that by nurturing a robust culture based on our core values we are able to attract, hire and retain a highly engaged team. Our cultural pillars – to collaborate, create and communicate – reflect the way we lead and work with one another internally as well as externally with our customers, partners, suppliers and other stakeholders. We seek to embed our core values to act responsibly and with integrity, to instill a sense of individual role and purpose at Calix, to communicate openly and honestly and to “take care of our own” in how we lead and conduct our business. Our culture of collaboration creates an inclusive working environment and inclusive engagement with our stakeholders; our culture to create encourages innovation from a diversity of experiences, backgrounds and characteristics; and our culture to communicate encourages open and honest discussion.

Our talent programs. We invest in talent programs to identify and hire candidates who embody our culture and core values and will further our mission. We focus on onboarding and assimilating our hires into the Calix culture while encouraging them to express their own diverse views and talents, in turn strengthening our culture. Although we do have facilities for our employees, we embrace a “work from anywhere” environment which allows us to hire top talent regardless of their physical location. Our compensation and rewards programs are designed to foster an energized, engaged, motivated and high-performing workforce. We hire and compensate our talent based on their role, experiences, contributions and performance, regardless of their gender, race or ethnic background or other personal characteristics. For example, our current programs include cash incentive bonuses designed to reward corporate and individual performance and cash bonus opportunities for internal promotions to leadership roles. In addition to performance stock option grants for senior executives, we offer two employee stock purchase plans, because we believe stock ownership rewards employees for corporate performance aligned to our stockholders’ interests. Our programs are regularly reviewed and adjusted based on benchmarks against competitive industry programs. We encourage open communications with our teams and conduct both internal and third-party run surveys to improve how we engage with and support our talent.

Our wellness, safety and health programs. A centerpiece of our culture is “taking care of our own,” which means we foster a collaborative and supportive environment so that every member of our team has the opportunity to thrive. This mindset starts with our CEO and is embedded in how we lead as well as in our wellness, safety and health programs. Our programs seek to support wellbeing broadly, with comprehensive health benefit offerings, a 401(k) plan for retirement savings available upon hire and with employer match in the U.S. and pension programs for most of our non-U.S. locations, sick leave days and leave programs, unlimited time off, disability benefits and reimbursements under our wellness fund and remote office program.

Throughout the COVID-19 pandemic, our approach has been a combination of education and actions designed with the goal of ensuring we have a very safe work environment for all our employees globally. We increased support and attention for our team in Nanjing, China, closely monitoring wellbeing and providing flexibility and tools to enable business continuity, while keeping our team safe. We initiated CEO-led sessions in an open forum with all employees addressing the impact of the pandemic and our response to support our workforce and business. We host a communications hub to provide and to enable our teams to share, resources and information such as public health and safety updates, resources for self-care, managing education and school-related challenges and leading remote teams, as well as interesting articles related to the pandemic. We implemented work and safety protocols, including a COVID-19 vaccine mandate, that put the health and safety of our team first and transitioned our remote work program to apply to all employees in the U.S. and Canada. We also reconfigured our offices and adjusted our office and health screening protocols to create a safe place to conduct essential tasks. We supplemented our wellness fund to cover broader health and wellness services, including in-home programs and child/family care, and expanded our home office program with ergonomic furniture, collaboration tools, virtual learning resources and telecommunications services to enable our teams.

Corporate Information

Our principal executive offices are located at: 2777 Orchard Parkway, San Jose, California 95134, and our telephone number is: (408) 514-3000. Our website address is: www.calix.com. We do not incorporate the information on or accessible through our website into this Annual Report on Form 10-K, and you should not consider any information on, or that can be accessed through, our website as part of this Annual Report on Form 10-K. Calix®, the Calix logo design, AXOS®, Calix Cloud®, CommandIQ®, EXOS®, GigaCenter®, GigaSpire® and other trademarks or service marks of Calix appearing in this Annual Report on Form 10-K are the property of Calix. Trade names, trademarks and service marks of other companies appearing in this Annual Report on Form 10-K are the property of the respective holders. The Securities and Exchange Commission, or SEC, maintains a website at www.sec.gov that contains reports, proxy statements and other information regarding issuers that file electronically with the SEC. We post on the Investor Relations page of our website, www.calix.com, a link to our filings with the SEC free of charge, as soon as reasonably practical after they are filed electronically with the SEC.

ITEM 1A. Risk Factors

We have identified the following additional risks and uncertainties that may affect our business, financial condition and/or results of operations. Investors should carefully consider the risks described below, together with the other information set forth in this Annual Report on Form 10-K, before making any investment decision. The risks described below are not the only ones we face. Additional risks not currently known to us or that we currently believe are immaterial may also significantly impair our business operations. Our business could be harmed by any of these risks. The trading price of our common stock could decline due to any of these risks, and investors may lose all or part of their investment.

Business and Operational Risks

We have risks associated with being materially dependent upon third-party vendors; certain factors that affect our business as a result of those dependencies have in the past and could continue to disrupt our business and adversely impact our gross margin and results of operations.

We materially depend upon third-party vendors for our complex global supply chain operations, including for services to develop, design and source components and materials, as well as manufacture, transport and deliver our products. If any of these vendors stop providing their services, for any reason, we would have to obtain similar services from other sources, which may not be available on commercially reasonable terms, if at all. We also have limited control over disruptions that may occur at the facilities of those providers, such as supply interruptions, labor shortages, strikes, shipping backlogs at ports and similar disruptions to transportation infrastructure, design and manufacturing failures, quality control issues, systems failures or even facility closures arising from the COVID-19 pandemic or natural disasters. In addition, switching development firms or manufacturers could delay the manufacture and availability of products and/or require us to re-qualify our products with our customers, which would be costly and time-consuming. Any interruption in the development, supply or distribution of our products would adversely affect our ability to meet scheduled product deliveries to our customers and could result in lost revenue or higher costs, which would negatively impact our gross margin and operating results and harm our business.

Particular risks associated with management of our global supply chain operations include the following:

- ***Manufacturing constraints, shortages and other disruptions.*** We do not have internal manufacturing capabilities and rely solely on a small number of CMs to manufacture and supply our products. Our business operations and ability to supply our products are highly dependent upon our ability to secure adequate third-party manufacturing capabilities and capacity and to effectively manage those third parties to meet our business needs. Our dependence solely on third-party manufacturers makes us vulnerable to possible supply and capacity constraints and reduces our control over manufacturing disruptions due to component availability, extended lead times delivery schedules, quality, manufacturing yields and increased costs. Some of these risks have occurred from time to time in our business. If these disruptions and constraints are prolonged, or if these manufacturers do not have the ability or business continuity plans to fulfill their obligations to us, our business could be disrupted. We also expect to face increasing competition for manufacturing capacity and resources as other companies seek to move manufacturing operations out of China due to uncertainties around tariffs, trade disputes or other factors. If we cannot effectively manage our vendors or if we fail to invest adequate resources to manage our supply chain operations, our ability to meet customer orders and generate revenue may be negatively impacted. A substantial portion of our manufacturing is done at facilities outside of the U.S., largely in Asia, which presents increased supply risk, including the risk of supply interruptions, delays, shortages or reductions in manufacturing quality or controls. In addition, these supply interruptions, delays and shortages could impair our ability to meet our customer requirements, require us to pay higher prices or incur expedite fees, which would harm our business and negatively impact our gross margin and results of operations. Our international manufacturing also creates risks and uncertainties associated with regulatory changes or government actions such as local business requirements, trade restrictions and tariffs, economic sanctions or related legislation, which may complicate our export and import activities, be disruptive to the operations of our manufacturers and logistics partners or result in higher product and shipping costs and variability of supply. For example, substantially all our silicon suppliers have extended their lead times to 52 weeks or more and increased prices. Manufacturing in Asia further heightens our risk of meeting customer delivery requirements as we rely upon third-party logistics companies to transport and import significant volumes of products to the U.S. where we generate a substantial majority of our revenue. These supply chain risks are further increased by shipping backlogs at ports and similar disruptions to transportation infrastructure due to a growing surge in global demand for goods.

- ***Limited sources and sole-sourced supply.*** We are dependent upon sole-source or limited-source suppliers for some key product components such as chipsets and certain of our application-specific integrated circuit processors and resistor components, including certain components sourced solely through suppliers located in China. Any of these suppliers could stop producing our components, be subject to higher costs or tariffs, epidemics or other conditions that disrupt their operations, cease operations or enter into exclusive arrangements with our competitors, consequently affecting our operations and results. For example, we have experienced disruptions in our supply of certain components that we source from suppliers in China, Southeast Asia, Mexico and other countries as a result of the COVID-19 pandemic, causing delays in supply of our products due to production disruptions, factory closures and longer lead times for components and from uncertainty around trade and tariff policies between the U.S. and China. Being dependent upon these suppliers limits our ability to mitigate these disruptions in our supply chain and such disruptions, particularly if prolonged, may adversely affect our ability to obtain components and materials needed to manufacture our products at acceptable prices or at all. These risks would adversely affect our ability to meet scheduled product deliveries to our customers, increase costs and in turn harm our business and results of operations.
- ***Limitations on ability to manage third-party risks.*** Our business with third-party manufacturers typically represents a relatively small percentage of their total revenue. Consequently, our orders may not be given adequate priority if such manufacturers have to allocate limited capacity among competing customers. This could delay supplies of product to us or limit our ability to ramp product volumes within desired timeframes. If any of our manufacturing partners are unable or unwilling to continue manufacturing our products in required volumes and at high quality levels, we would have to identify, qualify and select acceptable alternative manufacturers. Having to take the time to qualify new contract manufacturers could disrupt our ability to maintain continuous supply of product to meet customer requirements. An alternative manufacturer may not be available to us when needed or may not be in a position to satisfy our production requirements at commercially reasonable prices and quality. In addition, we and/or our manufacturers may not be able to negotiate commercially reasonable terms and sufficient quantities of component supplies with component and materials suppliers to meet our manufacturing needs because our purchase volumes may be too low for us to be considered a priority customer for securing supplies, particularly when there are shortages or limited availability of key components and materials. As a result, suppliers could stop selling to us and our manufacturers at commercially reasonable prices, or at all. Any such interruption or delay may force us and our manufacturers to seek components or materials from alternative sources, which may not be available, or result in higher prices. Switching suppliers could also force us to redesign our products to accommodate new components and could require us to re-qualify our products with our customers, which would be costly and time consuming. A significant interruption in manufacturing or supply availability for any of these reasons would reduce supply to our customers, which would result in lost revenue and harm our customer relationships.
- ***Ability to forecast and manage inventory liability with vendors.*** We have experienced unanticipated increases in demand from customers, in part as a result of higher consumer demand for internet services and improved WiFi due to COVID-19; in turn, this has resulted in our shipments being delayed. If we underestimate product demand from our customers, our manufacturers may have inadequate component inventory to meet our demand. If we are not able to adequately anticipate demand, this could interrupt our product manufacturing, increase our cost of product revenue associated with expedite fees and air freight and/or result in delays or cancellation of customer orders. If we are unable to deliver products timely to our customers, we may lose customer goodwill or our customers may choose to purchase from other vendors, all of which may have a material negative impact on our revenue and operating results. If we overestimate our product demand, our manufacturers may purchase excess components and build excess inventory, and we could be required to pay for these excess parts or products and their storage costs. Long lead times for component supply, which have been magnified by factory closures and shortages due to the COVID-19 pandemic as well as higher demand for certain components, and unanticipated demand for our products have in the past and are expected to continue to impact our ability to accurately forecast our production requirements. We may incur liabilities for certain component inventory purchases that have been rendered excess or obsolete, which may have an adverse effect on our gross margin, financial condition and results of operations.

Our business and results of operations have been, and are expected to continue to be, negatively affected by the COVID-19 pandemic that has severely impacted the global economy.

Since late 2019, the COVID-19 pandemic has severely impacted the global economy, disrupting financial markets, global manufacturing activities, customer purchasing patterns and general business operations, resulting in business closures, significant unemployment rates and substantial and prolonged government restrictions on business, travel and personal activities. These measures have disrupted our global supply chain activities, including our third-party manufacturers, logistics providers and suppliers and significantly limited our business travel, customer engagements and normal business activities, all of which heighten our business and operational risks. As the effects of the pandemic persist, we may continue to experience a sustained shortage of components and materials, which may have a material negative impact on our ability to supply products to meet customer requirements and could materially adversely affect our business and results of operations. Our customers' purchasing decisions may be impacted by the pandemic, which could in turn impact our sales and results of operations. Although demand for our products has been strong in the short-term as subscribers seek more bandwidth and better Wi-Fi, customers' purchasing decisions over the long-term may be impacted by the pandemic and its impact on the economy. For example, BSPs may not invest in our new platforms or delay infrastructure improvements due to the uncertainty in the global economy. A prolonged disruption to our business and operations and other adverse impacts of the COVID-19 pandemic or further future disruptions could have a material adverse effect on our business, results of operations and financial condition.

With the increased availability of vaccines in the U.S., we reopened our offices in July 2021 for fully-vaccinated employees who choose to work at the office and resumed business travel with safety precautions as we continue to monitor evolving pandemic regulations and focus on the safety, well-being and productivity of our workforce. The recent emergence of the Omicron variant has made it more likely that COVID-19 related effects on our business will continue for the foreseeable future. There are no assurances that the global economy will recover from the on-going effects of the pandemic quickly or at all, or that impacted areas will be able to adequately contain COVID-19 infections.

Security breaches and data loss may expose us to liability, harm our reputation and adversely affect our business.

As part of our business operations, we collect, store, process, use and/or disclose sensitive data relating to our business, including in connection with the provision of our cloud services and in our information systems and data centers (including third-party data centers). We also engage third-party providers to support various internal functions, such as human resources, finance, information technology and electronic communications, as well as the development and delivery of our products and cloud services, which includes collecting, handling, processing and/or storage of data on our behalf. These internal and external functions involve an array of software and systems (including cloud-based) that enable us to conduct, monitor and/or protect our business, operations, systems and IT assets. Our cloud-based solutions enable us to host our customers' subscriber data in third-party data centers. While we and our third-party providers apply multiple layers of security to prevent unauthorized access to, use, alteration or disclosure of data, including encryption and authentication technologies, these security measures may be compromised by malicious hackers. Hackers could steal proprietary or personal information related to our business, products, employees and customers; hold data ransom; or otherwise interrupt our systems and services or those of our supply chain partners, vendors, customers or others. There have been increasing instances of cybersecurity attacks and security breaches, including sophisticated supply chain attacks. As we and our third-party providers continue to increase our reliance on virtual environments and communications systems and cloud-based solutions to support our work-from-anywhere culture and overall business needs, our exposures to third-party vulnerabilities and security risks also increase. Despite our on-going enhancement of security precautions, hackers are increasingly more sophisticated and aggressive, and our efforts may be inadequate to prevent all incidents of data breach or theft due, for example, to the increased use by attackers of tools and techniques that are specifically designed to circumvent controls, to avoid detection, and to remove or obfuscate forensic evidence.

We and certain of our third-party providers have in the past been subject to cyberattacks and security incidents. The theft, loss or misuse of proprietary or personal data collected, stored or processed by us or our service providers to run our business could result in significant security and remediation costs, regulatory fines and penalties, and/or litigation costs. Even if we and our third-party providers allocate, implement and manage reasonable security and data protection measures, we could experience data loss, unauthorized data disclosure or a breach of our systems, products or those of our third-party data centers that materially impact our business. The continued growth of our cloud-based platforms and services portfolio and increase reliance on third-party development partners and third-party software and cloud-based solutions, increases the likely risks arising from security breaches or data loss. Any data loss or compromise of our systems, including our product platforms that collect and process personal data, or third-party data centers upon which those platforms rely, could result in loss of confidence in the security of our offerings and loss of customers or customer goodwill, damage our reputation, lead to liability given the increasing development of strict privacy and data security laws and regulations around the world, and adversely affect our business, financial condition, operating results and cash flows. Although we maintain insurance that may apply to cybersecurity risks and liabilities, there can be no guarantee that any or all costs or losses incurred will be partially or fully insured.

Business and operational risks associated with our international operations could harm our business.

We are subject to business and operational risks associated with our international operations, including our global supply chain operations and our international offices located in Nanjing, China and Bangalore, India. In addition, we are exposed to risk arising from dependence upon third-party development contractors in India, and, to a lesser extent, dependence upon our international sales operations. The risks associated with our international operations also include costs of complying with differing and changing laws and regulatory requirements, tariffs, export quotas, custom duties and other trade restrictions; effects of inflation, currency controls and/or fluctuations in currency exchange rates; limited, inadequate or non-existent IP protection; and uncertainties associated with political conflicts and instabilities, variable economic conditions, terrorist attacks or acts of war. Our development operations and activities in China and India involve these and other significant risks, including: local labor conditions and regulations; knowledge transfer related to our technology and exposure to misappropriation of IP or confidential information, including information that is proprietary to us, our customers and third parties; heightened exposure to changes in the economic, security, political and pandemic conditions; international trade agreements and U.S. tax provisions that could adversely affect our international operations; complexities of managing development timelines and deliverables from abroad; and differences in local business practices and customs that may not align with our expectations and standards.

Along with the foregoing risks, our international sales operations involve risks associated with greater costs and complexity localizing and supporting our products and platforms in local markets; trade regulations, compliance requirements and incremental costs applicable to the qualification, production, sale and delivery of our products; longer collection periods, financial instability and other difficulties impacting collection of accounts receivable in certain jurisdictions; more intense competition including from local equipment suppliers; and our reliance on value added resellers to sell and support our products in international markets given our limited presence and infrastructure outside the U.S. To expand our international operations, we will need to invest resources to attract key talent, build operational infrastructure, execute on our international strategy and drive international market demand for our products. If we invest substantial resources to expand our international operations and are unable to do so successfully and in a timely manner, our financial condition and results of operations may suffer.

If we do not successfully execute our business strategy to increase our sales to new and existing BSPs, our operating results, financial condition, cash flows and long-term growth may be negatively impacted.

Our growth depends upon our ability to increase sales to existing and new BSP customers of all types and sizes, and the execution of our strategy to increase sales to BSPs involves significant risk. The majority of our revenue is not recurring, and our customers generally have no committed purchase requirements, may cancel orders or cease purchasing our products at any time. If our customers stop purchasing our products for any reason, our business and results of operations would be harmed. If we are unable to increase our sales to new and existing BSPs, our operating results, financial condition, cash flows and long-term growth may be negatively impacted. Our strategy includes investing in regional sales teams and select channel partners to sell to smaller regional BSPs. A large portion of our current sales are to customers with smaller regional networks and limited capital expenditure budgets. The spending patterns of many of these customers are generally less formal and often characterized by small and sporadic purchases, and the potential revenue from any one of these customers is limited. We rely primarily on channel partners, including value added resellers, internationally and for certain U.S. markets. We face fierce competition for business with key channel partners. If we are unable to engage channel partners that we believe are key to our strategy, we may fail to grow our sales as planned. Furthermore, we rely on our channel partners to promote and sell our products. The loss of a key channel partner or the failure of our partners to provide adequate services could have a negative effect on customer satisfaction and could cause harm to our business.

Our selling efforts to larger BSPs require substantial investments of technical, marketing and sales resources through lengthy equipment qualification and sales cycles without any assurance of generating sales. We may be required to invest in costly upgrades to meet more stringent performance criteria and interoperability requirements, develop new customer-specific features or adapt our products to meet required standards. We have invested and expect to continue to invest considerable time, effort and expenditures, including investment in product research and development, related to these opportunities without any assurance that our efforts will result in revenue.

The quality of our support and services offerings is important to sustain and increase our sales to new and existing customers. Our services to customers have increasingly broadened to help them deploy our products within their networks. Once our products are deployed within our customers' networks, they depend on our support organization to resolve any issues relating to those products. If we do not effectively assist our customers in deploying our products, succeed in helping them quickly resolve post-deployment issues or provide effective support, it could adversely affect our ability to sell our products to existing customers and harm our reputation with potential new customers. As a result, our failure to maintain high quality support and services could result in the loss of customers, which would harm our business.

If we do not successfully increase our sales through adoption of our platform offerings, our operating results, financial condition, cash flows and long-term growth may be negatively impacted.

We have platform offerings that are new and early in their life cycles and subject to uncertain market demand. If our customers are unwilling to adopt these new offerings, install our new products or deploy our new services, or if we are unable to achieve market acceptance of our products and platforms, our business and financial results may be harmed. Moreover, adoption of our cloud product offerings, such as our Revenue EDGE, is dependent upon the success of our customers in investing, marketing, selling and deploying broader services—including ancillary services—to their subscribers, and our ability to differentiate our products from competing or substitutive product and service offerings. For example, our Revenue EDGE Suites include network security, parental controls and a growing ecosystem of services from partners like Arlo and Servify. However, if subscriber demand for such services does not grow as expected or declines, or our customers are unable or unwilling to invest in our platforms to deploy and market these services, demand for our products may decrease or fail to grow at rates we anticipate.

We may have difficulty evolving and scaling our business and operations to meet customer and market demand, which could result in lower profitability or cause us to fail to execute on our business strategies.

In order to grow our business, we will need to continually evolve and scale our business and operations to meet customer and market demand. Evolving and scaling our business and operations places increased demands on our management as well as our financial and operational resources to effectively manage organizational change; design scalable processes; accelerate and/or refocus research and development activities; expand our manufacturing, supply chain and distribution capacity; increase our sales and marketing efforts; broaden our customer-support and services capabilities; maintain or increase operational efficiencies; scale support operations in a cost-effective manner; implement appropriate operational and financial systems; and maintain effective financial disclosure controls and procedures. If we cannot evolve and scale our business and operations effectively, we may not be able to execute our business strategies in a cost-effective manner and our business, financial condition, profitability and results of operations could be adversely affected.

Changing market and customer requirements may adversely affect the valuation of our inventory as well as our supplier purchase commitments.

Customer demand for our products can change rapidly in response to market and technology developments. We may, from time to time, adjust inventory valuations downward or end of life certain of our products in response to our assessment of our business strategy as well as consideration of demand from our customers for specific products or product lines. We also periodically evaluate our supplier purchase commitments, which have increased significantly due to extended lead-times in the current supply chain environment. We record a liability for excess and obsolete components based on our estimated future demand for our products, potential obsolescence of technology and product life cycles. If we fail to accurately plan our inventory levels, which becomes more challenging as component lead times increase, we may have to write off excess or obsolete inventory, or accrue a liability for component inventory held by our suppliers, both of which could have a material adverse effect on our financial condition and results of operations.

We could become subject to litigation that could harm our business or negatively impact our results of operations.

In the ordinary course of business, we are subject to legal claims, or may become involved in regulatory proceedings, related to disputes over commercial, competition, IP, labor and employment and other matters. Regardless of the merits of any such claims, litigation and regulatory proceedings are inherently uncertain, and can be costly, disruptive to our business and operations, harmful to our reputation, and distracting to management. In particular, as a technology company, we may be subject to IP claims asserting patent, copyright, trademark and/or other infringement claims that are costly to defend and could limit our ability to use some technologies in the future. The risk of such claims is heightened as we expand our products and services and increasingly rely on more technologies, including third-party IP rights that we license and incorporate into our products and services. Third parties from whom we license IP may be unable or unwilling to indemnify us for such claims or offer any other remedy to us. Increasingly, patent infringement claims are asserted by patent assertion entities and non-practicing entities, or NPEs, that do not conduct business as an operating company and hold and own patents only for the purpose of aggressively pursuing royalties through infringement assertions or patent infringement litigation. Further, in our industry, the number of assertions by NPEs continues to increase due in part to patent sales by operating companies to NPEs and availability of litigation financing. We have received and expect to continue to receive assertions from NPEs and other third parties alleging that we may be infringing their patents or other IP rights; offering licenses to such IP; and/or threatening litigation. Any claims asserting that our products infringe the proprietary rights of third parties, with or without merit, could be time-consuming, result in costly litigation and divert the efforts of our engineering teams and management. These claims could also result in the suspension of our ability to import, market and sell our products and services, product shipment delays or requirements to modify our products or enter into costly settlements or licensing agreements. Such royalty or licensing agreements, if required, may not be available to us on acceptable terms, if at all. Furthermore, we may additionally be financially responsible for claims made against our customers, including costs of litigation and damages awarded, under indemnity obligations which could further negatively impact our results of operations. Protracted litigation could cause us to incur significant defense costs, which would negatively impact our results of operations.

We have a history of losses and fluctuations in our gross margin and operating results, which make it difficult to predict our future performance and could cause the market price of our stock to decline.

We have a history of net operating losses and fluctuations in our quarterly and annual gross margin and operating results, including losses and fluctuations due to factors outside of our control. Factors that impact variability of our operating results include our ability to predict our revenue and reduce and control our costs, our ability to predict product functions and features desired by our customers, the impact of global economic conditions, our ability to effectively manage our global supply chain operations, our ability to effectively manage third parties upon whom we depend to conduct our business, our customers' spending patterns and purchasing decisions, the impact of competition, customer adoption of our products, our ability to manage our legal, contractual and regulatory obligations and liabilities, and other risk factors identified in the lead-in to "Management's Discussion and Analysis of Financial Condition and Results of Operations" above and in this "Risk Factors" section. Our gross margin is further impacted by customer, geographic and product mix, the impact of competition on our prices, our ability to manage our costs associated with components and materials, excess and obsolescence, expedite fees and logistics-related activities, contractual commitments and other product costs. Fluctuating results make it difficult to predict our future performance and could cause the market price of our stock to decline. We expect to continue to incur significant expenses and cash outlays as we expand our business and operations and target new customer opportunities. Given our anticipated growth and the intense competitive pressures we face, we may be unable to adequately control our operating expenses or maintain positive operating income. Comparing our operating results on a period-to-period basis may not be meaningful, and you should not rely on our past results as an indication of our future performance. If our revenue or operating results fall below the expectations of investors or securities analysts, or below any guidance we may provide to the market, the market price of our stock would likely decline.

We cannot guarantee that we will achieve sustained profitability. We will have to generate and sustain significant and consistent increased revenue, while continuing to control our expenses, to maintain profitability. If we are unable to sustain our operating income and positive cash flows from operations, our liquidity, results of operations and financial condition will be adversely affected, and we may be forced to limit our development activities, reduce our investment in growth initiatives and institute cost-cutting measures, any of which would adversely impact our business and growth.

We are exposed to customer credit risks that could adversely affect our operating results and financial condition.

We generally extend credit terms for sales to our customers which exposes us to credit risk. If we are unable to collect our accounts receivable balances as anticipated, our operating results and financial condition will be harmed. A number of factors contribute to this risk, including our ability to adequately assess a customer's creditworthiness and financial condition, changes in a customer's financial condition and/or liquidity, our ability to timely collect our accounts receivable from customers, disagreements with customers on invoiced balances and economic downturns or other unanticipated events impacting a customer's ability to pay. Furthermore, some of our international customers operate in countries with developing economies, volatile financial markets or currency regulations that impact their ability to make payments in U.S. dollars. The COVID-19 pandemic has also presented financial challenges to numerous businesses, including delays in collections from some of our international customers in emerging markets and, if prolonged, may result in liquidity issues leading to heightened difficulties with collections. While we take measures to pursue collections on our accounts receivable, we have from time to time written down accounts receivable and written off doubtful accounts and may need to do so in future periods. The determination of allowances for doubtful accounts involves significant judgment, and if we underestimate our allowance for doubtful accounts, we will have to make further write-downs. Such write-downs or write-offs could negatively affect our operating results for the period in which they occur and could harm our cash flow or our financial condition.

If we lose any of our key personnel, or are unable to attract, train and retain qualified personnel, our ability to manage our business and continue our growth would be negatively impacted.

Our success depends, in large part, on the continued contributions of our key personnel who are highly skilled and would be difficult to replace. Competition for skilled personnel, particularly in software development and engineering, is intense. We cannot be certain that we will be successful in attracting and retaining qualified personnel, or that newly hired personnel will function effectively, both individually and as a group. If we are unable to effectively recruit, hire and utilize new employees to align with our company objectives, execution of our business strategy and our ability to react to changing market conditions may be impeded, and our business, financial condition and results of operations may suffer. In the first half of 2020, we transitioned to a "work-from-anywhere" model, and if we do not effectively manage our distributed workforce, we could face challenges maintaining our corporate culture, which could increase attrition or limit our ability to attract personnel. None of our key personnel are bound by a written employment contract to remain with us for a specified period. In addition, we do not currently maintain key person life insurance covering our key personnel. If we lose the services of any key personnel, our business, financial condition and results of operations may suffer.

If we experience disruptions with our enterprise resource planning system, we may not be able to effectively transact business or produce financial statements, which would adversely affect our business, results of operations and cash flows.

In January 2020, we migrated our Oracle enterprise resource planning, or ERP, system to Oracle's cloud platform. With that migration, we are highly dependent upon Oracle to host, manage and maintain our ERP system. Any disruptions to their business or processes, or delays in their ability to provide services to us, may in turn disrupt our business operations or increase costs. Furthermore, we receive quarterly system updates and enhancements on the cloud platform according to Oracle's release timeline and change management processes, which if not managed properly may disrupt our business operations and delay our ability to process transactions and produce reports necessary to conduct our business. We are highly dependent upon our ERP system for critical business functions, including order processing and management, supply chain and procurement operations, financial planning, accounting and reporting; accordingly, protracted disruption in functionality or processing capabilities of the

ERP system could materially impair our ability to process transactions timely or produce accurate financial statements on a timely basis. If our systems suffer prolonged interruption, our results of operations and cash flows would be adversely affected.

As a public company we are subject to significant accounting, legal and regulatory requirements; our failure to comply with these requirements may adversely affect our operating results and financial condition.

We are subject to significant accounting, legal and regulatory requirements, including requirements and rules under the Sarbanes-Oxley Act, or SOX, and the Dodd-Frank Wall Street Reform and Consumer Protection Act, or Dodd-Frank, among other rules and regulations implemented by the SEC, as well as listing requirements of the New York Stock Exchange, or NYSE. We incur significant accounting, legal and other expenses and must invest substantial time and resources to comply with public company reporting and compliance requirements, including costs to ensure we have adequate internal controls over accounting and financial reporting, proper documentation and testing procedures among other requirements. We cannot be certain that the actions we have taken to implement internal controls over financial reporting will be sufficient. We have in the past discovered, and may in the future discover, areas of our internal financial and accounting controls and procedures that need improvement, particularly as we enhance, automate and improve functionality of our processes and internal applications, including Oracle's cloud platform. New laws and regulations as well as changes to existing laws and regulations affecting public companies, including the provisions of SOX and Dodd-Frank and rules adopted by the SEC and the NYSE, would likely result in increased costs to us as we respond to their requirements. We continue to invest resources to comply with evolving laws and regulations, and this investment may result in increased general and administrative expense.

If we fail to maintain proper and effective internal controls, our ability to produce accurate financial statements on a timely basis could be impaired, which would adversely affect our operating results and our stock price.

Our management is responsible for establishing and maintaining adequate internal control over financial reporting to provide reasonable assurance regarding the reliability of our financial reporting and the preparation of financial statements in accordance with U.S. generally accepted accounting principles. Our management does not expect that our internal control over financial reporting will prevent or detect all error and all fraud. A control system, no matter how well designed and operated, can provide only reasonable, not absolute, assurance that the control system's objectives will be met. Because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that misstatements due to error or fraud will not occur or that all control issues and instances of fraud, if any, within our company will have been detected. If we are unable to produce accurate financial statements on a timely basis, investors could lose confidence in the reliability of our financial statements, which could cause the market price of our common stock to decline and make it more difficult for us to finance our operations and growth.

Risks Related to Our Products

Our products are highly technical and may contain undetected hardware or software defects or software bugs, which could harm our reputation and adversely affect our business.

Our products, including our smart home and business systems and our cloud and software platforms, are highly technical and, when deployed, are critical to the operation of many networks. Our products have contained and may contain undetected defects, bugs or security vulnerabilities, which risks may be exacerbated as we continue to expand our cloud and software portfolio and include services from third-party partners. Some defects in our products may only be discovered after a product has been installed and used by customers and may in some cases only be detected under certain circumstances or after extended use. Any errors, bugs, defects or security vulnerabilities discovered in our products after commercial release could result in loss of revenue or delay in revenue recognition, loss of customers and increased service and warranty and retrofit costs, any of which could adversely affect our business, operating results and financial condition. In addition, we could face claims for security and data breach, product liability, tort or breach of warranty. Our contracts with customers contain provisions relating to warranty disclaimers and liability limitations, which may not be upheld. Defending a lawsuit, regardless of its merit, is costly and may divert management's attention and adversely affect the market's perception of us and our products. In addition, if our business liability insurance coverage proves inadequate or future coverage is unavailable on acceptable terms or at all, our business, operating results and financial condition could be adversely impacted.

If we are unable to ensure that our products interoperate properly and as required within our customers' networks, our business will be harmed.

Our products must interoperate with our customers' existing and planned networks, which often have varied and complex specifications, utilize multiple protocol standards, include software applications and customizations and products from multiple vendors and contain multiple generations of products that have been added over time. As a result, we must continually ensure that our products interoperate properly with these existing and planned networks. To meet these requirements, we must undertake development efforts, including test protocols, that require substantial capital investment and employee resources. We may not accomplish these development goals quickly or cost-effectively, if at all. If we fail to maintain interoperability, we may face substantially reduced demand for our products, which would reduce our revenue opportunities and market share. We rely upon interoperability arrangements with equipment and software vendors for the use or integration of their technology with our products. If these relationships fail, we may have to devote substantially more resources to developing alternative products and processes and our efforts may not be as effective as the combined solutions under our current arrangements. In some cases, these other vendors are either direct competitors or companies that have extensive relationships with our existing and potential customers and influence the purchasing decisions of those customers. Some of our competitors have stronger relationships with some of our interoperability partners, and as a result, our ability to have successful interoperability arrangements with these companies may be harmed, which in turn may harm our ability to successfully sell and market our products.

Our estimates regarding warranty or product obligations are highly subjective. If our estimates change, the liability for warranty or product obligations may be increased, impacting future cost of revenue.

Our products are highly complex, and our product testing may not be adequate to detect all defects, errors, failures and quality issues. Accordingly, our estimates regarding future warranty or product obligations are highly subjective, and if our estimates change, the liability for warranty or product obligations may be increased, impacting future cost of revenue. Quality or performance problems for products covered under warranty could adversely impact our reputation and negatively affect our operating results and financial position. The development and production of new products with high complexity often involves problems with software, components and manufacturing methods. If significant warranty or other product obligations arise due to reliability or quality issues arising from defects in software, faulty components or improper manufacturing methods, our operating results and financial position could be negatively impacted by cost associated with fixing software or hardware defects; high service and warranty expenses; high inventory obsolescence expense; delays in collecting accounts receivable; payment of liquidated damages for performance failures; and loss of customer goodwill and future sales.

Our business and operations depend on proprietary technologies, and our financial performance may suffer if we cannot protect and enforce our IP rights.

Our success and ability to compete depend on proprietary technology. We rely significantly upon patent, copyright, trademark, trade secret and other IP laws, IP registration rights and agreements with our employees, customers, partners, suppliers and other parties, to establish and maintain IP rights necessary for our business and operations. U.S. IP laws afford us only limited protection, and the laws of some foreign countries do not protect proprietary rights to the same extent or at all. Our patent applications may not result in issued patents, and our issued patents may not be enforceable. Our IP rights could be challenged, invalidated, infringed or circumvented any of which could impair or harm our business and operations and be costly to defend. Our failure to adequately protect our IP rights could result in our competitors offering similar products, resulting in the loss of our competitive advantage and decreased sales.

We and our third-party providers may be unable to adequately prevent unauthorized third-party copying or use of our IP. For example, contractual provisions protecting our IP could be breached, our IP could be reverse engineered or unlawfully distributed. It may become more difficult to adequately protect our IP as we expand our reliance on third parties for the design, development and/or manufacture of our products. In addition, we may become subject to increased risks arising from or related to security breaches, data loss or theft of our data or our IP, and have greater difficulty protecting our IP as our work-from-anywhere workforce and work product become more distributed. Policing the unauthorized use and distribution of our IP is difficult and costly. Litigation, which could result in substantial costs, diversion of resources and harm to our business, may be necessary to enforce our IP rights, protect our trade secrets or determine the validity and scope of proprietary rights.

If we are unable to obtain third-party technology licenses needed for our products and platform solutions, our business and operations will be impaired, and our operating results could be adversely affected.

We increasingly rely on technology licensed from third parties for our products and platform solutions. We may not be able to secure or maintain necessary technology licenses from these third parties on commercially reasonable terms or at all. Third parties may also choose to not renew licenses with us, demand unreasonable license fees or cease to offer technologies that we require. The inability to obtain necessary third-party licenses or to secure reasonable license terms at a cost acceptable to us could harm the competitiveness of our products and solutions, result in lost revenue and adversely affect our operating results. For example, we may be forced to forego product features or platform offerings, including features and offerings we believe are critical to our strategy, accept substitute technology of lower quality or performance standards or incur higher costs, or the time-to-market of our products or product features could be delayed. Furthermore, our ability to utilize third-party technology may be disrupted by disputes over IP rights, including claims of IP infringement, which could prevent us from offering or selling the products that utilize the disputed technology and adversely affect our operating results.

Our use of open-source software could impose limitations on our ability to commercialize our products.

We incorporate open-source software into our products. The terms of many open-source software licenses have not been interpreted by the courts, and there is a risk that such licenses could be construed in a manner that could impose unanticipated conditions or restrictions on our ability to sell our products. In such event, we could be required to make our proprietary software generally available to third parties, including competitors, at no cost, to seek licenses from third parties in order to continue offering our products, to re-engineer our products or to discontinue the sale of our products in the event re-engineering cannot be accomplished on a timely basis or at all, any of which could adversely affect our revenue and operating expenses.

Macroeconomic and Industry Risks

Adverse global economic conditions, geopolitical issues and other conditions that impact our increasingly global operations could have a negative effect on our business, results of operations and financial condition and liquidity.

As a global company, our performance is affected by global economic conditions as well as geopolitical issues and other conditions with global reach. In recent years, concerns about the global economic outlook have adversely affected market and business conditions in general. Macroeconomic weakness and uncertainty make it more difficult for us to manage our operations and accurately forecast revenue, gross margin and expenses. Geopolitical issues, such as ongoing conflicts between the United States and China, tariff and trade policy changes, increasing potential of conflict involving countries in Asia that are critical to our supply chain operations, such as Taiwan and China, and the tensions between Russia and NATO countries over the Ukraine, have resulted in increasing global tensions and create uncertainty for global commerce. In particular, we incurred substantial costs and diversion of resources realigning our supply chain operations to move substantially all of our product manufacturing to locations outside of China as a result of U.S. tariff and trade policy changes. The global impact of the COVID-19 pandemic continues to create shortages in component and supplies and otherwise disrupt and delay our global supply chain operations. Moreover, shipping backlogs and similar disruptions to transportation infrastructure due to an increasing surge in the global demand for goods has exacerbated supply chain challenges. Sustained or worsening of global economic conditions and geopolitical issues may increase our cost of doing business, materially disrupt our supply chain operations, cause our customers to reduce or delay spending and intensify pricing pressures. Any or all of these factors could negatively affect demand for our products and our business, financial condition and result of operations.

We face intense competition that could reduce our revenue and adversely affect our financial results.

The market for our products is highly competitive, and we expect competition from both established and new companies to increase. Our ability to compete successfully depends on a number of factors, including our ability to successfully develop new products and solutions that anticipate BSP and market requirements and changes in technology and industry standards; BSP acceptance and adoption of our products and solutions; our ability to differentiate our products from our competitors’ offerings based on performance, features, cost-effectiveness or other factors; our product capabilities to meet customer network requirements and preferences; and our success in marketing and selling our products and platform solutions.

Many of our current or potential competitors have longer operating histories, greater name recognition, broader product lines, larger customer bases and significantly greater financial, technical, sales, marketing and other resources than we do and are better positioned to acquire and offer complementary products and services. As the broadband access equipment market has undergone and continues to undergo consolidation, our competitors have merged, grown and been able to offer more comprehensive solutions than they individually had offered. Potential customers may also prefer to purchase from their existing suppliers rather than a new supplier, regardless of product performance or features, because the products that we and our competitors offer require a substantial investment of time and funds to qualify and install. The recent demand on network capacity due to the shift towards a remote workforce may attract new market entrants with competitive or substitutive products, which may lead to increased sales cycles, cause pricing pressure and impact adoption of our platforms due to the broader availability of product offerings. Some of our competitors may offer substantial discounts or rebates to win or retain customers. If we are forced to reduce prices to retain existing customers or win new customers, we may be unable to sustain gross margin at desired levels or profitability. Competitive pressures could result in increased pricing pressure, reduced profit margin, increased sales and marketing expenses and failure to increase, or the loss of, market share, any of which could reduce our revenue and adversely affect our financial results.

Our industry is characterized by rapid technological advance, and if we fail to develop new products or enhancements that meet changing BSP requirements, we could experience lower sales.

Our industry is characterized by rapid technological change, changing needs of BSPs, evolving industry standards and frequent introductions of new products and platforms. We invest significant amounts to pursue innovative technologies that we believe will be adopted by BSPs. For example, we have invested and continue to invest resources in our cloud and software platforms. In addition, on an ongoing basis, we expect to reposition our product and service offerings and introduce new offerings as we encounter rapidly changing BSP requirements and increasing competitive pressures. If we cannot increase sales of our new platforms and services, keep pace with rapid technological developments to meet customer needs and compete with evolving standards or if the technologies we choose to invest in fail to meet customer needs or are not adopted by customers in the timeframes that we expect, our financial condition and results of operations would be adversely affected.

Developing our products is complex and involves uncertainties, including pricing risks for key materials, component shortages and limited suppliers. We may experience design, manufacturing, software development quality, support, marketing and other difficulties that could delay or prevent the development, introduction or marketing of new products and enhancements. If we fail to meet our development targets, demand for our products will decline. If we are unable to anticipate and develop new products or enhancements to our existing products on a timely and cost-effective basis, our products may become technologically obsolete more rapidly than anticipated over time, resulting in lower sales which would harm our business. Furthermore, the introduction of new or enhanced products also requires that we manage the transition from older products in accordance with customer requirements. If we fail to maintain compatibility requirements in our customers' networks, demand for our products would decline, which would reduce our revenue opportunities and market share.

Increasingly, we have relied on third-party development partners to remain competitive. Investment in third-party development services for our product and service platforms reduces our direct control and may result in increased challenges in product design, integration and support of third-party features in our products. In addition, these investments may take several years to generate positive returns, if ever. We have engineering services arrangements that include future revenue-share payments on our sale of the developed products and that require us to make minimum payments whether or not we achieve the desired revenue levels. If our actual demand falls short of expectations, we will be obligated to make the minimum payments, and we may be required to write-down the value of the developed products, which could adversely affect our financial results.

Our sales cycles can be long and unpredictable, and our sales efforts require considerable time and expense. As a result, our sales are difficult to predict and may vary substantially, which may cause our operating results to fluctuate significantly.

The timing of our revenue is difficult to predict. Our sales efforts often involve educating BSPs about the use and benefits of our products, platforms and services. BSPs typically undertake a significant evaluation process, which frequently involves not only our products, platforms and services, but also those of our competitors and results in a lengthy sales cycle. Sales cycles for larger customers are relatively longer and require considerably more time and expense. We spend substantial time, effort and money in our sales efforts without any assurance that our efforts will produce sales. In addition, product purchases are frequently subject to budget constraints, multiple approvals and unplanned administrative, processing and other delays. The timing of revenue related to sales of products and services that have installation requirements may be difficult to predict due to interdependencies that may be beyond our control, such as BSP testing and turn-up protocols or other vendors' products, services or installations of equipment upon which our products and services rely. Such delays may result in fluctuations in our quarterly revenue. If sales expected from a specific customer for a particular quarter are not realized in that quarter or at all, we may not achieve our revenue forecasts and our financial results would be adversely affected.

Our business depends upon the capital spending patterns and decisions of BSPs, and any decrease or delay in capital spending by BSPs due to the timing and availability of capital and other causes would reduce our revenue and harm our business.

Demand for our products depends on the magnitude and timing of capital spending by BSPs as they construct, expand, upgrade and maintain their access networks as well as BSPs' adoption of our platforms and cloud-based services. Capital spending is cyclical in our industry, sporadic among individual BSPs and can change on short notice, which gives us little visibility into changes in spending behavior in any particular quarter. Capital spending for network infrastructure projects could be delayed or canceled in response to factors outside our control, such as reduced consumer spending, challenging capital markets or declining liquidity trends. BSP spending is also affected by reductions in budgets, delays in purchasing cycles, access to government funding programs or capital markets, and seasonality and delays in capital allocation decisions. Historically, our customers may spend less or have less deployments in the first quarter due to pending annual budgets or, in certain regions, due to weather conditions that inhibit outside fiber deployment, resulting in weaker demand for our products in the first quarter. Softness in demand in any of our customer markets, including due to macro-economic conditions beyond our control or uncertainties associated with regulatory reforms, has in the past and could in the future lead to unexpected decline or slowdown in customer capital expenditure. Further, BSPs may pursue capital investment in network technologies other than those offered by us or may choose not to adopt our products and platform solutions in their networks. Reductions in capital expenditures by BSPs, particularly our significant customers, would have a material negative impact on our revenue and results of operations and slow our rate of revenue growth. As a consequence, our results for a particular period may be difficult to predict, and our prior results are not necessarily indicative of results in future periods.

Historically, our customer base has been concentrated, and the loss of any of our key customers may adversely impact our revenue and results of operations, and any delays in payment by a key customer could negatively impact our cash flows and working capital.

Historically, a large portion of our sales has been, and in the future may be, to a limited number of large customers. Changes in the BSP market, such as financial difficulties, spending cuts or corporate consolidations that impact purchasing decisions by these customers have and may again negatively impact our revenue, and as a result, revenue from such customers may remain flat or continue to decline. For example, sales to Lumen, our only greater than 10% customer in 2020 and 2019, declined in 2021 and sales to other BSP customers increased such that Lumen was not a 10% customer. There is no assurance that purchasing levels by Lumen will increase from current levels. Historically, we experienced delays or declines in purchases by certain BSPs due to deterioration in their financial condition. For example, Windstream and Frontier, two of our medium-sized customers, each completed a financial restructuring and emerged from Chapter 11 bankruptcy in September 2020 and April 2021, respectively. Any decrease or delay in purchases of any of our key customers, particularly if prolonged or sustained, or our inability to grow our sales with them, may have a material negative impact on our revenue and results of operations.

In addition, some larger customers may demand discounts and rebates or desire to purchase their access systems and software from multiple providers. As a result of these factors, our future revenue opportunities may be limited, and we may face pricing pressures, which in turn could adversely impact our gross margin and our profitability. The loss of, reduction in, or pricing discounts associated with orders from any key customer would significantly reduce our revenue and harm our business. Furthermore, delays in payment and/or extended payment terms from any of our key or larger customers could have a material negative impact on our cash flows and working capital to support our business operations.

Over the years, the BSP market has undergone substantial consolidation, reducing the number of potential customers and delays or decreases in capital spending. Continued consolidation of the BSP industry and among independent local exchange carriers and IOC customers, who represent a large part of our business, could make it more difficult for us to grow our customer base, increase sales of our products and maintain adequate gross margin.

Government-sponsored programs and U.S. federal government shutdowns could impact the timing and buying patterns of BSPs, which may cause fluctuations in our operating results.

We sell to BSPs, including U.S.-based IOCs, which rely significantly upon interstate and intrastate access charges and federal and state subsidies in the form of grants and other funding such as the Federal Communications Commission’s, or FCC’s, Rural Digital Opportunity Fund, the CARES Act or the American Rescue Plan Act. The FCC and some states may change such payments and subsidies, which could reduce IOC revenue. Furthermore, many IOCs use or expect to use government-supported loan programs or grants, such as Rural Utility Service loans and grants, to finance capital spending. These government-supported loan programs and grants generally include conditions such as deployment criteria, domestic preference provisions and other requirements that apply to the project and selected equipment as conditions for funding. For example, the U.S. government recently introduced legislation imposing domestic content requirements for infrastructure programs that receive federal funding. Changes to the terms or administration of these programs, including uncertainty from government and administrative change, increasing focus on domestic requirements by the U.S. that may require re-assessment of compliance, potential funding limitations that impact our ability to meet program requirements or delays due to U.S. federal government shutdowns could reduce the ability of IOCs to access capital or secure funding these programs to purchase our products and services and thus reduce our revenue opportunities. Customers may curtail purchases if they receive less funding than planned, are negatively impacted by federal government shutdowns or changes in government regulations and subsidies, or as funding winds down, any of which could have an adverse effect on our operating results and financial condition.

Government and Regulatory Risks

Increasing data privacy regulations could impact our business and expose us to increased liability.

Government authorities in the United States and around the world have implemented and are continuing to implement broader and more stringent laws and regulations concerning data protection. The interpretation and application of these data protection laws and regulations are often uncertain and changing, and it is possible that they may be interpreted and applied in a manner that is inconsistent with our data practices. For example, the General Data Protection Regulation, or GDPR, adopted by the European Union, or EU, imposes specific duties and requirements upon companies that collect, process or control personal data of EU residents. Although we currently do not have material operations or business in the EU, we would incur substantial costs in order to expand our business and operations to the EU. Furthermore, the GDPR imposes significant penalties for noncompliance of up to the greater of €20 million or 4% of a company’s worldwide revenue; accordingly, any non-compliance with the GDPR could result in a material adverse effect on our business, financial condition and results of operations. In January 2020, the California Consumer Privacy Act became effective, imposing significant new data privacy rights for consumers and requirements for the handling of consumer personal data. In July 2020, the Court of Justice of the EU invalidated the EU-U.S. Privacy Shield as a valid mechanism for the transfer of personal data from the EU to the United States. Additionally, in November 2020 California adopted the California Privacy Rights Act, which creates further obligations relating to consumer data beginning in January 2022, with enforcement beginning July 2023. Complying with new and changing laws could cause us to incur substantial costs in order to market and sell our cloud-based solutions in the U.S. and internationally, deter customers from adopting our cloud-based solutions or require us to redesign our platform in order to meet customer requirements related to such laws. Regulatory actions or claims involving our practices in the collection, storage, processing, use or disclosure of consumer information or other personal data, even if unfounded, could damage our reputation and adversely affect our operating results. The failure or perceived failure to comply may result in government or civil proceedings or actions against us, or could cause us to lose customers, which could have an adverse effect on our business.

If we fail to comply with evolving industry standards, sales of our products would be adversely affected.

Our products are subject to a significant number of domestic and international standards, which evolve as new technologies are developed and deployed. As we expand into new global markets, we are likely to encounter additional standards. Our products must comply with these standards in order to be widely marketable. In some cases, we are required to obtain certifications or authorizations before our products can be introduced, marketed or sold in new markets or to new customers. For example, our ability to maintain Operations System Modification for Intelligent Network Elements certification for our products will affect our ongoing ability to continue to sell our products to large BSPs. In addition, our ability to expand our international operations may be limited by standards in countries or may require us to redesign our products or develop new products to meet local standards. We may not be able to design our products to comply with local requirements, which would impede or prevent our ability to grow our business in those locations. Moreover, as we expand our business and operations globally, we must increase investments to maintain compliance with evolving standards across all of our markets. The costs of complying with evolving standards or failure to obtain timely authorizations or certification could prevent us from selling our products where these standards or regulations apply, which would result in lower revenue and lost market share.

Our failure or the failure of our manufacturers to comply with environmental and other legal regulations could adversely impact our results of operations.

The manufacture, assembly and testing of our products may require the use and disposal of hazardous materials that are subject to environmental, health and safety regulations, or materials subject to laws restricting the use of conflict minerals. We substantially depend upon our third-party manufacturers to comply with these requirements. Any failure by us or our third-party manufacturers to comply with these requirements could result in regulatory penalties, legal claims or disruption of production of our products. In addition, any failure to properly manage the use, transportation, emission, discharge, storage, recycling or disposal of hazardous materials could subject us to increased costs or liabilities. Existing and future environmental regulations and other legal requirements may restrict our use of certain materials to manufacture, assemble and test products. Any of these consequences could adversely impact our results of operations by increasing our expenses and/or requiring us to alter our manufacturing processes.

We are subject to governmental export and import controls that could subject us to liability or impair our ability to compete in additional international markets.

Our products are subject to U.S. export and trade controls and restrictions. International shipments of certain of our products may require export licenses or are subject to additional export requirements. In addition, the import laws of other countries may limit our ability to distribute our products, or our customers' ability to buy and use our products, in those countries. Changes in our products or changes in export and import regulations or duties may create delays in the introduction of our products in international markets, prevent our customers with international operations from deploying our products or, in some cases, prevent the export or import of our products to certain countries altogether. Any change in export or import regulations, duties or related legislation, shift in approach to the enforcement or scope of existing regulations, or change in the countries, persons or technologies targeted by such regulations, could negatively impact our ability to sell, profitably or at all, our products to existing or potential international customers.

Regulatory and physical impacts of climate change and other natural events may affect our customers and our manufacturers, resulting in adverse effects on our operating results.

As emissions of greenhouse gases continue to alter the composition of the atmosphere, affecting large-scale weather patterns and the global climate, any new regulation of greenhouse gas emissions may result in additional costs to our customers and our manufacturers. In addition, the physical impacts of climate change and other natural events, including changes in weather patterns, drought, rising ocean and temperature levels, earthquakes and tsunamis may impact our customers, suppliers and manufacturers, and our operations. These potential physical effects may adversely affect our revenue, costs, production and delivery schedules, and cause harm to our results of operations and financial condition.

Our customers are subject to government regulation, and changes in current or future laws or regulations that negatively impact our customers could harm our business.

The FCC has jurisdiction over our U.S. customers, and FCC regulatory policies that create disincentives for investment in access network infrastructure or impact the competitive environment in which our customers operate may harm our business. For example, adoption of regulations that affect providers of broadband Internet access services could impede the penetration of our customers into certain markets or affect the prices they may charge in such markets. Similarly, changes to regulatory tariff requirements or other regulations relating to pricing or terms of carriage on communication networks could slow the development or expansion of network infrastructures, which could adversely affect the sale of our products and services. Many of our customers are subject to FCC rate regulation of interstate telecommunications services and are recipients of government stimulus payments. The imposition of limits or restrictions on access to these programs could affect the ability of IOCs to access capital, which would in turn reduce our revenue opportunities. In addition, many of our customers are subject to state regulation of intrastate telecommunications services, including rates for such services, and may also receive funding from state universal service funds. Changes in rate regulations or universal service funding rules, either at the U.S. federal or state level, could adversely affect our customers' revenue and capital spending plans. Moreover, various international regulatory bodies have jurisdiction over certain of our non-U.S. customers. Changes in these domestic and international standards, laws and regulations, or judgments in favor of plaintiffs in lawsuits against BSPs based on changed standards, laws and regulations could adversely affect the development of broadband networks and services. This, in turn, could directly or indirectly adversely impact the communications industry in which our customers operate.

Risks Related to Ownership of Our Common Stock

Our stock price may continue to be volatile, and the value of an investment in our common stock may decline.

The trading price of our common stock has been, and is likely to continue to be, volatile, which means that it could decline substantially within a short period of time and could fluctuate widely in response to various factors, some of which are beyond our control. These factors include those discussed above and others such as quarterly variations in our results of operations or those of our competitors; failure to meet any guidance that we have previously provided regarding our anticipated results; changes in earnings estimates or recommendations by securities analysts; failure to meet securities analysts' estimates; announcements by us or our competitors of new products, significant contracts, commercial relationships, acquisitions or capital commitments; developments with respect to IP rights; our ability to develop and market new and enhanced products on a timely basis; our commencement of, or involvement in, litigation and developments relating to such litigation; changes in governmental regulations; and a slowdown in the communications industry or the general economy.

In recent years, the stock market in general, and the market for technology companies in particular, has experienced extreme price and volume fluctuations that have often been unrelated or disproportionate to the operating performance of those companies. Broad market and industry factors may seriously affect the market price of our common stock, regardless of our actual operating performance. Recently, the COVID-19 pandemic has severely impacted U.S. markets, causing dramatic swings in the U.S. stock exchanges that resulted in increased volatility in the trading price of our common stock. Historically, following periods of volatility in the market price of a company's securities, there is increased risk that stockholders may initiate securities class action litigation against the company. Such litigation, if instituted against us, could result in substantial costs and a diversion of our management's attention and resources.

Provisions in our charter documents and under Delaware law could discourage a takeover that stockholders may consider favorable and may lead to entrenchment of our management and Board of Directors.

Our amended and restated certificate of incorporation and amended and restated bylaws contain provisions that could have the effect of delaying or preventing changes in control or changes in our management or our Board of Directors. These provisions include: (1) a classified Board of Directors with three-year staggered terms, which may delay the ability of stockholders to change the membership of a majority of our Board of Directors; (2) no cumulative voting in the election of directors, which limits the ability of minority stockholders to elect director candidates; (3) the exclusive right of our Board of Directors to elect a director to fill a vacancy created by the expansion of the Board of Directors or the resignation, death or removal of a director, which prevents stockholders from being able to fill vacancies on our Board of Directors; (4) the ability of our Board of Directors to issue shares of preferred stock and to determine the price and other terms of those shares, including preferences and voting rights, without stockholder approval, which could be used to significantly dilute the ownership of a hostile acquirer; (5) a prohibition on stockholder action by written consent, which forces stockholder action to be taken at an annual or special meeting of our stockholders; (6) the requirement that a special meeting of stockholders may be called only by the chairman of the Board of Directors, the chief executive officer or the Board of Directors, which may delay the ability of our stockholders to force consideration of a proposal or to take action, including the removal of directors; and (7) advance notice procedures that stockholders must comply with in order to nominate candidates to our Board of Directors or to propose matters to be acted upon at a stockholders' meeting, which may discourage or deter a potential acquirer from conducting a solicitation of proxies to elect the acquirer's own slate of directors or otherwise attempting to obtain control of us. We are also subject to certain anti-takeover provisions under Delaware law, which prohibits a corporation, in general, from engaging in a business combination with any holder of 15% or more of its capital stock unless the holder has held the stock for three years or, among other things, the Board of Directors has approved the transaction.

We may need additional capital in the future to finance our business.

Our working capital needs and cash use have continued to increase to support our business operations and growth, and we may need additional capital if our current plans and assumptions change. In January 2022, we terminated our loan and security agreement with Bank of America, N.A. If our financial position deteriorates, we may not be able to secure a similar source of financing to support our working capital needs on acceptable terms or at all. If future financings involve the issuance of equity securities, our then-existing stockholders would suffer dilution. If we raise additional debt financing, we may be subject to restrictive covenants that limit our ability to conduct our business. If we are unable to sustain positive operating income and cash flows from operations, our liquidity, results of operations and financial condition may be adversely affected. Furthermore, if we are unable to generate sufficient cash flows to support our operational needs, we may need to seek additional sources of liquidity, including borrowings, to support our working capital needs, even if we believe we have generated sufficient cash flows to support our operational needs. There is no assurance that any other sources of liquidity may be available to us on acceptable terms or at all. If we are unable to generate sufficient cash flows or obtain other sources of liquidity, we will be forced to limit our development activities, reduce our investment in growth initiatives and institute cost-cutting measures, all of which would adversely impact our business and growth.

We do not currently intend to pay dividends on our common stock and, consequently, our stockholders' ability to achieve a return on their investment will depend on appreciation in the price of our common stock.

We do not currently intend to pay a cash dividend on our common stock for the foreseeable future. We currently intend to invest our future earnings, if any, to fund our growth. Therefore, our stockholders are not likely to receive any dividends on our common stock for the foreseeable future.

Our failure to adequately address and resolve risks and uncertainties associated with acquisitions could have a material adverse impact on our financial condition and results of operations.

We may in the future acquire businesses, products or technologies to expand our product offerings and capabilities, customer base and business. We have evaluated and expect to continue to evaluate a wide array of potential strategic transactions. Such investments may involve significant risks and uncertainties, including distraction of management from current operations, unanticipated costs, and legal and regulatory challenges, all of which could have a material adverse impact on our financial condition and results of operations. In addition, the anticipated benefit of any acquisition may never materialize or the process of integrating acquired businesses, products or technologies may create unforeseen operating difficulties and expenditures.

ITEM 1B. Unresolved Staff Comments

None.

ITEM 2. Properties

We currently lease our corporate headquarters in San Jose, California. In addition to our headquarters site, we lease additional office space in the United States, China and India.

We believe that our facilities are in good condition and are generally suitable to meet our needs for the foreseeable future. We believe that prior to expiration of our current office space leases that we can renew or obtain suitable lease space on commercially reasonable terms for our business needs. In addition, we may continue to seek additional space as needed, and we believe this space will be available on commercially reasonable terms.

ITEM 3. Legal Proceedings

From time to time, we are involved in various legal proceedings arising from the normal course of business. We are not currently a party to any legal proceedings that, if determined adversely to us, in our opinion, are currently expected to individually or in the aggregate have a material adverse effect on our business, operating results or financial condition taken as a whole.

ITEM 4. Mine Safety Disclosures

Not applicable.

PART II

ITEM 5. Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities

Comparative Stock Prices

Our common stock has been trading on the New York Stock Exchange, under the trading symbol "CALX" since our initial public offering on March 24, 2010. Prior to this time, there was no public market for our common stock.

Number of Common Stockholders

As of February 9, 2022, the approximate number of holders of our common stock was 560 (not including beneficial owners of stock held in street name).

Dividends

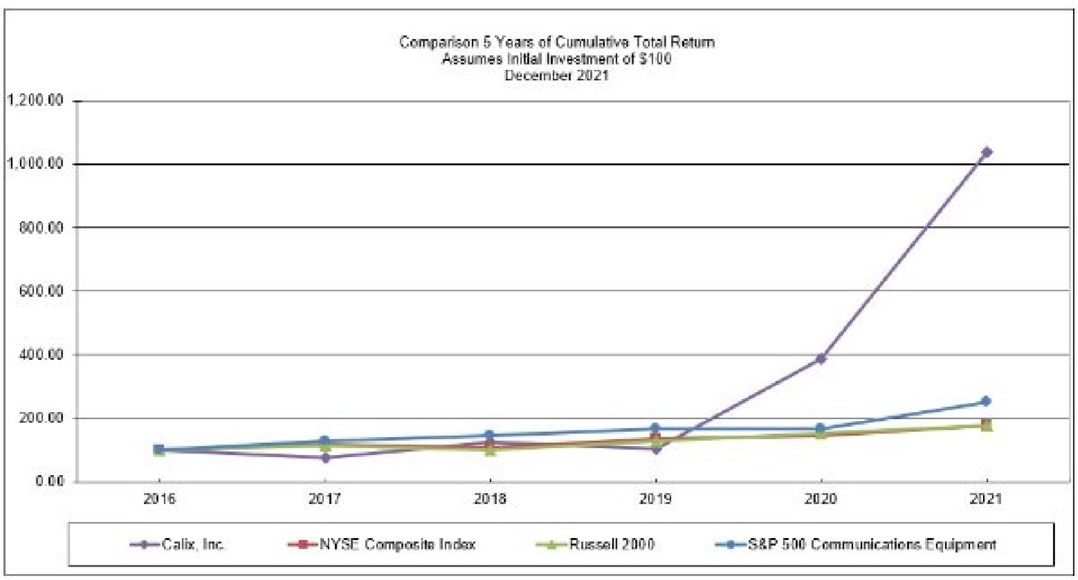
We have never declared or paid a cash dividend on our common stock, and we do not currently intend to pay any cash dividends on our common stock in the foreseeable future.

Recent Sales of Unregistered Securities

None.

Performance Graph

The following graph shows a comparison of the cumulative total stockholder return on our common stock with the cumulative total returns of the NYSE Composite Index, Russell 2000 Index and the S&P 500 Communications Equipment Index. The S&P 500 Communications Equipment Index replaces the Morningstar Communication Equipment Index in this analysis and going forward, as the latter data is no longer accessible. The latter index has been included with data through 2019. The graph tracks the performance of a $100 investment in our common stock and in each of the indexes during the last five fiscal years ended December 31, 2021. Data for the Russell 2000 Index and S&P 500 Communications Equipment assume reinvestment of dividends. Stockholder returns over the indicated period are based on historical data and should not be considered indicative of future stockholder returns.



This performance graph shall not be deemed "soliciting material" or to be "filed" with the SEC for purposes of Section 18 of the Securities Exchange Act of 1934, as amended, or otherwise subject to the liabilities under that Section, and shall not be deemed to be incorporated by reference into any filing of Calix, Inc. under the Securities Act of 1933, as amended.

ITEM 6. [Reserved]

ITEM 7. Management's Discussion and Analysis of Financial Condition and Results of Operations

The Management's Discussion and Analysis of Financial Condition and Results of Operations contains forward-looking statements regarding future events and our future results that are subject to the safe harbors created under the Securities Act of 1933 (the "Securities Act") and the Securities Exchange Act of 1934 (the "Exchange Act"). All statements other than statements of historical facts are statements that could be deemed forward-looking statements. These statements are based on current expectations, estimates, forecasts and projections about the industry in which we operate and the beliefs and assumptions of our management. In some cases, forward-looking statements can be identified by the use of words such as "believe," "could," "expect," "may," "estimate," "continue," "anticipate," "intend," "should," "plan," "predict," "will," "would," "project," "potential," or the negative thereof or other comparable terminology. In addition, any statements that refer to projections of our future financial performance, our anticipated growth and trends in our business and industry and other characterizations of future events or circumstances are forward-looking statements. Readers are cautioned that these forward-looking statements are only predictions and are subject to risks, uncertainties and assumptions that are difficult to predict, including those identified in the Risk Factors discussed in Item 1A, in the discussion below, as well as in other sections of this Annual Report on Form 10-K. Therefore, actual results may differ materially and adversely from those expressed in any forward-looking statements. All forward-looking statements and reasons why results may differ included in this report are made as of the date hereof, and we assume no obligation to update these forward-looking statements or reasons why actual results might differ.

Overview

We are the leading global provider of cloud and software platforms, systems and services that focus on the access network, the portion of the network that governs available bandwidth and determines the range and quality of services that can be offered to subscribers. These cloud and software platforms enable BSPs of all types and sizes to innovate and transform their businesses. Our BSP customers are empowered to utilize real-time data and insights from Calix platforms to simplify their businesses and deliver experiences that excite their subscribers. These insights enable BSPs to grow their brand through increased subscriber acquisition, loyalty and revenue and to reduce their operating costs, thereby increasing the value of their businesses and contributions to their communities.

We market our cloud and software platforms, systems and services to BSPs globally through our direct sales force as well as select resellers. Our customers range from smaller, regional BSPs to some of the world's largest BSPs. We have enabled approximately 1,700 BSP customers purchasing directly and through partners to deploy passive optical, Active Ethernet and point-to-point Ethernet fiber access networks.

Our revenue increased to $679.4 million in 2021 from $541.2 million in 2020 and $424.3 million in 2019. Our revenue and potential revenue growth will depend on our ability to sell and license our cloud and software platforms, systems and services to strategically aligned customers of all types such as wireless internet service providers, fiber overbuilders, cable MSOs, municipalities and electric cooperatives in the United States and internationally. Our growth is also highly dependent on the speed and willingness of customers to adopt these platforms.

Revenue fluctuations result from many factors, including, but not limited to: increases or decreases in customer orders for our products and services, market, financial or other factors that may delay or materially impact customer purchasing decisions, non-availability of products due to supply chain challenges, including component and labor shortages and increasing lead times as well as disruptions as a result of the COVID-19 pandemic, contractual terms with customers that result in delayed revenue recognition and varying budget cycles and seasonal buying patterns of our customers. More specifically, our customers tend to spend less in the first quarter as they are finalizing their annual budgets, and in certain regions, customers are challenged by winter weather conditions that inhibit fiber deployment in outside infrastructure. Our revenue is also dependent upon our customers' timing of purchases, capital expenditure plans and decisions to upgrade their network or adopt new technologies, including adoption of our software and cloud platform solutions, as well as our ability to grow our customer base.

Cost of revenue is strongly correlated to revenue and tends to fluctuate due to all of the above factors that may cause revenue fluctuations. Factors that have impacted our cost of revenue, and that we expect will impact cost of revenue in future periods, also include: changes in the mix of products delivered, customer location and regional mix, changes in the cost of our inventory, including higher costs due to materials shortages including components, supply constraints or unfavorable changes in trade policies, investments to support expansion of cloud and customer support offerings as well as our customer success organization, changes in product warranty and incurrence of retrofit costs, amortization of intangibles, asset write-offs, support fees for silicon-related development work for our products, allowances for obligations to our suppliers and inventory write-downs. Given the ongoing supply chain disruptions related to component shortages, longer lead times as a result of increased global demand for certain components and disruptions related to the COVID-19 pandemic, we have experienced and are continuing to experience product supply delays and related challenges, and we expect these delays and related challenges to persist in the foreseeable future. Similarly, challenges in supply chain logistics have persisted due to greater global demand for transport services as well as labor shortages and resulted in increases in our global freight charges. In addition, we periodically elect to ship by air in order to meet delivery commitments to our customers, and air freight rates have increased from prior year levels. Cost of revenue also includes fixed expenses related to our internal operations, which could increase our cost of revenue as a percentage of revenue if our revenue declines.

Our gross profit and gross margin fluctuate based on timing of factors such as changes in customer mix and changes in the mix of products demanded and sold (and any related write-downs of existing inventory) and have in the past been negatively impacted by increases in mix of revenue from channel sales rather than direct sales or other unfavorable customer or product mix, shipment volumes and any related volume discounts, changes in our product and services costs, pricing decreases or discounts, new product introductions or upgrades to existing products, customer rebates and incentive programs due to competitive pressure or materials shortages, supply constraints, investments to support expansion of cloud and customer support offerings, tariffs or unfavorable changes in trade policies.

Our operating expenses fluctuate based on the following factors among others: changes in headcount and personnel costs, which comprise a significant portion of our operating expenses; variable compensation due to fluctuations in shipment volumes or level of achievement against performance targets; timing of research and development expenses, including investments in innovative solutions and new customer segments, prototype builds and outsourced development resources; investments in marketing programs; asset write-offs; investments in our business and information technology infrastructure; and fluctuations in stock-based compensation expenses due to timing of equity grants or other factors affecting vesting.

During the third quarter of 2021, we recognized a discrete tax benefit of $162.0 million based on our reassessment of the amount of our U.S. federal and state deferred tax assets that are more likely than not to be realized, primarily as a result of actual and projected increases in U.S. profitability in the current and future periods.

We had net income of $238.4 million in 2021 and $33.5 million in 2020 and a net loss of $17.7 million in 2019. As of December 31, 2021, we had an accumulated deficit of $430.7 million as a result of losses in previous years. Further, as a result of factors contributing to the fluctuations described above among other factors, many of which are outside our control, our quarterly operating results fluctuate from period to period. Comparing our operating results on a period-to-period basis may not be meaningful, and you should not rely on our past results as an indication of our future performance.

COVID-19 Pandemic

We are subject to risks and uncertainties as a result of the COVID-19 pandemic. The extent of the impact of the COVID-19 pandemic on our business is highly uncertain and difficult to predict, particularly as variants of the coronavirus continue to spread around the world. In March 2020, we instituted office closures, travel restrictions and a work-from-anywhere policy for substantially all our employees due to shelter-in-place mandates. In July 2021, we reopened our U.S. offices to fully-vaccinated employees, who choose to work in the office, and we lifted certain travel restrictions. The COVID-19 pandemic has had a prolonged impact on our supply chain operations due to restrictions, reduced capacity and limited availability from suppliers on whom we rely for sourcing components and materials and from third-party partners on whom we rely for manufacturing, warehousing and logistics services. Although demand for our products has been strong in the short-term as subscribers seek more bandwidth and better Wi-Fi, customers' purchasing decisions over the long-term may be impacted by the pandemic and its impact on the economy, which could in turn impact our revenue and results of operations. Furthermore, our supply chain continues to face constraints primarily due to challenges in sourcing components and materials and managing global logistics and transport services for our products due to shortages and delays. The prolonged impact of COVID-19 could exacerbate these constraints or cause further supply chain disruptions.

Critical Accounting Policies and Estimates

Our financial statements are prepared in accordance with U.S. generally accepted accounting principles. These accounting principles require us to make certain estimates and judgments that can affect the reported amounts of assets and liabilities as of the date of the financial statements, as well as the reported amounts of revenue and expenses during the periods presented. We base our estimates, assumptions and judgments on historical experience and on various other factors that are believed to be reasonable under the circumstances. To the extent there are material differences between these estimates and actual results, our financial statements may be affected. We evaluate our estimates, assumptions and judgments on an ongoing basis.

We believe the following critical accounting policies affect our significant judgments and estimates used in the preparation of our financial statements.

Revenue Recognition

We derive revenue from contracts with customers primarily from the following and categorize our revenue as follows:

- Systems include revenue from the sale of access and premises systems, software platform licenses and cloud-based software subscriptions.
- Services include revenue from professional services, customer support, software- and cloud-based maintenance, extended warranty subscriptions, training and managed services.

Revenue is recognized when a performance obligation is satisfied, which occurs when control of the promised goods or services is transferred to the customer, in an amount that reflects the consideration we expect to be entitled to in exchange for those goods or services. Revenue from sales of access and premises systems is recognized when control is transferred to the customer, which is generally when the products are shipped. Revenue from software platform licenses, which provides the customer with a right to use the software as it exists, is generally recognized upfront when product is made available to the customer. Revenue from cloud-based software subscriptions, customer support, maintenance, extended warranty subscriptions and managed services is generally recognized ratably over the contract term. Revenue from professional services and training is recognized as the services are delivered.

A performance obligation is a promise in a contract to transfer a distinct good or service to the customer and is the unit of account. A contract's transaction price is allocated to each distinct performance obligation and recognized as revenue when, or as, the performance obligation is satisfied. Our hardware products contain both software and non-software components that function together to deliver the products' essential functionality and therefore constitutes a single performance obligation as the promise to transfer the individual software and non-software components is not separately identifiable and, therefore, not distinct. Our contracts may include multiple performance obligations. For such arrangements, we allocate the contract's transaction price to each performance obligation using the relative stand-alone selling price of each distinct good or service in the contract. We generally determine stand-alone selling prices based on the prices charged to customers or our best estimate of stand-alone selling price. Our estimate of stand-alone selling price is established considering multiple factors including, but not limited to, geographies, market conditions, competitive landscape, internal costs, gross margin objectives, characteristics of targeted customers and pricing practices. The determination of estimated stand-alone selling price is made through consultation with and formal approval by management, taking into consideration the go-to-market strategy.

Inventory Valuation and Supplier Purchase Commitments

Inventory, which primarily consists of finished goods purchased from CMs or ODMs, is stated at the lower of cost (determined by the first-in, first-out method) and net realizable value. Inbound shipping costs and tariffs are included in the cost of inventory. In addition, we, from time to time, procure component inventory primarily as a result of manufacturing discontinuation of critical components by suppliers. We regularly monitor inventory quantities on-hand and record write-downs for excess and obsolete inventory based on our estimate of demand for our products, potential obsolescence of technology, product life cycles and whether pricing trends or forecasts indicate that the carrying value of inventory exceeds our estimated selling price. We also evaluate our supplier purchase commitments, which have increased significantly due to extended lead-times in the current supply chain environment, and record a liability for excess and obsolete components based on our estimated demand of our products, potential obsolescence of technology and product life cycles. These factors are impacted by market and economic conditions, technology changes and new product introductions and require estimates that may include elements that are uncertain. Actual demand may differ from forecasted demand and may have a material effect on gross profit. If inventory is written down, a new cost basis is established that cannot be increased in future periods. The sale of previously reserved inventory has not had a material impact on our gross margin.

Income Taxes

We evaluate our tax positions and estimate our current tax exposure along with assessing temporary differences that result from different book to tax treatment of items not currently deductible for tax purposes. These differences result in deferred tax assets and liabilities on our Consolidated Balance Sheets, which are estimated based upon the difference between the financial statement and tax bases of assets and liabilities using the enacted tax rates that will be in effect when these differences reverse. In general, deferred tax assets represent future tax benefits to be received when certain expenses previously recognized in our Consolidated Statements of Comprehensive Income (Loss) become deductible expenses under applicable income tax laws or loss or credit carryforwards are utilized. Accordingly, realization of our deferred tax assets is dependent on future taxable income against which these deductions, losses and credits can be utilized.

We must assess the likelihood that our deferred tax assets will be recovered from future taxable income, and to the extent we believe that recovery is not more likely than not, we must establish a valuation allowance. Management judgment is required in determining our provision for income taxes, our deferred tax assets and liabilities and any valuation allowance recorded against our net deferred tax assets. Prior to the third quarter of 2021, we maintained a full valuation allowance against all deferred tax assets, because there was insufficient positive evidence to overcome the existing negative evidence, primarily consisting of several years of consecutive reported pre-tax losses, such that it was not more likely than not that the deferred tax assets were realizable. In the third quarter of 2021, we reported positive operating performance for five consecutive quarters and continued to maintain a cumulative three-year pre-tax profit. In addition, we expect continued positive operating performance into the foreseeable future to allow for utilization of all operating losses and substantially all tax credit carryforwards prior to their expiration. After considering these factors, we determined that the positive evidence overcame the negative evidence and concluded that it was more likely than not that a substantial portion of our U.S. federal and certain other state deferred tax assets were realizable. We currently maintain a valuation allowance of $29.2 million for certain U.S. federal and California state deferred tax assets.

Recent Accounting Pronouncements Not Yet Adopted

There have been no additional accounting pronouncements or changes in accounting pronouncements that are significant or potentially significant to us.

Results of Operations for Years Ended December 31, 2021 and 2020

Revenue

The following table sets forth our revenue (dollars in thousands):

	Years Ended December 31,		2021 vs 2020 Change	
	2021	2020	$	%
Revenue:				
Systems	$ 642,577	$ 508,552	$ 134,025	26 %
Services	36,817	32,687	4,130	13 %
	$ 679,394	$ 541,239	$ 138,155	26 %
Percent of total revenue:				
Systems	95 %	94 %		
Services	5 %	6 %		
	100 %	100 %		

Our revenue is principally derived in the United States. Revenue generated in the United States represented approximately 83% of our total revenue in 2021 and 88% in 2020.

Our revenue increased by $138.2 million, or 26%, during 2021 compared with 2020 mostly due to higher systems revenue of $134.0 million. Services revenue increased $4.1 million in 2021 compared with 2020. The increase in systems revenue was primarily due to higher revenue from our small, regional customers and, to a lesser extent, our medium-sized customers, as service providers adopted our All Platform offerings and sought to provide a better Wi-Fi experience, partially offset by a decrease in revenue to large customers. The increase in services revenue was due to the continued ramp in our service offerings aligned with cloud and software products for our customers.

No customer accounted for more than 10% of our total revenue for 2021. Lumen accounted for more than 10% of our total revenue in 2020. See Note 12 *"Revenue from Contracts with Customers"* to the Consolidated Financial Statements set forth in this report for more details on concentration of revenue for the years presented.

Gross Profit and Gross Margin

The following table sets forth our gross profit and gross margin (dollars in thousands):

	Years Ended December 31,		2021 vs 2020 Change	
	2021	2020	$	%
Gross profit:				
Systems	$ 345,474	$ 256,914	$ 88,560	34 %
Services	11,113	10,105	1,008	10 %
	$ 356,587	$ 267,019	$ 89,568	34 %
Gross margin:				
Systems	53.8 %	50.5 %		
Services	30.2 %	30.9 %		
	52.5 %	49.3 %		

Gross profit increased by $89.6 million to $356.6 million during 2021 from $267.0 million during 2020. Gross margin increased to 52.5% during 2021 from 49.3% during 2020. The increase in systems gross margin in 2021 compared to the 2020 was mainly due to continued growth in our All Platform offerings along with favorable product and customer mix as well as a credit for previously paid tariffs due to product re-export of $4.3 million, or 70 basis points. This was partially offset by increased costs due to higher component costs and global freight charges due to the global supply-chain disruption and shortages.

Services gross margin decreased in 2021 due to continued investments in our customer success organization. This was partially offset by better service revenue mix as we shifted away from low gross margin deployment services to higher gross margin services aligned with our platform offerings.

Operating Expenses

Sales and Marketing Expenses

Sales and marketing expenses consist of personnel costs, employee sales commissions, marketing programs and events, software tools and travel-related expenses. The following table sets forth our sales and marketing expenses (dollars in thousands):

	Years Ended December 31,		2021 vs 2020 Change	
	2021	**2020**	**$**	**%**
Sales and marketing	$ 125,909	$ 94,185	$ 31,724	34 %
Percent of total revenue	19 %	17 %		

Sales and marketing expenses increased by $31.7 million during 2021 compared with 2020 primarily due to increases in personnel expenses of $19.7 million, mainly related to investments in sales headcount and higher sales incentive compensation, marketing expenses of $4.9 million, stock-based compensation of $2.5 million, software costs of $1.8 million, travel expenses of $1.1 million and outside services expenses of $0.9 million.

We expect our investments in sales and marketing will increase in absolute dollars, but be relatively consistent as a percentage of revenue, as we extend our market reach and grow our business in support of our key strategic initiatives.

Research and Development Expenses

Research and development expenses include personnel costs, outside contractor and consulting services, depreciation on lab equipment, costs of prototypes and overhead allocations. The following table sets forth our research and development expenses (dollars in thousands):

	Years Ended December 31,		2021 vs 2020 Change	
	2021	**2020**	**$**	**%**
Research and development	$ 101,747	$ 85,258	$ 16,489	19 %
Percent of total revenue	15 %	16 %		

The increase in research and development expenses of $16.5 million during 2021 compared with 2020 was mainly due to increases in outside services expenses of $7.7 million, personnel expenses of $6.7 million, stock-based compensation of $2.0 million and depreciation and amortization of $1.2 million. These increases were partially offset by lower facilities expenses of $1.2 million.

We expect our investments in research and development to increase in absolute dollars, but remain relatively consistent as a percentage of systems gross profit, as we expand the functionality and capabilities of our platforms.

General and Administrative Expenses

General and administrative expenses consist primarily of personnel costs related to our executive, finance, human resources, information technology and legal organizations, outside consulting services, insurance, facilities and fees for professional services. Professional services consist of outside audit, legal, accounting and tax services. The following table sets forth our general and administrative expenses (dollars in thousands):

	Years Ended December 31,		2021 vs 2020 Change	
	2021	**2020**	**$**	**%**
General and administrative	$ 55,779	$ 44,444	$ 11,335	26 %
Percent of total revenue	8 %	8 %		

The increase in general and administrative expenses of $11.3 million during 2021 compared with 2020 was mainly due to increases in stock-based compensation of $5.3 million, personnel expenses of $3.1 million, outside services expenses of $1.6 million and unallocated-facilities expenses of $1.4 million. Beginning in the third quarter of 2020, we changed our facility allocation to align with our work-from-anywhere initiative, and consequently, most of our facilities expenses are retained in general and administrative expenses. These increases were partially offset by a decrease in our bad debt expense of $1.0 million.

We expect our general and administrative investments to increase in absolute dollars but decline slightly as a percentage of revenue over time as revenue continues to grow.

Restructuring Charges (Benefit)

Responding to changes caused by the COVID-19 pandemic, we initiated a restructuring plan in June 2020 to accelerate our all-platform future and to align with a work-from-anywhere culture. We incurred restructuring charges of $6.3 million in 2020, consisting of facilities-related charges and severance and other termination related benefits. In 2021, we reversed $0.8 million in facilities-related charges as a result of subleasing the abandoned portion of our San Jose headquarters. See Note 4 *"Balance Sheet Details"* of the Notes to Consolidated Financial Statements included in this Annual Report on Form 10-K.

Interest and Other Expense, Net

The following table sets forth our interest and other expense, net (dollars in thousands):

	Years Ended December 31,		2021 vs 2020 Change	
	2021	2020	$	%
Interest and other expense, net	$ (1,284)	$ (2,562)	$ 1,278	(50)%

Interest and other expense, net increased by $1.3 million in 2021 compared with 2020 mainly due to lower interest expenses and lower foreign currency losses.

Income Taxes

The following table sets forth our income taxes (dollars in thousands):

	Years Ended December 31,		2021 vs 2020 Change	
	2021	2020	$	%
Income taxes	$ (165,724)	$ 800	$ (166,524)	(20,816)%
Effective tax rate	(228)%	2 %		

During 2021, we recognized an income tax benefit of $162.0 million offset by current income taxes, based on our reassessment of the amount of our U.S. federal and other state deferred tax assets that are more likely than not to be realized, primarily as a result of actual and projected increases in U.S. profitability in the current and future periods. In performing our analysis, we used the most updated plans and estimates that we currently use to manage the underlying business and calculated the ability to utilize our deferred tax assets. We continue to maintain a valuation allowance of $29.2 million on certain U.S. federal and California state deferred tax assets that we believe are not more likely than not to be realized in future periods.

As of December 31, 2020, the total expense was primarily related to foreign activity. In 2020, based on a review of the positive and negative evidence, we concluded that the deferred tax assets were not more likely than not to be realized, which resulted in an immaterial domestic provision as the deferred tax assets were fully offset with the valuation allowance.

Our income taxes may be subject to fluctuation during the year and in future years as new information is obtained, which may affect the assumptions used to estimate the annual effective tax rate, including factors such as actual results differing from our estimates of pre-tax earnings in the various jurisdictions in which we operate, which could impact the recognition of our deferred tax assets, the recognition or de-recognition of tax benefits related to uncertain tax positions and changes in or the interpretation of tax laws in jurisdictions where we conduct business.

2020 Compared to 2019

For a comparison of our results of operations for the years ended December 31, 2020 and 2019, see Item 7 *"Management's Discussion and Analysis of Financial Condition and Results of Operations"* of our Annual Report on Form 10-K for the year ended December 31, 2020 filed with the SEC on February 22, 2021.

Liquidity and Capital Resources

We have funded our operations and investing activities primarily through cash flow generated from operations, sales of our common stock, including an underwritten public offering in August 2020, and various borrowing arrangements. As of December 31, 2021, we had cash, cash equivalents and marketable securities of $204.3 million, which consisted of deposits held at banks and major financial institutions and highly liquid marketable securities such as U.S. government agency securities and commercial paper. This includes $3.6 million of cash primarily held by our foreign subsidiaries. As of December 31, 2021, our liability for taxes that would be payable as a result of repatriation of undistributed earnings of our foreign subsidiaries to the United States was not significant and limited to withholding taxes considering our existing net operating loss carryovers.

The following table presents the cash inflows and outflows by activity during 2021 and 2020 (in thousands):

	Years Ended December 31,	
	2021	2020
Net cash provided by operating activities	$ 56,793	$ 51,409
Net cash used in investing activities	(110,661)	(60,801)
Net cash provided by financing activities	24,383	42,147

Operating Activities

Our operating activities provided cash of $56.8 million in 2021 and $51.4 million in 2020. The increase in net cash provided by operating activities during 2021 as compared to 2020 was due primarily to a favorable change in our net operating results of $44.1 million after adjustment of non-cash charges partially offset by a $38.7 million net cash outflow resulting from changes in operating assets and liabilities. We had a non-cash benefit from deferred income taxes of $168.4 million offset by non-cash charges of stock-based compensation of $24.2 million and depreciation and amortization of $15.0 million.

In 2021, cash outflows from changes in operating assets and liabilities primarily consisted of increases in inventory of $36.6 million to support revenue growth and to mitigate supply chain shortages and disruptions; in prepaid expenses and other assets of $27.1 million mainly due to advance payments to our supply chain partners and capitalized sales commissions; and in accounts receivable of $15.8 million due to increased revenue. These changes were partially offset by increases in accounts payable of $16.0 million due to increased inventory purchases; in deferred revenue of $10.4 million due to Calix Cloud subscriptions, support contracts and extended warranties; and in total accrued liabilities of $0.7 million, mainly related to component inventory held at suppliers and accrued freight.

Investing Activities

In 2021, cash used in investing activities of $110.7 million consisted of net purchases of marketable securities of $100.2 million and capital expenditures of $10.5 million, primarily related to purchases of test equipment and computer equipment.

Financing Activities

In 2021, net cash provided by financing activities of $24.4 million primarily consisted of proceeds from the issuance of common stock related to our equity plans of $25.6 million. This was partially offset by payments related to a financing arrangement of $1.2 million.

2020 Compared to 2019

For a discussion of our liquidity and capital resources and our cash flow activities for the years ended December 31, 2020 and 2019, see Item 7 *"Management's Discussion and Analysis of Financial Condition and Results of Operations,"* of our Annual Report on Form 10-K for the year ended December 31, 2020, filed with the SEC on February 22, 2021.

Working Capital and Capital Expenditure Needs

We generated positive operating cash flow for three consecutive years and ended fiscal 2021 with $204.3 million in cash, cash equivalents and marketable securities. In January 2022, we terminated our loan and security agreement with Bank of America, N.A. The BofA Loan Agreement provided for a revolving facility up to a principal amount of up to $35.0 million and would have expired in January 2023. As of December 31, 2021 and 2020, we had no outstanding borrowings.

In the third quarter of fiscal 2020, we completed an underwritten public offering of 3,220,000 shares of our common stock at $20.00 per share, including a full exercise by the Underwriters of their option to purchase an additional 420,000 shares of Common Stock, for net proceeds of $60.1 million after deducting the underwriting discount and expenses paid by us. We used the net proceeds to repay the line of credit and increase our capital available to invest in our future growth, especially during uncertain times.

Our material cash commitments include non-cancelable firm purchase commitments, normal recurring trade payables, compensation-related and expense accruals, operating leases and revenue-share obligations. We believe that our outsourced approach to manufacturing provides us significant flexibility in both managing inventory levels and financing our inventory. In the event that our revenue plan does not meet our expectations, we may be required to curtail or eliminate expenditures to mitigate the impact on our working capital.

We believe, based on our current operating plan and expected operating cash flows, that our existing cash, cash equivalents and marketable securities will be sufficient to meet our anticipated cash needs for at least the next twelve months. If we are unable to execute on our current operating plan or continue to generate operating income and positive cash flows, our liquidity, results of operations and financial condition will be adversely affected, and we may need to seek other sources of liquidity, including the sale of additional equity or borrowing, to support our working capital needs. In addition, we may choose to seek other sources of liquidity even if we believe we have generated sufficient cash flows to support our operational needs. There is no assurance that any other sources of liquidity may be available to us on acceptable terms or at all. If we are unable to generate sufficient cash flows or obtain other sources of liquidity, we will be forced to limit our development activities, reduce our investment in growth initiatives and institute cost-cutting measures, all of which may adversely impact our business and potential growth.

Contractual Obligations and Commitments

Our principal commitments as of December 31, 2021 consisted of our contractual obligations under non-cancelable outstanding purchase obligations, operating lease obligations for office space and a revenue share obligation. The following table summarizes our contractual obligations as of December 31, 2021 (in thousands):

	Payments Due by Period			
	Total	**Less Than 1 Year**	**1-3 Years**	**3-5 Years**
Non-cancelable purchase commitments [1]	$ 281,831	$ 241,557	$ 33,056	$ 7,218
Operating lease obligations [2]	18,034	4,473	9,031	4,530
Revenue share obligation [3]	14,010	4,731	9,279	—
	$ 313,875	$ 250,761	$ 51,366	$ 11,748

(1) Represents outstanding purchase commitments to be delivered by our third-party manufacturers or other vendors. See Note 6 *"Commitments and Contingencies"* of the Notes to Consolidated Financial Statements included in this Annual Report on Form 10-K for further discussion regarding our outstanding purchase commitments related to our third-party manufacturers.

(2) Future minimum operating lease obligations in the table above primarily include payments for our office locations, which expire at various dates through 2026. See Note 6 *"Commitments and Contingencies"* of the Notes to Consolidated Financial Statements included in this Annual Report on Form 10-K for further discussion regarding our operating leases.

(3) Represents remaining payments related to a revenue-share obligation, including imputed interest associated with developed software product and related enhancements by an engineering service provider. The schedule reflects our expected revenue-share and true-up payments based on our revenue projections for the developed products over a sales period through March 2024. If the minimum revenue-share payments are not achieved by the end of that period, a true-up payment will be due. See Note 4 *"Balance Sheet Details"* of the Notes to Consolidated Financial Statements included in this Annual Report on Form 10-K for further discussion regarding our outstanding liability.

ITEM 7A. Quantitative and Qualitative Disclosures About Market Risk

Interest Rate Risk

The primary objectives of our investment activity are to preserve principal, provide liquidity and maximize income without significantly increasing risk. By policy, we do not enter into investments for trading or speculative purposes. As of December 31, 2021, we had cash, cash equivalents and marketable securities of $204.3 million, which was held primarily in cash, money market funds and highly liquid marketable securities such as U.S. government agency securities and commercial paper. Due to the nature of these money market funds and highly liquid marketable securities, we believe that we do not have any material exposure to changes in the fair value of our cash equivalents and marketable securities as a result of changes in interest rates.

Foreign Currency Exchange Risk

Our primary foreign currency exposures are described below.

Economic Exposure

The direct effect of foreign currency fluctuations on our sales and expenses has not been material because our sales and expenses are primarily denominated in U.S. dollars, or USD. However, we are indirectly exposed to changes in foreign currency exchange rates to the extent of our use of foreign CMs whom we pay in USD. Increases in the local currency rates of these vendors in relation to USD could cause an increase in the price of products that we purchase. Additionally, if the USD strengthens relative to other currencies, such strengthening could have an indirect effect on our sales to the extent it raises the cost of our products to non-U.S. customers and thereby reduces demand. A weaker USD could have the opposite effect. The precise indirect effect of currency fluctuations is difficult to measure or predict because our sales are influenced by many factors in addition to the impact of such currency fluctuations.

Translation Exposure

Our sales contracts are primarily denominated in USD and, therefore, the majority of our revenue is not subject to foreign currency risk. We are directly exposed to changes in foreign exchange rates to the extent such changes affect our expenses related to our foreign assets and liabilities with our subsidiaries in China, India and the United Kingdom, whose functional currencies are Chinese Renminbi, or RMB, Indian Rupee, or INR, and British Pounds Sterling, or GBP.

Our operating expenses are incurred primarily in the United States, in China associated with our research and development operations that are maintained there, in India for our new center of excellence and in the United Kingdom for our international sales and marketing activities. Our operating expenses are generally denominated in the functional currencies of our subsidiaries in which the operations are located. The percentages of our operating expenses denominated in the following currencies for the indicated fiscal years were as follows:

	Years Ended December 31,		
	2021	2020	2019
USD	92 %	92 %	90 %
RMB	6	6	7
GBP	2	2	3
INR	—	—	—
	100 %	100 %	100 %

If USD had appreciated or depreciated by 10%, relative to RMB, GBP and INR, our operating expenses for 2021 would have decreased or increased by approximately $2.3 million, or approximately 1%. We do not currently enter into forward exchange contracts to hedge exposure denominated in foreign currencies or any derivative financial instruments. In the future, we may consider entering into hedging transactions to help mitigate our foreign currency exchange risk.

Foreign exchange rate fluctuations may also adversely impact our financial position as the assets and liabilities of our foreign operations are translated into USD in preparing our Consolidated Balance Sheets. The effect of foreign exchange rate fluctuations on our consolidated financial position for the year ended December 31, 2021 was a net translation gain of $50,000. This gain is recognized as an adjustment to stockholders' equity through "Accumulated other comprehensive loss."

Transaction Exposure

We have certain assets and liabilities, primarily accounts receivables and accounts payable (including inter-company transactions) that are denominated in currencies other than the relevant entity's functional currency. In certain circumstances, changes in the functional currency value of these assets and liabilities create fluctuations in our reported consolidated financial position, cash flows and results of operations. Transaction gains and losses on these foreign currency denominated assets and liabilities are recognized each period within "Other income (expense), net" in our Consolidated Statements of Comprehensive Income (Loss). During the year ended December 31, 2021, we recognized a net loss related to these foreign exchange assets and liabilities of approximately $0.2 million.

ITEM 8. Financial Statements and Supplementary Data

Report of Independent Registered Public Accounting Firm

To the Stockholders and Board of Directors
Calix, Inc.:

Opinions on the Consolidated Financial Statements and Internal Control Over Financial Reporting

We have audited the accompanying consolidated balance sheets of Calix, Inc. and subsidiaries (the Company) as of December 31, 2021 and 2020, the related consolidated statements of comprehensive income (loss), stockholders' equity, and cash flows for each of the years in the three-year period ended December 31, 2021, and the related notes (collectively, the consolidated financial statements). We also have audited the Company's internal control over financial reporting as of December 31, 2021, based on criteria established in *Internal Control – Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission.

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

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 accompanying Management's Report on Internal Control Over Financial Reporting. Our responsibility is to express an opinion on the Company's consolidated financial statements and an opinion 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 (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) 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 (3) 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: (1) relate to accounts or disclosures that are material to the consolidated financial statements and (2) 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.

Evaluation of the recognition and realizability of deferred tax assets

As discussed in Note 10 to the consolidated financial statements, the Company assesses the estimated future realizability of the gross carrying value of its deferred tax assets at each reporting period. A valuation allowance is required when, based upon an assessment of various factors, including recent operating loss history, anticipated future earnings, and prudent and reasonable tax planning strategies, it is more likely than not that some portion of the deferred tax assets will not be realized. In addition, the Company recognizes the financial statement effects of uncertain tax positions when it is more likely than not that such positions will be sustained upon audit. During 2021, the Company recognized an income tax benefit of $165.7 million based on management's reassessment of the amount of its U.S. federal and other state deferred tax assets that are more likely than not to be realized. The Company's deferred tax assets include U.S. federal net operating loss and research and development carryforwards (hereinafter, collectively referred to as "carryforward assets") of $388.2 million and $37.1 million as of December 31, 2021, respectively. The Company had unrecognized tax benefits of $26.0 million as of December 31, 2021, primarily related to the carryforward assets.

We identified the evaluation of the realizability of the carryforward assets, and the related unrecognized tax positions associated with these carryforward assets, as a critical audit matter. Subjective and challenging auditor judgment was required to: (i) evaluate the realizability of the carryforward assets based on the projected future taxable income over the periods in which those carryforward assets will be utilized, and (ii) assess the application of tax laws to utilize the carryforward assets, which have begun to expire.

The following are the primary procedures we performed to address this critical audit matter. We evaluated the design and tested the operating effectiveness of certain internal controls related to the Company's evaluation of the realizability of the carryforward assets, and the related unrecognized tax positions, including controls related to the application of tax laws and the projections of future taxable income. We evaluated positive and negative evidence used in assessing whether the carryforward assets were more likely than not to be realized in the future, including evaluating the nature, frequency, and severity of current and cumulative taxable income or losses, as well as future projections of taxable income. We evaluated the reasonableness of management's projections of future taxable income considering (i) recent financial profitability trends of the Company, (ii) consistency with industry data and economic trends, (iii) whether these assumptions were consistent with evidence obtained in other areas of the audit, and (iv) the Company's ability to project future earnings based on comparisons of the Company's previous annual projections to actual results. We performed a sensitivity analysis over the amount and timing of future taxable income to assess the impact on utilization of the carryforward assets. We read historical financial information to evaluate the more likely than not tax position associated with the U.S. federal net operating loss carryforwards. We involved income tax professionals with specialized skills and knowledge, who assisted in assessing the Company's application of tax laws to utilize the carryforward assets, which have begun to expire, and evaluating the recognition and realizability of the carryforward assets.

Evaluation of net realizable value of inventory and excess and obsolete inventory liabilities

As discussed in Notes 1, 4 and 6 to the consolidated financial statements, the Company has finished goods inventories with a carrying value of $88.9 million and excess and obsolete inventory liabilities of $7.6 million as of December 31, 2021. The Company adjusts the inventory carrying value for excess or obsolete inventory based on assumptions about future demand for products, potential obsolescence of technology, product life cycle, and whether pricing trends or forecasts indicate that the carrying value of inventory exceeds the estimated selling price. These factors are impacted by market and economic conditions, technology changes and new product introductions and require significant estimates that may include elements that are uncertain. The Company also records a liability and a charge to cost of systems revenue for estimated losses on inventory the Company is obligated to purchase from its manufacturers when the inventory has been rendered excess and obsolete due to manufacturing and engineering change orders resulting from design changes, manufacturing discontinuation of products by its suppliers, or in cases where the Company has committed inventory levels that greatly exceed projected demand.

We identified the evaluation of net realizable value of inventory and excess and obsolete inventory liabilities as a critical audit matter. Evaluation of the Company's forecasted demand, including the Company's determination of the effect of market and economic conditions, technology and design changes, new product introductions, and discontinuation of products by its suppliers required significant auditor judgment.

The following are the primary procedures we performed to address this critical audit matter. We evaluated the design and tested the operating effectiveness of certain internal controls related to the Company's inventory process. This included controls over the forecasted demand and the Company's determination of the effect of market and economic conditions, technology and design changes, new product introductions, and discontinuation of products. We evaluated the Company's forecasted demand for a selection of products by assessing historical sales trends and customer order backlog. For a selection of inventory items, we (1) reperformed the analysis provided by the Company to assess the accuracy of the net realizable value of inventory by comparing historical sales activity, customer order backlog, or demand forecasts to the inventory on hand quantities, and (2) performed inquiries of Company's personnel and inspected documents regarding market and economic conditions, technology and design changes, and new product introductions. We evaluated the reasonableness of management's assumptions used to estimate the excess and obsolete inventory liabilities considering (1) inquiries of Company's personnel regarding market and economic conditions, technology and design changes, or supplier discontinuations, (2) historical reimbursements to suppliers for excess and obsolete component inventory, (3) the excess and obsolete liabilities and purchase commitment trends, and (4) the sensitivity of the assumptions to the impact of the excess and obsolete liabilities.

/s/ KPMG LLP

We have served as the Company’s auditor since 2015.

Santa Clara, California
February 22, 2022

CALIX, INC.

CONSOLIDATED BALANCE SHEETS
(In thousands, except par value)

	December 31, 2021	December 31, 2020
ASSETS		
Current assets:		
Cash and cash equivalents	$ 51,333	$ 80,807
Marketable securities	153,002	52,982
Accounts receivable, net	85,219	69,419
Inventory	88,880	52,268
Prepaid expenses and other current assets	30,811	11,414
Total current assets	409,245	266,890
Property and equipment, net	21,783	20,381
Right-of-use operating leases	12,182	11,741
Deferred tax assets	168,962	—
Goodwill	116,175	116,175
Other assets	13,685	12,165
	$ 742,032	$ 427,352
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	$ 29,061	$ 13,115
Accrued liabilities	71,597	68,736
Deferred revenue	27,478	19,189
Total current liabilities	128,136	101,040
Long-term portion of deferred revenue	22,016	19,904
Operating leases	12,376	12,946
Other long-term liabilities	11,076	13,137
Total liabilities	173,604	147,027
Commitments and contingencies (See Note 6)		
Stockholders' equity:		
Preferred stock, $0.025 par value; 5,000 shares authorized; no shares issued and outstanding as of December 31, 2021 and 2020	—	—
Common stock, $0.025 par value; 100,000 shares authorized; 64,274 shares issued and outstanding as of December 31, 2021, and 62,122 shares issued and outstanding as of December 31, 2020	1,607	1,553
Additional paid-in capital	997,855	948,055
Accumulated other comprehensive loss	(320)	(191)
Accumulated deficit	(430,714)	(669,092)
Total stockholders' equity	568,428	280,325
	$ 742,032	$ 427,352

See accompanying notes to consolidated financial statements.

Table of Contents

CALIX, INC.

CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME (LOSS)
(In thousands, except per share data)

	Years Ended December 31, 2021	2020	2019
Revenue:			
Systems	$ 642,577	$ 508,552	$ 393,231
Services	36,817	32,687	31,099
Total revenue	679,394	541,239	424,330
Cost of revenue:			
Systems	297,103	251,638	211,309
Services	25,704	22,582	25,096
Total cost of revenue	322,807	274,220	236,405
Gross profit	356,587	267,019	187,925
Operating expenses:			
Sales and marketing	125,909	94,185	82,553
Research and development	101,747	85,258	81,184
General and administrative	55,779	44,444	37,115
Restructuring charges (benefit)	(786)	6,286	—
Loss on asset retirement	—	—	2,474
Total operating expenses	282,649	230,173	203,326
Operating income (loss)	73,938	36,846	(15,401)
Interest and other expense, net:			
Interest expense, net	(402)	(1,585)	(958)
Other expense, net	(882)	(977)	(173)
Total interest and other expense, net	(1,284)	(2,562)	(1,131)
Income (loss) before income taxes	72,654	34,284	(16,532)
Income taxes	(165,724)	800	1,162
Net income (loss)	$ 238,378	$ 33,484	$ (17,694)
Net income (loss) per common share:			
Basic	$ 3.77	$ 0.57	$ (0.32)
Diluted	$ 3.51	$ 0.54	$ (0.32)
Weighted-average number of shares used to compute net income (loss) per common share:			
Basic	63,277	59,074	54,993
Diluted	67,856	61,998	54,993
Net income (loss)	$ 238,378	$ 33,484	$ (17,694)
Other comprehensive income (loss), net of tax:			
Unrealized loss on available-for-sale marketable securities, net	(179)	—	—
Foreign currency translation adjustments, net	50	663	(101)
Total other comprehensive income (loss), net of tax	(129)	663	(101)
Comprehensive income (loss)	$ 238,249	$ 34,147	$ (17,795)

See accompanying notes to consolidated financial statements.

CALIX, INC.

CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY
(In thousands)

	Common Stock		Additional Paid-in Capital	Accumulated Other Comprehensive Loss	Accumulated Deficit	Treasury Stock	Total Stockholders' Equity
	Shares	Amount					
Balance as of December 31, 2018	53,955	$ 1,482	$ 876,073	$ (753)	$ (684,882)	$ (39,986)	$ 151,934
Stock-based compensation	—	—	11,181	—	—	—	11,181
Issuance of common stock under equity incentive plans, net of forfeitures	2,493	63	8,645	—	—	—	8,708
Net loss	—	—	—	—	(17,694)	—	(17,694)
Other comprehensive loss	—	—	—	(101)	—	—	(101)
Balance as of December 31, 2019	56,448	1,545	895,899	(854)	(702,576)	(39,986)	154,028
Stock-based compensation	—	—	13,960	—	—	—	13,960
Issuance of common stock under equity incentive plans, net of forfeitures	2,454	60	18,067	—	—	—	18,127
Issuance of common stock in connection with public offering, net of expenses	3,220	82	59,981	—	—	—	60,063
Treasury stock retirement		(134)	(39,852)	—	—	39,986	—
Net income	—	—	—	—	33,484	—	33,484
Other comprehensive income	—	—	—	663	—	—	663
Balance as of December 31, 2020	62,122	1,553	948,055	(191)	(669,092)	—	280,325
Stock-based compensation	—	—	24,230	—	—	—	24,230
Issuance of common stock under equity incentive plans, net of forfeitures	2,152	54	25,570	—	—	—	25,624
Net income	—	—	—	—	238,378	—	238,378
Other comprehensive loss	—	—	—	(129)	—	—	(129)
Balance as of December 31, 2021	64,274	$ 1,607	$ 997,855	$ (320)	$ (430,714)	$ —	$ 568,428

See accompanying notes to consolidated financial statements.

CALIX, INC.

CONSOLIDATED STATEMENTS OF CASH FLOWS
(In thousands)

	Years Ended December 31,		
	2021	2020	2019
Operating activities:			
Net income (loss)	$ 238,378	$ 33,484	$ (17,694)
Adjustments to reconcile net income (loss) to net cash provided by operating activities:			
Stock-based compensation	24,230	13,960	11,181
Depreciation and amortization	15,012	13,718	10,316
Deferred income taxes	(168,426)	—	—
Asset retirements and write-downs	—	3,914	2,636
Changes in operating assets and liabilities:			
Accounts receivable, net	(15,800)	(22,910)	20,517
Inventory	(36,612)	(12,116)	9,998
Prepaid expenses and other assets	(27,074)	773	(63)
Accounts payable	16,025	2,190	(29,440)
Accrued liabilities	3,273	11,922	(1,836)
Deferred revenue	10,400	3,596	2,401
Other long-term liabilities	(2,613)	2,878	(3,362)
Net cash provided by operating activities	56,793	51,409	4,654
Investing activities:			
Purchases of property and equipment	(10,463)	(7,819)	(13,353)
Purchases of marketable securities	(298,092)	(72,982)	—
Maturities of marketable securities	197,894	20,000	—
Net cash used in investing activities	(110,661)	(60,801)	(13,353)
Financing activities:			
Proceeds from common stock issuances related to employee benefit plans	25,624	18,127	8,708
Payments related to financing arrangements	(1,241)	(5,758)	(2,737)
Proceeds from the sale of common stock in connection with public offering, net of expenses	—	60,063	—
Proceeds from line of credit	—	30,000	143,300
Payments related to the line of credit	—	(60,285)	(143,300)
Net cash provided by financing activities	24,383	42,147	5,971
Effect of exchange rate changes on cash and cash equivalents	11	595	(89)
Net increase (decrease) in cash and cash equivalents	(29,474)	33,350	(2,817)
Cash and cash equivalents at beginning of year	80,807	47,457	50,274
Cash and cash equivalents at end of year	$ 51,333	$ 80,807	$ 47,457
Supplemental disclosures of cash flow information:			
Interest paid	$ 631	$ 1,686	$ 1,123
Income taxes paid	$ 5,197	751	403
Non-cash investing activities:			
Changes in accounts payable and accrued liabilities related to purchases of property and equipment	$ 194	$ (597)	$ (2,435)

See accompanying notes to consolidated financial statements.

CALIX, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

1. Description of Business and Significant Accounting Policies

Company

Calix, Inc. (together with its subsidiaries, "Calix" or the "Company") was incorporated in August 1999 and is a Delaware corporation. The Company is the leading global provider of cloud and software platforms, systems and services that focus on the access network, the portion of the network that governs available bandwidth and determines the range and quality of services that can be offered to subscribers. These cloud and software platforms enable broadband service providers ("BSPs") of all types and sizes to innovate and transform their businesses. The Company's BSP customers are empowered to utilize real-time data and insights from Calix platforms to simplify their businesses and deliver experiences that excite their subscribers. These insights enable BSPs to grow their businesses through increased subscriber acquisition, loyalty and revenue, thereby increasing the value of their businesses and contributions to their communities.

Basis of Presentation and Accounting Guidance

The accompanying consolidated financial statements have been prepared in accordance with the requirements of the U.S. Securities and Exchange Commission ("SEC") and U.S. generally accepted accounting principles ("GAAP"). All significant intercompany balances and transactions have been eliminated in consolidation. Any reference in these notes to applicable accounting guidance is meant to refer to the authoritative U.S. GAAP as found in the Financial Accounting Standards Board ("FASB") Accounting Standards Codification ("ASC").

Risks and Uncertainties

The Company is subject to risks and uncertainties as a result of the COVID-19 pandemic. The extent of the impact of the COVID-19 pandemic on the Company's business is highly uncertain and difficult to predict, particularly as variants of the coronavirus continue to spread around the world. Although the availability of vaccines has increased, there are no assurances as to when the pandemic will become endemic. In March 2020, the Company instituted office closures, travel restrictions and a work-from-anywhere policy for substantially all of its employees due to shelter-in-place mandates. In July 2021, the Company reopened its U.S. offices to fully-vaccinated employees who choose to work in the office and lifted certain travel restrictions. The COVID-19 pandemic has had a prolonged impact on the Company's supply chain operations due to restrictions, reduced capacity and limited availability from suppliers on whom the Company relies for sourcing components and materials and from third-party partners on whom the Company relies for manufacturing, warehousing and logistics services. Although demand for the Company's products has been strong in the short-term as subscribers seek more bandwidth and better Wi-Fi, customers' purchasing decisions over the long-term may be impacted by the pandemic and its impact on the economy, which could in turn impact the Company's revenue and results of operations. Furthermore, the Company's supply chain continues to face constraints primarily due to challenges in sourcing components and materials for the Company's products. The prolonged impact of COVID-19 could exacerbate these constraints or cause further supply chain disruptions. As of the issuance date of these condensed consolidated financial statements, the extent to which the COVID-19 pandemic may materially impact the Company's financial condition, liquidity or results of operations remains uncertain.

Use of Estimates

The preparation of financial statements is in conformity with U.S. GAAP, which requires management to make estimates and assumptions that affect the amounts reported in the consolidated financial statements and accompanying notes. For the Company, these estimates include, but are not limited to: allowances for doubtful accounts and sales returns, excess and obsolete inventory, allowances for obligations to its contract manufacturers, valuation of stock-based compensation, useful lives assigned to long-lived assets, standard and extended warranty costs, realizability of deferred tax assets and uncertain tax positions and contingencies. Actual results could differ from those estimates, and such differences could be material to the Company's financial position and results of operations.

Revenue Recognition

The Company derives revenue from contracts with customers primarily from the following and categorizes its revenue as follows:

- Systems include revenue from the sale of access and premises systems, software platform licenses and cloud-based software subscriptions.
- Services include revenue from customer support, software- and cloud-based maintenance, extended warranty subscriptions, professional services, training and managed services.

Revenue is recognized when a performance obligation is satisfied, which occurs when control of the promised goods or services is transferred to the customer, in an amount that reflects the consideration the Company expects to be entitled to in exchange for those goods or services. Revenue from sales of access and premises systems is recognized when control is transferred to the customer, which is generally when the products are shipped. Revenue from software platform licenses, which provides the customer with a right to use the software as it exists, is generally recognized upfront when made available to the customer. Revenue from cloud-based software subscriptions, customer support, maintenance, extended warranty subscriptions and managed services is generally recognized ratably over the contract term. Revenue from professional services and training is recognized as the services are delivered.

A performance obligation is a promise in a contract to transfer a distinct good or service to the customer and is the unit of account. A contract's transaction price is allocated to each distinct performance obligation and recognized as revenue when, or as, the performance obligation is satisfied. The Company's hardware products contain both software and non-software components that function together to deliver the products' essential functionality and therefore constitutes a single performance obligation as the promise to transfer the individual software and non-software components is not separately identifiable and, therefore, not distinct. The Company's contracts may include multiple performance obligations. For such arrangements, the Company allocates the contract's transaction price to each performance obligation using the relative stand-alone selling price of each distinct good or service in the contract. The Company generally determines stand-alone selling prices based on the prices charged to customers or its best estimate of stand-alone selling price. The Company's estimate of stand-alone selling price is established considering multiple factors including, but not limited to, geographies, market conditions, competitive landscape, internal costs, gross margin objectives, characteristics of targeted customers and pricing practices. The determination of estimated stand-alone selling price is made through consultation with and formal approval by management, taking into consideration the go-to-market strategy.

Cost of Revenue

Cost of revenue consists primarily of finished goods inventory purchased from the Company's contract manufacturers, payroll and related expenses associated with managing the relationships with contract manufacturers, depreciation of manufacturing test equipment, warranty and retrofit costs, excess and obsolete inventory costs, allowances for obligations to its contract manufacturers, shipping charges and amortization of certain intangible assets. It also includes contractor and other costs of services incurred directly related to the delivery of services to customers.

Warranty and Retrofit

The Company offers limited warranties for its hardware products for a period of one, three or five years, depending on the product type. The Company recognizes estimated costs related to warranty activities as a component of cost of revenue upon product shipment or upon identification of a specific product failure. Under certain circumstances, the Company also provides fixes on specifically identified performance failures for products that are outside of the standard warranty period and recognizes estimated costs related to retrofit activities as a component of cost of revenue upon identification of such product failures. The Company recognizes estimated warranty and retrofit costs when it is probable that a liability has been incurred and the amount of loss is reasonably estimable. The estimates are based upon historical and projected product failure and claim rates, historical costs incurred in correcting product failures and information available related to any specifically identified product failures. Judgment is required in estimating costs associated with warranty and retrofit activities, and the Company's estimates are limited to information available to the Company at the time of such estimates. In some cases, such as when a specific product failure is first identified or a new product is introduced, the Company may initially have limited information and limited historical failure and claim rates upon which to base its estimates, and such estimates may require revision in future periods. The recorded amount is adjusted from time to time for specifically identified warranty and retrofit exposure. Actual warranty and retrofit expenses are charged against the Company's estimated warranty and retrofit liability when incurred. Factors that affect the Company's warranty and retrofit liability include the number of active installed units and historical and anticipated rates of warranty and retrofit claims and cost per claim.

Stock-Based Compensation

Stock-based compensation expense associated with stock options, performance stock options ("PSOs"), restricted stock units ("RSUs") and purchase rights under the Amended and Restated Employee Stock Purchase Plan (the "ESPP") and the Amended and Restated 2017 Nonqualified Employee Stock Purchase Plan (the "NQ ESPP") is measured at the grant date based on the fair value of the award, and is recognized, net of forfeitures, as expense over the remaining requisite service period (generally the vesting period) on a straight-line basis.

The fair value of stock option and employee stock purchase right under the ESPP is estimated at the grant date using the Black-Scholes option valuation model. The fair value of RSUs and employee stock purchase right under the NQ ESPP is based on closing market price of the Company's common stock on the date of grant.

Stock-based compensation expense associated with PSOs with graded vesting features and which contain both a performance and a service condition is measured based on fair value of stock options estimated at the grant date using the Black-Scholes option valuation model, and is recognized, net of forfeitures, as expense over the requisite service period using the graded vesting attribution method.

Compensation expense is only recognized if the Company has determined that it is probable that the performance condition will be met. The Company reassesses the probability of vesting at each reporting period and adjusts compensation expense based on its probability assessment.

Loss Contingencies

From time to time, the Company is involved in legal proceedings arising from the normal course of business activities. The Company evaluates the likelihood of an unfavorable outcome of legal proceedings to which it is a party and accrues a loss contingency when the loss is probable and reasonably estimable. Assessing legal contingencies involves significant judgment and estimates, and the outcome of litigation is inherently uncertain and subject to numerous factors outside the Company's control. Significant judgment is required when the Company assesses the likelihood of any adverse judgments or outcomes, including the potential range of possible losses, and whether losses are probable and reasonably estimable.

Because of uncertainties related to these matters, the Company bases its estimates of whether a loss contingency is probable or reasonably possible, as well as the reasonable range of possible losses associated with each loss contingency, only on the information available at the time. As additional information becomes available, and at least quarterly, the Company reassesses the potential liability on each significant matter and may revise its estimates. These revisions could have a material impact on the Company's business, operating results or financial condition. The actual outcome of these legal proceedings may materially differ from the Company's estimates of potential liability, which could have a material adverse effect on the Company's business, operating results or financial condition.

Credit Risk and Inventory Supplier Concentrations

Financial instruments that potentially subject the Company to significant concentrations of credit risk consist primarily of cash, cash equivalents, marketable securities and accounts receivable. Cash equivalents consist of money market funds and marketable securities with a maturity at the date of purchase of ninety days or less, which are invested through financial institutions in the United States. Deposits in and investments held by these financial institutions may, at times, exceed federally insured limits. The Company has not experienced any losses in such accounts. The Company also has approximately $3.6 million of cash held by its foreign subsidiaries in Brazil, China and the United Kingdom. Management believes that the financial institutions that hold the Company's cash and cash equivalents are financially sound and, accordingly, minimal credit risk exists with respect to these cash and cash equivalents.

The Company depends primarily on a small number of outside contract manufacturers ("CMs") and original design manufacturers ("ODMs") for the bulk of its finished goods inventory. The Company generally purchases its products through purchase orders with its suppliers. While the Company seeks to maintain a sufficient supply of its products, the Company's business and results of operations could be adversely affected by a stoppage or delay in receiving such products, the receipt of defective parts, an increase in price of such products or the Company's inability to obtain lower prices from its CMs, ODMs and other suppliers in response to competitive pressures.

Fair Value of Financial Instruments

The carrying amounts of cash and cash equivalents, trade receivables, accounts payable and other accrued liabilities approximate their fair value due to their relatively short-term nature. Marketable securities are valued using quoted market prices in active markets to determine fair value.

Cash, Cash Equivalents and Marketable Securities

Cash equivalents and marketable securities are stated at amounts that approximate fair value based on quoted market prices.

The Company has invested its excess cash primarily in money market funds and highly liquid marketable securities such as U.S. treasury bonds, corporate debt instruments, commercial paper and U.S. government securities. The Company considers all investments with maturities of three months or less when purchased to be cash equivalents. Marketable securities represent highly liquid U.S. treasury bonds, corporate debt instruments, commercial paper and U.S. government securities with maturities greater than 90 days at date of purchase. Marketable securities with maturities greater than one year are classified as current because management considers all marketable securities to be available for current operations.

The Company's investments have been classified and accounted for as available-for-sale. Such investments are recorded at fair value and unrealized holding gains and losses are reported as a separate component of comprehensive loss in the stockholders' equity until realized. Realized gains and losses on sales of marketable securities, if any, are determined on the specific identification method and are reclassified from accumulated other comprehensive loss to results of operations as “Other income (expense), net.” Realized loss was de minimis for 2021.

For the Company’s available-for-sale debt securities in an unrealized loss position, the Company determines whether a credit loss exists. In this assessment, among other factors, the Company considers the extent to which the fair value is less than the amortized cost, any changes to the rating of the security by a rating agency, and adverse conditions specifically related to the security. If factors indicate a credit loss exists, an allowance for credit loss will be recorded to “Other income (expense), net,” limited by the amount that the fair value is less than the amortized cost basis. The amount of fair value change relating to all other factors will be recognized in other comprehensive loss.

See Note 2 “*Cash, Cash Equivalents and Marketable Securities.”*

Allowance for Doubtful Accounts

The Company maintains an allowance for doubtful accounts for expected credit losses at contract inception resulting from the inability of its customers to make required payments. The Company records a specific allowance and revises the expected loss based on an analysis of individual past-due balances. Additionally, based on historical write-offs and the Company’s collection experience, the Company records an additional allowance based on a percentage of outstanding receivables. The Company performs credit evaluations of its customers’ financial condition. These evaluations require judgment and are based on a variety of factors including, but not limited to, current economic trends, payment history and a financial review of the customer. Actual collection losses may differ from management’s estimates, and such differences could be material to the Company's financial position and results of operations.

Inventory Valuation and Supplier Purchase Commitments

Inventory, which primarily consists of finished goods purchased from CMs or ODMs, is stated at the lower of cost (determined by the first-in, first-out method) or market value. Inbound shipping costs and U.S. tariffs are included in cost of inventory. In addition, the Company, from time to time, procures component inventory primarily as a result of manufacturing discontinuation of critical components by suppliers. The Company regularly monitors inventory quantities on hand and records write-downs for excess and obsolete inventories based on the Company’s estimate of demand for its products, potential obsolescence of technology, product life cycles and whether pricing trends or forecasts indicate that the carrying value of inventory exceeds its estimated selling price. The Company also evaluates its supplier purchase commitments, which have increased significantly due to extended lead-times in the current supply chain environment, and records a liability for excess and obsolete components based on its estimated demand of our products, potential obsolescence of technology and product life cycles. These factors are impacted by market and economic conditions, technology changes and new product introductions and require significant estimates that may include elements that are uncertain. Actual demand may differ from forecasted demand and may have a material effect on gross profit. If inventory is written down, a new cost basis is established that cannot be increased in future periods. Shipments from suppliers before the Company receives them are recorded as in-transit inventory when title and the significant risks and rewards of ownership have passed to the Company.

Contract Costs

The Company capitalizes certain sales commissions related primarily to multi-year cloud-based software subscriptions and extended warranty support contracts.

Capitalized commissions are amortized as sales and marketing expenses over the period that the related revenue is recognized, which can be up to five years for extended warranty. The Company classifies the unamortized portion of deferred commissions as current or noncurrent based on the timing of when the Company expects to recognize the expense. The current and noncurrent portions of deferred commissions are included in “Prepaid expenses and other current assets” and “Other assets,” respectively, in the Company’s Consolidated Balance Sheets.

Property and Equipment

Property and equipment are stated at cost, less accumulated depreciation, and are depreciated using the straight-line method over the estimated useful life of each asset. Generally, computer equipment is depreciated over two years; purchased software is depreciated over three to five years; test equipment is depreciated over three years; furniture and fixtures are depreciated over seven years; and leasehold improvements are depreciated over the shorter of the respective lease term or the estimated useful life of the asset. Maintenance and repairs are charged to expense as incurred.

Goodwill

Goodwill was recorded as a result of the Company’s acquisitions of Occam Networks, Inc. in February 2011 and Optical Solutions, Inc. in February 2006. The Company records goodwill when consideration paid in a business acquisition exceeds the fair value of the net tangible assets and the identified intangible assets acquired. Goodwill is not amortized but instead is subject to an annual impairment test or more frequently if events or changes in circumstances indicate that it may be impaired. The Company evaluates goodwill on an annual basis as of the end of the second quarter of each fiscal year. Management has determined that it operates as a single reporting unit and, therefore, evaluates goodwill impairment at the enterprise level.

At the end of the second quarter of 2021, the Company completed its annual goodwill impairment test. Based on its assessment of certain qualitative factors such as market capitalization, management concluded that the fair value of the Company was more likely than not greater than its carrying amount as of June 27, 2021. As such, it was not necessary to perform the two-step quantitative goodwill impairment test at the time.

There have been no significant events or changes in circumstances subsequent to the 2021 annual impairment test that would more likely than not indicate that the carrying value of goodwill may have been impaired as of December 31, 2021. There were no impairment losses for goodwill for the years ended December 31, 2021, 2020 or 2019.

Deferred Revenue

Deferred revenue results from transactions where the Company billed the customer for products or services and when cash payments are received or due prior to transferring control of the promised goods or services to the customer.

Payment terms to customers typically range from net 30 to net 90 days and vary by the size and location of customer and the products or services offered. The period between the transfer of control of the promised good or service to a customer and when payment is due is not significant.

Income Taxes

The Company evaluates its tax positions and estimates its current tax exposure along with assessing temporary differences that result from different book to tax treatment of items not currently deductible for tax purposes. These differences result in deferred tax assets and liabilities on the Company's Consolidated Balance Sheets, which are estimated based upon the difference between the financial statement and tax bases of assets and liabilities using the enacted tax rates that will be in effect when these differences reverse. In general, deferred tax assets represent future tax benefits to be received when certain expenses previously recognized in the Company's Consolidated Statements of Comprehensive Income (Loss) become deductible expenses under applicable income tax laws or loss or credit carryforwards are utilized. Accordingly, realization of the Company's deferred tax assets is dependent on future taxable income against which these deductions, losses and credits can be utilized.

The Company must assess the likelihood that its deferred tax assets will be recovered from future taxable income, and to the extent the Company believes that recovery is not more likely than not, it must establish a valuation allowance. Management judgment is required in determining the Company's provision for income taxes, our deferred tax assets and liabilities and any valuation allowance recorded against its net deferred tax assets. Prior to the third quarter of 2021, the Company maintained a 100% valuation allowance against all deferred tax assets, because there was insufficient positive evidence to overcome the existing negative evidence, primarily consisting of several years of consecutive reported pre-tax losses, such that it was not more likely than not that the deferred tax assets were realizable. In the third quarter of 2021, the Company had reported positive operating performance for five consecutive quarters and continued to maintain a cumulative three-year pre-tax profit. In addition, the Company expects continued positive operating performance into the foreseeable future to allow for utilization of all operating loss and substantially all tax credit carryforwards prior to their expiration. After considering these factors, the Company determined that the positive evidence overcame any negative evidence and concluded that it was more likely than not that a substantial portion of its U.S. federal and certain other state deferred tax assets were realizable. The Company currently maintains a valuation allowance of $29.2 million for certain U.S. federal and California state deferred tax assets.

Newly Adopted Accounting Standards

The Company did not adopt any new accounting standards in 2021 that were significant to the Company.

Recent Accounting Pronouncements Not Yet Adopted

There have been no accounting pronouncements or changes in accounting pronouncements that are significant or potentially significant to the Company.

2. Cash, Cash Equivalents and Marketable Securities

Cash, cash equivalents and marketable securities consisted of the following (in thousands):

	December 31,			
	2021		2020	
Cash and cash equivalents:				
Cash	$	26,442	$	30,745
Commercial paper		21,582		—
Money market funds		2,320		10,068
Corporate debt securities		989		—
U.S. government securities		—		39,994
Total cash and cash equivalents		51,333		80,807
Marketable securities:				
Commercial paper		80,812		—
U.S. government securities		60,279		52,982
U.S. government agency securities		5,527		—
Corporate debt securities		3,576		—
Municipal securities		2,808		—
Total marketable securities		153,002		52,982
	$	204,335	$	133,789

The carrying amounts of the Company's money market funds approximate their fair values due to their nature, duration and short maturities. The above amounts in 2021 are net of $0.2 million in unrealized losses. Unrealized losses in 2020 were de minimis. As of December 31, 2021, all marketable securities were due in two years or less.

3. Fair Value Measurements

The Company measures its cash equivalents and marketable securities at fair value on a recurring basis. Fair value is an exit price, representing the amount that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants. 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. The Company utilizes the following three-tier value hierarchy which prioritizes the inputs used in measuring fair value:

Level 1 – Observable inputs that reflect quoted prices (unadjusted) for identical assets or liabilities in active markets.

Level 2 – Observable inputs other than quoted prices included in Level 1 for similar instruments in active markets, quoted prices for identical or similar instruments in markets that are not active, and model-driven valuations in which all significant inputs and significant value drivers are observable in active markets.

Level 3 – Unobservable inputs to the valuation derived from fair valuation techniques in which one or more significant inputs or significant value drivers are unobservable. The fair value hierarchy also requires the Company to maximize the use of observable inputs, when available, and to minimize the use of unobservable inputs when determining inputs and determining fair value.

The following tables sets forth the Company's financial assets measured at fair value on a recurring basis based on the three-tier fair value hierarchy (in thousands):

As of December 31, 2021	Level 1		Level 2		Total	
Money market funds	$	2,320	$	—	$	2,320
U.S. government securities		60,279		—		60,279
Commercial paper		—		102,394		102,394
U.S. government agency securities		—		5,527		5,527
Corporate debt securities		—		4,565		4,565
Municipal securities		—		2,808		2,808
	$	62,599	$	115,294	$	177,893

As of December 31, 2020	Level 1
Money market funds	$ 10,068
U.S. government securities	92,976
	$ 103,044

4. Balance Sheet Details

Accounts receivable, net consisted of the following (in thousands):

	December 31,	
	2021	2020
Accounts receivable	$ 85,944	$ 70,824
Allowance for doubtful accounts	(725)	(1,405)
	$ 85,219	$ 69,419

The table below summarizes the changes in allowance for doubtful accounts and product return liability for the periods indicated (in thousands):

	Balance at Beginning of Year	Additions Charged to Expenses or Revenue Net of Recoveries	Write Offs and Returns	Balance at End of Year
Year Ended December 31, 2021:				
Allowance for doubtful accounts	$ 1,405	$ (201)	$ (479)	$ 725
Product return liability	1,888	3,681	(3,733)	1,836
Year Ended December 31, 2020:				
Allowance for doubtful accounts	$ 374	$ 1,085	$ (54)	$ 1,405
Product return liability	919	3,391	(2,422)	1,888
Year Ended December 31, 2019:				
Allowance for doubtful accounts	$ 370	$ 168	$ (164)	$ 374
Product return liability	880	1,620	(1,581)	919

Inventory consisted of the following (in thousands):

	December 31,	
	2021	2020
Raw materials	$ 130	$ 34
Finished goods	88,750	52,234
	$ 88,880	$ 52,268

Property and equipment, net consisted of the following (in thousands):

	December 31,	
	2021	2020
Test equipment	$ 39,476	$ 37,670
Computer equipment	11,156	9,062
Software	9,013	16,093
Furniture and fixtures	1,812	2,069
Leasehold improvements	1,351	1,345
	62,808	66,239
Accumulated depreciation and amortization	(41,025)	(45,858)
	$ 21,783	$ 20,381

Depreciation and amortization expenses were $15.0 million, $13.7 million and $10.3 million for the years ended December 31, 2021, 2020 and 2019, respectively.

Other long-term assets consisted of the following (in thousands):

	December 31,	
	2021	2020
Intangible asset	$ 6,885	$ 9,517
Other long-term assets	6,800	2,648
	$ 13,685	$ 12,165

Intangible Asset Acquisition

In March 2018, and as amended in December 2020, the Company entered into an agreement with a vendor to develop a certain software product and related enhancements pursuant to which the Company is obligated to make revenue-share payments under the program, subject to aggregate fixed revenue-share payments of $15.8 million. The payments are based on a revenue-share rate applied to revenue from the developed-product and the corresponding hardware sales through March 2024. If the minimum revenue-share payments are not achieved by the end of that period, a true-up payment will be due. The Company had its first sale in August 2019, and as a result, the Company capitalized an intangible asset with a value of $13.2 million in the third quarter of 2019 and also recognized a liability of $13.2 million (a non-cash investing activity). The intangible asset has an estimated five-year useful life and is being amortized using the greater of the ratio of current gross revenue for the products to the total of current and anticipated future gross revenue for the products or the straight-line method. As of December 31, 2021, the liability, including accrued interest, was $13.2 million of which $4.7 million is included in "Accrued liabilities" and $8.5 million in "Other long-term liabilities" in the accompanying Consolidated Balance Sheet. As of December 31, 2020, the liability, including accrued interest, was $13.9 million of which $2.9 million was included in accrued liabilities and $11.0 million in other long-term liabilities.

Capitalized Cloud Implementation Costs

In January 2020, the Company went live with its cloud-based enterprise resource planning ("ERP") system. As a result, the Company capitalized $7.5 million of implementation costs in both "Prepaid expenses and other current assets" and "Other long-term assets" in the Company's Consolidated Balance Sheet. This amount is being amortized over a period of 29 months, representing the remaining contractual term. The amortization expense for the years ended December 31, 2021 and 2020 was $3.1 million.

Accrued liabilities consisted of the following (in thousands):

	December 31,	
	2021	2020
Compensation and related benefits	$ 23,165	$ 23,740
Component inventory held by suppliers	7,611	3,992
Current portion of warranty and retrofit	7,076	9,208
Professional and consulting fees	4,819	4,497
Customer advances or rebates	4,742	8,374
Current portion of revenue-share payments	4,731	2,925
Taxes payable	4,251	3,476
Freight	3,997	1,955
Operating leases	3,596	2,994
Product returns	1,836	1,888
Operations	1,400	950
Other	4,373	4,737
	$ 71,597	$ 68,736

Changes in the Company’s accrued warranty and retrofit liability were as follows (in thousands):

	Years Ended December 31,		
	2021	2020	2019
Balance at beginning of year	$ 9,208	$ 7,294	$ 8,547
Provision for warranty and retrofit charged to cost of revenue	3,370	5,888	4,425
Utilization of reserve	(2,984)	(3,974)	(5,678)
Balance at end of year	$ 9,594	$ 9,208	$ 7,294

Accrued Restructuring Charges

Responding to trends caused by the COVID-19 pandemic, the Company initiated a restructuring plan in June 2020 to accelerate the Company’s All-Platform future and to align with a work-from-anywhere culture. The Company incurred restructuring charges of approximately $6.3 million, consisting of facilities-related charges and severance and other termination related benefits for the year ended December 31, 2020.

In the fourth quarter of 2021, as a result of subleasing the abandoned portion of the Company’s San Jose headquarters, the Company reversed $0.8 million in facilities-related charges due to the expected recovery of accrued common areas maintenance fees.

The following table summarizes the activities pursuant to the above restructuring plan (in thousands):

	Facilities	Severance and Related Benefits	Total
Restructuring charges	$ 5,112	$ 1,174	$ 6,286
Asset write-down	(3,748)	—	(3,748)
Cash payments	(120)	(1,042)	(1,162)
Balance as of December 31, 2020	$ 1,244	$ 132	$ 1,376
Restructuring benefit	(786)	—	(786)
Cash payments	(277)	(132)	(409)
Balance as of December 31, 2021	$ 181	$ —	$ 181

5. Credit Agreements

Line of Credit

In January 2022, the Company terminated the loan and security agreement with Bank of America, N.A. (“BofA Loan Agreement”). The BofA Loan Agreement provided for a revolving facility up to a principal amount of $35.0 million and would have expired in January 2023. As of December 31, 2021, the Company had no outstanding borrowings.

Financing Arrangements

During 2018, the Company entered into financing arrangements to purchase lab and test equipment for approximately $5.1 million, which were non-cash investing activities. In the fourth quarter of 2020, the Company paid $1.4 million to settle the remainder of the balance. The weighted average interest rate was 6.2%.

The Company entered into financing arrangements for consulting services of $2.0 million in 2019 and $1.8 million in 2018 in connection with the Company’s ERP implementation, which were non-cash investing activities. In the fourth quarter of 2020, the Company paid $1.4 million to settle the remainder of the balance. The weighted average interest rate was 6.3%.

6. Commitments and Contingencies

Lease Commitments

The Company leases office space under non-cancelable operating leases. Certain of the Company’s operating leases contain renewal options and rent acceleration clauses. Future minimum payments under the non-cancelable operating leases consisted of the following as of December 31, 2021 (in thousands):

Year Ending December 31,	Future Minimum Lease Payments
2022	$ 4,473
2023	4,600
2024	4,430
2025	3,971
2026	560
Total future minimum lease payments	18,034
Less imputed interest	(2,062)
	$ 15,972

As of December 31, 2021, the operating lease liability consisted of the following (in thousands):

Accrued liabilities - current portion of operating leases	$ 3,596
Operating leases	12,376
	$ 15,972

The Company leases its headquarters office space in San Jose, California under a lease agreement that expires in December 2025. The future minimum lease payments under the lease are $9.6 million and are included in the table for the year ended December 31, 2021 above.

In October 2021, the Company entered into a lease for a facility in Bangalore, India. The lease commenced in October 2021 for a term of 60 months. The future minimum lease payments of $2.2 million are included in the table for the year ended December 31, 2021 above. The Company recorded a right-of-use operating lease asset and operating lease liability of $2.0 million in the fourth quarter of 2021.

The above tables also include future minimum lease payments for the Company's office facilities in Petaluma, California; Plymouth, Minnesota; Richardson, Texas; Nanjing, China; and West Jordan, Utah, which expire at various dates through 2027.

In November 2021, the Company entered into a sublease for a portion of the San Jose headquarters office space that was previously abandoned. The sublease commences in August 2022 for a term of 39 months. Future minimum payments consisted of the following as of December 31, 2021 (in thousands):

Year Ending December 31,	Future Minimum Sublease Payments
2022	$ 308
2023	750
2024	773
2025	661
Total future minimum sublease payments	$ 2,492

The weighted average discount rate for the Company’s operating leases as of December 31, 2021 was 6.1%. The weighted average remaining lease term as of December 31, 2021 was 3.9 years.

For the years ended December 31, 2021, 2020 and 2019, total rent expense of the Company was $4.1 million, $4.0 million and $4.7 million, respectively. Cash paid within operating cash flows for operating leases was $3.9 million for year ended December 31, 2021.

Purchase Commitments

The Company’s CMs and ODMs place orders for certain component inventory in advance based upon the Company’s build forecasts in order to reduce manufacturing lead times and ensure adequate component supply. The components are used by the CMs and ODMs to build the products included in the build forecasts. The Company generally does not take ownership of the components held by CMs and ODMs. The Company places purchase orders with its CMs and ODMs in order to fulfill its monthly finished product inventory requirements. The Company incurs a liability when the CMs and ODMs convert the component inventory to a finished product and takes ownership of the finished goods inventory. In the event of termination of services with a manufacturing partner, the Company has purchased, and may be required to purchase in the future, certain of the remaining components inventory held by the CM or ODM as well as any outstanding orders pursuant to the contractual provisions with such CM or ODM. As of December 31, 2021 and 2020, the Company had approximately \$247.3 million and \$123.7 million, respectively, of outstanding purchase commitments for inventories to be delivered by its suppliers, including CMs and ODMs, within one to two years.

The Company has from time to time, and subject to certain conditions, reimbursed certain suppliers for component inventory purchases when this inventory has been rendered excess or obsolete, for example due to manufacturing and engineering change orders resulting from design changes, manufacturing discontinuation of products by its suppliers, or in cases where the Company has committed inventory levels that greatly exceed projected demand. The estimated excess and obsolete inventory liabilities related to such manufacturing and engineering change orders and other factors, which are included in accrued liabilities in the accompanying Consolidated Balance Sheets, were \$7.6 million and \$4.0 million as of December 31, 2021 and 2020, respectively. The Company records the related charges in cost of systems revenue in its Consolidated Statements of Comprehensive Income (Loss).

Litigation

From time to time, the Company is involved in various legal proceedings arising from the normal course of business activities. The Company is not currently a party to any legal proceedings that, if determined adversely to the Company, in management’s opinion, are currently expected to individually or in the aggregate have a material adverse effect on the Company’s business, operating results or financial condition taken as a whole.

Indemnifications

The Company from time to time enters into contracts that require it to indemnify various parties against claims from third parties. These contracts primarily relate to (i) certain real estate leases, under which the Company may be required to indemnify property owners for environmental and other liabilities, and other claims arising from the Company’s use of the applicable premises, (ii) agreements with the Company’s officers, directors and certain employees, under which the Company may be required to indemnify such persons for liabilities arising out of their relationship with the Company, (iii) contracts under which the Company may be required to indemnify customers against third-party claims that a Company product infringes a patent, copyright or other intellectual property right and (iv) agreements under which the Company may be required to indemnify the counterparty for certain claims that may be brought against them arising from the Company’s acts or omissions with respect to the transactions contemplated by such agreements.

Because any potential obligation associated with these types of contractual provisions are not quantified or stated, the overall maximum amount of the obligation cannot be reasonably estimated. Historically, the Company has not been required to make payments under these obligations, and no liabilities have been recorded for these obligations in the accompanying Consolidated Balance Sheets.

7. Stockholders’ Equity

Preferred Stock

The Board of Directors has the authority, without a further vote of the stockholders, to designate and issue up to 5.0 million shares of preferred stock in one or more series and to fix the rights, preferences, privileges and restrictions thereof. These rights, preferences and privileges could include dividend rights, conversion rights, voting rights, terms of redemption, liquidation preferences, sinking fund terms and the number of shares constituting any series or the designation of such series, any or all of which may be greater than the rights of common stock. The issuance of the Company’s preferred stock could adversely affect the voting power of holders of common stock and the likelihood that such holders will receive dividend payments and payments upon liquidation. In addition, the issuance of preferred stock could have the effect of delaying, deferring or preventing a change in control of the Company or other corporate action. Since the Company’s initial public offering, the Board of Directors has not designated any rights, preference or powers of any preferred stock, and no shares of preferred stock have been issued.

Common Stock

Holders of the Company’s common stock are entitled to receive dividends, if any, as may be declared from time to time by the Board of Directors out of legally available funds. No dividends have been declared or paid as of December 31, 2021. In the event of the Company’s liquidation, dissolution or winding up, holders of the Company’s common stock will be entitled to share ratably in the net assets legally available for distribution to stockholders after the payment of all of the Company’s debts and other liabilities and the satisfaction of any liquidation preference granted to the holders of any then outstanding shares of preferred stock.

In August 2020, the Company completed an underwritten public offering of 3,220,000 shares of its common stock at $20.00 per share, including a full exercise by the underwriters of their option to purchase an additional 420,000 shares of Common Stock, resulting in net proceeds of $60.1 million, after deducting the underwriting discount and expenses paid by the Company.

Treasury Stock Retirement

In August 2020, the Company's Board of Directors authorized the retirement of the 5,329,817 shares of common stock held as treasury stock. Under Delaware law these shares return to the authorized but unissued common stock pool. As a result, the Company eliminated the $40.0 million treasury stock balance, offsetting this against common stock by $0.1 million and additional paid-in capital by $39.9 million.

Equity Incentive Plans

2019 Equity Incentive Award Plan

At the Company's 2019 annual meeting of stockholders, the stockholders approved the 2019 Equity Incentive Award Plan (the "2019 Plan"). The 2019 Plan supersedes and replaces the 2010 Equity Incentive Award Plan (the "2010 Plan") and preceding plans. No further awards will be granted under the 2010 Plan following the effectiveness of the 2019 Plan; however, the terms and conditions of the 2010 Plan will continue to govern any outstanding awards granted under the 2010 Plan.

Employees and consultants of the Company, its subsidiaries and affiliates, as well as members of the Company's Board of Directors, are eligible to receive awards under the 2019 Plan. The 2019 Plan provides for the grant of stock options, stock appreciation rights, restricted stock, RSUs or other stock or cash-based awards and dividend equivalents to eligible individuals.

The number of shares available for issuance under the 2019 Plan included an initial reserve of 1.7 million shares of common stock, any shares of common stock that are available for issuance under the 2010 Plan as of the effective date of the 2019 Plan and any shares of common stock subject to issued and outstanding awards under the 2010 Plan that expire, are cancelled or otherwise terminate following the effective date of the 2019 Plan. At the Company's 2021 annual meeting of stockholders, the stockholders approved an increase in the number of shares of common stock issuable under the 2019 Plan by 3.8 million shares. As of December 31, 2021, there were 6.8 million shares available for issuance under the 2019 Plan.

Stock options granted under the 2019 Plan are granted at a price not less than 100% of the fair market value of the common stock on the date of grant. Stock options issued under the 2019 Plan generally vest 25% on the first anniversary of the vesting commencement date and on a quarterly basis thereafter for a period of an additional three years. The options have a maximum term of ten years.

In February 2020, PSOs exercisable for up to an aggregate of 0.8 million shares of common stock were granted to certain Company executives with a grant date fair value of $9.16 per share. The actual number of shares earned is contingent upon achievement of annual corporate financial targets for bookings and non-GAAP net income for 2020 (collectively, the "2020 Performance Targets") during the one-year performance period. Under the 2020 Performance Targets, if non-GAAP net income is below 80% of target or bookings are below 90% of target, no shares are awarded. From this base, shares are awarded on a 50% weighting for both non-GAAP net income and bookings up to 100% for each 2020 Performance Target using a sliding scale. In February 2021, the Compensation Committee of the Company's Board of Directors certified the full achievement of the 2020 Performance Targets subject to the four-year services condition. As such, 25% of the shares of the PSOs were vested on that date, and the remaining 75% of the shares of common stock will vest substantially equal quarterly installments over the subsequent 36 months, subject to the executive's continuous service with the Company through the respective vesting dates. Stock-based compensation expense of $0.8 million and $1.6 million was recognized for the years ended December 31, 2021 and 2020, respectively, related to these awards.

In February 2021, PSOs exercisable for up to an aggregate of 0.7 million shares of common stock were granted to certain Company executives with a grant date exercise price of $36.74 per share. The actual number of shares earned is contingent upon achievement of annual corporate financial targets for bookings and non-GAAP net income for 2021 (collectively, the "2021 Performance Targets") during the one-year performance period. Under the 2021 Performance Targets, if the non-GAAP net income is below 80% of target or bookings are below 90% of target, no shares would be awarded. From this base, shares are awarded on a 50% weighting for both non-GAAP net income and bookings up to 100% for each 2021 Performance Target using a sliding scale. In February 2022, the Compensation Committee of the Company's Board of Directors certified the results against the 2021 Performance Targets and awarded 97% of PSOs subject to the four-year services condition. As such, 25% of the awarded shares of the PSOs were vested on that date, and the remaining 75% of the shares of common stock will vest substantially equal quarterly installments over the subsequent 36 months, subject to the executive's continuous service with the Company through the respective vesting dates. Stock-based compensation expense of $6.3 million was recognized for the year ended December 31, 2021 related to these awards.

Stock Options

The following table summarizes the activity of stock options under the Company's equity incentive plans (in thousands, except per share data):

Stock Options	Number of Shares	Weighted-Average Exercise Price Per Share	Weighted-Average Remaining Contractual Life (in years)	Aggregate Intrinsic Value (1)
Outstanding as of December 31, 2020	6,801	$ 9.76		
Granted	1,578	42.89		
Exercised	(1,450)	7.70		
Canceled	(281)	24.18		
Outstanding as of December 31, 2021	6,648	$ 17.46	7.34	$ 415,597
Vested and expected to vest as of December 31, 2021	6,484	$ 17.13	7.31	$ 407,477
Options exercisable as of December 31, 2021	3,191	$ 8.61	5.91	$ 227,689

(1) Amounts represent the difference between the exercise price and the fair market value of common stock at December 31, 2021 of $79.97 per share for all "in-the-money" options outstanding.

During the years ended December 31, 2021, 2020 and 2019, total intrinsic value of stock options exercised was $59.6 million, $6.7 million and $0.2 million, respectively. Total cash received from employees as a result of stock option exercises in 2021, 2020 and 2019 was $11.2 million, $0.9 million and $0.4 million, respectively.

Employee Stock Purchase Plans

The ESPP allows eligible employees to purchase shares of the Company's common stock through payroll deductions of up to 15% of their eligible compensation subject to certain Internal Revenue Code limitations. In addition, no participant may purchase more than 2,000 shares of common stock in each offering period.

The offering periods under the ESPP are two six-month offering periods from August 15th through February 14th and February 15th through August 14th of each year. The price of common stock purchased under the ESPP is 85% of the lower of the fair market value of the common stock on the commencement date and the end date of each six-month offering period. At the Company's 2021 annual meeting of stockholders, the stockholders approved an increase in the number of shares of common stock issuable under the ESPP by 1.3 million shares. The total shares authorized for issuance under the ESPP increased from 9.8 million shares to 11.1 million shares. As of December 31, 2021, there were 3.6 million shares available for issuance under the ESPP. During the year ended December 31, 2021, 0.3 million shares were purchased under the ESPP. As of December 31, 2021, unrecognized stock-based compensation expense of $0.3 million related to the ESPP is expected to be recognized over a remaining service period of 0.1 years.

The NQ ESPP allows eligible employees to purchase shares of the Company's common stock through payroll deductions of up to 25% of their eligible compensation. Eligible employees have the right to (a) purchase the maximum number of whole shares of common stock that can be purchased with the elected payroll deductions during each offering period for which the employee is enrolled at a purchase price equal to the closing price of the Company's common stock on the last day of such offering period and (b) receive an equal number of shares of the Company's common stock that are subject to a risk of forfeiture in the event the employee terminates employment within the one year period immediately following the purchase date. The NQ ESPP provides two six-month offering periods from November 15th through May 14th and May 15th through November 14th of each year. At the Company's 2021 annual meeting of stockholders, the stockholders approved an increase in the number of shares of common stock issuable under the NQ ESPP by 0.8 million shares. The maximum number of shares of common stock currently authorized for issuance under the NQ ESPP is 5.5 million shares, with a maximum of 0.5 million shares allocated per purchase period. As of December 31, 2021, there were 2.8 million shares available for issuance under the NQ ESPP, including the stockholder-approved 0.8 million share increase. During the year ended December 31, 2021, 0.3 million shares were purchased and issued. As of December 31, 2021, unrecognized stock-based compensation expense of $8.0 million related to the NQ ESPP is expected to be recognized over a remaining weighted-average service period of 1.1 years.

Stock-Based Compensation

The following table summarizes stock-based compensation expense (in thousands):

	Years Ended December 31,		
	2021	2020	2019
Cost of revenue:			
Products	$ 790	$ 575	$ 507
Services	668	450	389
Sales and marketing	6,728	4,273	3,415
Research and development	6,769	4,736	3,913
General and administrative	9,275	3,926	2,957
	$ 24,230	$ 13,960	$ 11,181

The following table summarizes the weighted-average grant date fair values of the Company's stock-based awards granted in the periods indicated:

	Years Ended December 31,		
	2021	2020	2019
Stock options	$ 26.55	$ 8.55	$ 3.66
RSUs	$ —	$ 11.22	$ 6.62
ESPP	$ 12.93	$ 5.52	$ 2.04
NQ ESPP	$ 55.50	$ 19.40	$ 7.24

The Company values employee stock purchase rights under the NQ ESPP at the closing market price of the Company's common stock on the date of grant.

The Company estimates the fair value of stock options and employee stock purchase right under the ESPP at the grant date using the Black-Scholes option-pricing model. This model requires the use of the following assumptions:

(i) Expected volatility of the Company's common stock – The Company computes its expected volatility assumption based on a blended volatility (50% historical volatility and 50% implied volatility from traded options on the Company's common stock). The selection of a blended volatility assumption was based upon the Company's assessment that a blended volatility is more representative of the Company's future stock price trend as it weighs the historical volatility with the future implied volatility.

(ii) Expected life of the option award – Represents the weighted-average period that the stock options are expected to remain outstanding. The Company's computation of expected life utilizes the simplified method in accordance with Staff Accounting Bulletin No. 110 due to the lack of sufficient historical exercise data to provide a reasonable basis upon which to estimate expected term. The mid-point between the vesting date and the expiration date is used as the expected term under this method.

(iii) Expected dividend yield – Assumption is based on the Company's history of not paying dividends and no future expectations of dividend payouts.

(iv) Risk-free interest rate – Based on the U.S. Treasury yield curve in effect at the time of grant with maturities approximating the grant's expected life.

The following table summarizes the weighted-average assumptions used in estimating the grant-date fair value of stock options and of each employee's purchase right under the ESPP in the periods indicated:

	Years Ended December 31,		
Stock Options	2021	2020	2019
Expected volatility	56 %	53 %	47 %
Expected life (years)	6.04	6.11	6.11
Expected dividend yield	—	—	—
Risk-free interest rate	1.11 %	0.48 %	1.67 %

	Years Ended December 31,		
ESPP	2021	2020	2019
Expected volatility	63 %	70 %	48 %
Expected life (years)	0.49	0.39	0.49
Expected dividend yield	—	—	—
Risk-free interest rate	0.05 %	0.12 %	2.03 %

In addition, the Company applies an estimated forfeiture rate to awards granted and records stock-based compensation expense only for those awards that are expected to vest. Forfeiture rates are estimated at the time of grant based on the Company's historical experience. Further, to the extent the Company's actual forfeiture rate is different from management's estimate, stock-based compensation is adjusted accordingly.

As of December 31, 2021, unrecognized stock-based compensation expense by award type, net of estimated forfeitures, and their expected weighted-average recognition periods are summarized in the following table (in thousands).

	Stock Option	ESPPs
Unrecognized stock-based compensation expense	$ 31,512	$ 8,355
Weighted-average amortization period (in years)	2.1	1.1

The Company expects to recognize stock-based compensation expense of $19.6 million in 2022, $10.9 million in 2023, $6.8 million in 2024 and $2.6 million in 2025.

Shares Reserved for Future Issuance

As of December 31, 2021, the Company had common shares reserved for future issuance as follows (in thousands):

Stock options outstanding	6,648
Shares available for future grant under 2019 Plan	6,846
Shares available for future issuance under ESPP	3,589
Shares available for future issuance under NQ ESPP	2,802
	19,885

8. Employee Benefit Plan

The Company sponsors a 401(k) tax-deferred savings plan for all employees who meet certain eligibility requirements. Participants may contribute, on a pre-tax basis, a percentage of their annual compensation, but not to exceed a maximum contribution amount pursuant to Section 401(k) of the Internal Revenue Code. The Company, at the discretion of the Board of Directors, may make additional matching contributions on behalf of the participants. The Company made matching contributions totaling $3.2 million, $2.7 million and $2.5 million in 2021, 2020 and 2019, respectively.

9. Accumulated Other Comprehensive Loss

The table below summarizes the changes in accumulated other comprehensive loss by component:

`	Unrealized Gains and Losses on Available-for-Sale Marketable Securities	Foreign Currency Translation Adjustments	Total
Balance as of December 31, 2019	$ —	$ (854)	$ (854)
Other comprehensive income	—	663	663
Balance as of December 31, 2020	—	(191)	(191)
Other comprehensive income (loss)	(179)	50	(129)
Balance as of December 31, 2021	$ (179)	$ (141)	$ (320)

Assets and liabilities of the Company's wholly owned foreign subsidiaries are translated from their respective functional currencies at exchange rates in effect at the balance sheet date, and revenue and expenses are translated at the monthly average exchanges rates. These translations result in differences called foreign currency translation adjustments. Realized foreign currency transaction gains or losses were not significant during the years ended December 31, 2021, 2020 and 2019 and are recorded in "Other income (expense), net" in the Company's Consolidated Statements of Comprehensive Income (Loss).

10. Income Taxes

The domestic and foreign components of income (loss) before incomes taxes were as follows (in thousands):

	Years Ended December 31,		
	2021	2020	2019
Domestic	$ 70,776	$ 33,777	$ (17,935)
Foreign	1,878	507	1,403
	$ 72,654	$ 34,284	$ (16,532)

Income taxes consisted of the following (in thousands):

	Years Ended December 31,		
	2021	2020	2019
Current:			
State	$ 2,818	$ 285	$ 313
Foreign	438	507	835
Current income tax	3,256	792	1,148
Deferred:			
Federal	(157,355)	—	—
State	(11,631)	—	—
Foreign	6	8	14
Deferred income tax	(168,980)	8	14
	$ (165,724)	$ 800	$ 1,162

The differences between the statutory and effective tax rates, expressed as a percentage of net income (loss) before income taxes, were as follows:

	Years Ended December 31,		
	2021	2020	2019
Federal statutory rate	21.0 %	21.0 %	21.0 %
Impact of state taxes	(15.6)	0.1	5.6
Foreign operations	(0.2)	0.6	(2.8)
R&D tax credits	1.4	(4.8)	6.2
Foreign income inclusion	—	—	(1.3)
Stock-based compensation	(12.8)	(4.1)	(5.1)
Other permanent items	(0.3)	0.6	(2.0)
Tax true-up	(0.2)	(0.4)	(11.8)
Valuation allowance	(208.3)	(48.1)	(16.8)
Net operating loss expiration	(13.1)	37.4	—
	(228.1)%	2.3 %	(7.0)%

The significant components of the Company’s deferred tax assets were as follows (in thousands):

	December 31,	
	2021	2020
Deferred tax assets (liabilities):		
Net operating loss carryforwards	$ 82,672	$ 114,973
Tax credit carryforwards	52,538	49,978
Depreciation and amortization	(1,511)	681
Accruals and reserves	10,302	10,753
Deferred revenue	11,351	9,219
Stock-based compensation	4,921	4,821
Intangible assets	37,692	(568)
Other	233	(18)
Gross deferred tax assets	198,198	189,839
Valuation allowance	(29,236)	(189,858)
	$ 168,962	$ (19)

All deferred taxes, along with any related valuation allowance, are classified in the Consolidated Balance Sheet as long-term.

A valuation allowance is required when, based upon an assessment of various factors, including recent operating loss history, anticipated future earnings, and prudent and reasonable tax planning strategies, it is more likely than not that some portion of the deferred tax assets will not be realized. At each reporting period, the Company assesses the estimated future realizability of the gross carrying value of its deferred tax assets. The Company’s periodic assessments take into consideration both positive evidence (future profitability projections for example and recent financial performance) and negative evidence (historical financial performance for example) as it relates to evaluating the future recoverability of its deferred tax assets. During 2021, the Company recognized an income tax benefit of $165.7 million, based on management’s reassessment of the amount of its U.S. federal and other state deferred tax assets that are more likely than not to be realized, primarily as a result of actual and projected increases in U.S. profitability in the current and future periods. In performing its analysis, the Company used the most updated plans and estimates that it currently uses to manage the underlying business and calculated the ability to utilize its deferred tax assets. The Company continues to maintain a valuation allowance of $29.2 million on certain U.S. federal and state deferred tax assets that the Company believes are not more likely than not to be realized in future periods.

As of December 31, 2021, the Company had U.S. federal and state net operating losses of approximately $388.2 million and $52.3 million, respectively. The U.S. federal net operating loss carryforwards have begun to expire and will continue to expire at various dates through 2039 if not utilized. The state net operating loss carryforwards have begun to expire and will continue to expire at various dates through 2039 if not utilized. Additionally, the Company has U.S. federal, California and other U.S. states research and development credits of approximately $37.1 million, $42.1 million and $3.0 million as of December 31, 2021, respectively. The U.S. federal research and development credits have begun to expire in 2021, and the California research and development credits have no expiration date. The credits related to other various U.S. states have begun to expire and will continue to expire at various dates through 2036.

Uncertain Tax Positions

ASC 740, *“Income Taxes,”* prescribes a recognition threshold and measurement attribute to the financial statement recognition and measurement of a tax position taken or expected to be taken in a tax return. The guidance also provides guidance on derecognition, classification, accounting in interim periods and disclosure requirements for uncertain tax positions. The standard requires the Company to recognize the financial statement effects of an uncertain tax position when it is more likely than not that such position will be sustained upon audit. The Company recognizes accrued interest and penalties related to unrecognized tax benefits as interest expense and income tax expense, respectively, in its Consolidated Statements of Comprehensive Income (Loss).

The following table reconciles the Company’s unrecognized tax benefits (in thousands):

	Years Ended December 31,	
	2021	2020
Balance at beginning of year	$ 23,516	$ 22,264
Reduction for tax positions related to prior year	(1,427)	(163)
Additions for tax positions related to prior year	1,947	—
Additions for tax positions related to current year	1,956	1,415
Balance at end of year	$ 25,992	$ 23,516

As of December 31, 2021 and 2020, the Company had unrecognized tax benefits of $26.0 million and $23.5 million, respectively, $13.7 million of which would affect the Company’s effective tax rate if recognized. There were no accrued interest or penalties for uncertain income tax as of December 31, 2021.

The Company files tax returns in the United States and various state jurisdictions, the United Kingdom, China and Brazil. The tax years 2000 through 2021 remain open and subject to examination by the appropriate governmental agencies due to tax attribute carryforwards.

11. Net Income (Loss) Per Common Share

The following table sets forth the computation of basic and diluted net income (loss) per common share for the periods indicated (in thousands, except per share data):

	Years Ended December 31,		
	2021	2020	2019
Numerator:			
Net income (loss)	$ 238,378	$ 33,484	$ (17,694)
Denominator:			
Weighted-average common shares — basic	63,277	59,074	54,993
Effect of dilutive potential common shares	4,579	2,924	—
Weighted-average common shares — diluted	67,856	61,998	54,993
Basic net income (loss) per common share	$ 3.77	$ 0.57	$ (0.32)
Diluted net income (loss) per common share	$ 3.51	$ 0.54	$ (0.32)
Potentially dilutive shares excluded, weighted-average	1,006	753	6,607

Unvested restricted stock awards are included in the calculation of basic weighted-average shares because such shares are participating securities; however, the impact was immaterial.

Potentially dilutive shares have been excluded from the computation of diluted net income (loss) per common share when their effect is antidilutive. These antidilutive shares were primarily from stock options and RSUs. For each of the periods presented where the Company reported a net loss, the effect of all potentially dilutive securities would be antidilutive, and as a result diluted net loss per common share is the same as basic net loss per common share.

12. Revenue from Contracts with Customers

The Company develops, markets and sells communications access systems and software, and there are no segment managers who are held accountable for operations, operating results and plans for levels or components below the Company unit level. Accordingly, the Company is considered to be in a single reporting segment and operating unit structure. The Company's chief operating decision maker is the Company's Chief Executive Officer, who reviews financial information presented on a Company-wide basis, for purposes of allocating resources and evaluating financial performance.

Geographic Information:

The following is a summary of revenue disaggregated by geographic region based upon the location of the customers (in thousands):

	Years Ended December 31,		
	2021	2020	2019
United States	$ 565,964	$ 473,779	$ 365,701
Europe	45,879	22,925	11,464
Americas excluding U.S.	45,719	27,802	24,821
Middle East & Africa	19,018	14,075	18,617
Asia Pacific	2,814	2,658	3,727
	$ 679,394	$ 541,239	$ 424,330

The Company's property and equipment, net of accumulated depreciation, are located in the following geographical areas (in thousands):

	December 31,	
	2021	2020
United States	$ 19,900	$ 19,383
China	1,840	998
India	43	—
	$ 21,783	$ 20,381

Contract Asset

The primary contract asset is revenue recognized on professional services contracts where the services are transferred to the customer over time, which has yet to be billed, and is classified within accounts receivable. Amounts are billed in accordance with the agreed-upon contractual terms. The balance as of December 31, 2021 was $1.7 million of which the Company expects to bill 91% of the balance during 2022. The balance as of December 31, 2020 was $2.3 million of which $0.2 million remained in the Company's Consolidated Balance Sheet at December 31, 2021. The decrease in the contract asset was driven by billings for past services as well as the timing and volume of professional services contracts.

Contract Liability

Deferred revenue consisted of the following (in thousands):

	December 31,	
	2021	2020
Current:		
Products and services	$ 22,586	$ 14,651
Extended warranty	4,892	4,538
	27,478	19,189
Long-term:		
Products and services	3,137	1,879
Extended warranty	18,879	18,025
	22,016	19,904
	$ 49,494	$ 39,093

The increase in the deferred revenue balance for the year ended December 31, 2021 is primarily driven by cash payments received or due in advance of satisfying the Company's performance obligations, offset by $19.2 million of revenue recognized that was included in the deferred revenue balance at the beginning of the year.

Revenue allocated to remaining performance obligations represent contract revenue that has not yet been recognized, which includes deferred revenue and amounts that will be invoiced and recognized as revenue in future periods. This amount was $125.3 million as of December 31, 2021, and the Company expects to recognize 34% of such revenue over the next 12 months and the remainder thereafter.

Contract Costs

The Company capitalizes certain sales commissions related primarily to multi-year subscriptions and extended warranty support for which the expected amortization period is greater than one year. As of December 31, 2021, the unamortized balance of deferred commissions was $7.4 million. For the year ended December 31, 2021 the amount of amortization was $1.4 million, and there was no impairment loss in relation to the costs capitalized.

Concentration of Customer Risk

No customer accounted for more than 10% of the Company’s total revenue for the year ended December 31, 2021. Lumen Technologies, Inc. (formerly CenturyLink, Inc.), the Company’s only greater-than-10%-of-revenue customer, represented 11% and 15% of total revenue for the years ended December 31, 2020 and 2019, respectively.

One customer represented 12% of the Company’s accounts receivable as of December 31, 2021. No customer represented more than 10% of the Company’s accounts receivable as of December 31, 2020.

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

There were no changes in nor any disagreements with accountants on accounting principles or practices, financial statement disclosure, auditing scope or procedures, or other reportable events requiring disclosure pursuant to Item 304(b) of Regulation S-K.

ITEM 9A. Controls and Procedures

Evaluation of Disclosure Controls and Procedures

As of the end of the period covered by this report, which we refer to as the evaluation date, we carried out an evaluation under the supervision and with the participation of management, including our principle executive officer and principle financial officer, of our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act).

The purpose of this evaluation was to determine whether as of the evaluation date our disclosure controls and procedures were effective to provide reasonable assurance that the information we are required to disclose in our filings with the SEC, (i) is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms and (ii) accumulated and communicated to our management, including our principal executive officer and our principal financial officer, as appropriate to allow timely decisions regarding required disclosure. Based upon this evaluation, our principal executive officer and our principal financial officer concluded that our disclosure controls and procedures were effective at the reasonable assurance level as of the end of the period covered by this report.

Management's Report on Internal Control Over Financial Reporting

Management is responsible for establishing and maintaining adequate internal control over financial reporting. Our internal control over financial reporting is 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. 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. Management has evaluated the effectiveness of our internal control over financial reporting as of December 31, 2021 using the criteria set forth in the Internal Control—Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission, or COSO, (2013 framework). Based on our evaluation, management has concluded that we maintained effective control over financial reporting as of December 31, 2021 based on the COSO criteria. The effectiveness of our internal control over financial reporting as of December 31, 2021 has been audited by KPMG LLP, an independent registered public accounting firm, as stated in their report included in this Annual Report on Form 10-K.

Limitations on the Effectiveness of Controls

Our disclosure controls and procedures provide our principal executive officer and our principal financial officer reasonable assurances that our disclosure controls and procedures will achieve their objectives. However, our management, including our principal executive officer and our principal financial officer, does not expect that our disclosure controls and procedures or our internal control over financial reporting can or will prevent all human error. A control system, no matter how well designed and implemented, can provide only reasonable, not absolute, assurance that the objectives of the control system are met. Furthermore, the design of a control system must reflect the fact that there are internal resource constraints, and the benefit of controls must be weighed relative to their corresponding costs. Because of the limitations in all control systems, no evaluation of controls can provide complete assurance that all control issues and instances of error, if any, within our company are detected. These inherent limitations include the realities that judgments in decision-making can be faulty, and that breakdowns can occur due to human error or mistake. Additionally, controls, no matter how well designed, could be circumvented by the individual acts of specific persons within the organization. The design of any system of controls is also based in part upon certain assumptions about the likelihood of future events, and there can be no assurance that any design will succeed in achieving its stated objectives under all potential future conditions.

Changes in Internal Control over Financial Reporting

There was no change in our internal control over financial reporting identified in connection with the evaluation required by Rule 13a-15(d) and 15d-15(d) of the Exchange Act that occurred during the fourth quarter of 2021 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

ITEM 9B. Other Information

None.

ITEM 9C. Disclosure Regarding Foreign Jurisdictions that Prevent Inspections

Not applicable.

PART III

ITEM 10. Directors, Executive Officers and Corporate Governance

Information required by this Item 10 relating to our directors is incorporated by reference to the information set forth under the captions "Proposal No. 1—Election of Directors" and "Director Compensation" and in other applicable sections of the Proxy Statement for the 2022 Annual Meeting of Stockholders to be filed with the Securities and Exchange Commission pursuant to Regulation 14A of the Exchange Act, or the Proxy Statement, to be filed within 120 days of the end of the fiscal year covered by this Report. Information required by this Item 10 relating to our officers is incorporated by reference to the information set forth under the captions "Executive Officers" and "Executive Compensation" and in other applicable sections of the Proxy Statement. Information regarding our Section 16 reporting compliance is incorporated by reference to the information set forth under the captions "Security Ownership of Certain Beneficial Owners and Management" and "Section 16(a) Beneficial Ownership Reporting Compliance" of the Proxy Statement.

We have adopted a code of ethics, which applies to all employees, officers and directors of Calix. The Code of Business Conduct and Ethics meets the requirements of a "code of ethics" as defined by Item 406 of Regulation S-K, and applies to our Chief Executive Officer, Chief Financial Officer and all other employees, as indicated above. The Code of Business Conduct and Ethics also meets the requirements of a code of conduct under NYSE listing standards. The Code of Business Conduct and Ethics is posted on our website at www.calix.com under the links "About - Investor Relations - Governance - Code of Conduct." We intend to disclose any amendments to the Code of Business Conduct and Ethics, as well as any waivers for executive officers or directors, on our website at www.calix.com.

ITEM 11. Executive Compensation

Information required by this Item 11 relating to executive compensation and other matters is incorporated by reference to the information set forth under the caption "Compensation Discussion and Analysis" and in other applicable sections of the Proxy Statement.

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

Information required by this Item 12 relating to security ownership of certain beneficial owners and management and related stockholder matters is incorporated by reference to the information set forth under the caption "Security Ownership of Certain Beneficial Owners and Management" and in other applicable sections of the Proxy Statement. Information regarding securities authorized for issuance under our equity compensation plans is incorporated by reference to the information set forth under the caption "Equity Compensation Plan Information" of the Proxy Statement.

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

Information required by this Item 13 relating to certain relationships and related transactions and director independence is incorporated by reference to the information set forth under the caption "Certain Relationships and Related Transactions" and in other applicable sections of the Proxy Statement.

ITEM 14. Principal Accountant Fees and Services

Our independent registered public accounting firm is KPMG LLP, Santa Clara, CA Auditor Firm ID: 185

Information required by this Item 14 relating to principal account fees and services is incorporated by reference to the information set forth under the caption "Principal Accountant Fees and Services" of the Proxy Statement.

PART IV

ITEM 15. Exhibits, Financial Statement Schedules

(a) The following documents are filed as part of this Report:

1. Consolidated Financial Statements

The consolidated financial statements of Calix and the report of independent registered public accounting firm thereon are set forth under Part II, Item 8 of this report.

2. Consolidated Financial Statement Schedules

All schedules have been omitted because they are not applicable, not required, not presently in amounts sufficient to require submission of the schedule, or the information required to be set forth therein is included in the consolidated financial statements or notes thereto.

3. Exhibits

The following exhibits are filed with or incorporated by reference in this report. Where such filing is made by incorporation by reference to a previously filed registration statement or report, such registration statement or report is identified in parentheses. We will furnish any exhibit upon request to: Calix Investor Relations, Thomas J. Dinges at Tom.Dinges@calix.com.

Exhibit Number	Description
3.1	Amended and Restated Certificate of Incorporation of Calix, Inc. (filed as Exhibit 3.3 to Amendment No. 7 to Calix's Registration Statement on Form S-1 filed with the Securities and Exchange Commission on March 23, 2010 (File No. 333-163252) and incorporated by reference)
3.2	Amended and Restated Bylaws of Calix, Inc. (filed as Exhibit 3.5 to Amendment No. 7 to Calix's Registration Statement on Form S-1 filed with the Securities and Exchange Commission on March 23, 2010 (File No. 333-163252) and incorporated by reference)
4.1	Form of Calix, Inc.'s Common Stock Certificate (filed as Exhibit 4.1 to Amendment No. 7 to Calix's Registration Statement on Form S-1 filed with the Securities and Exchange Commission on March 23, 2010 (File No. 333-163252) and incorporated by reference)
4.2	Description of Securities (filed as Exhibit 4.2 to Calix's Form 10-K filed with the SEC on February 21, 2020 (File No. 001-34674) and incorporated by reference).
10.1*	Calix, Inc. 2010 Equity Incentive Award Plan and related documents (filed as Exhibit 10.4 to Amendment No. 6 to Calix's Registration Statement on Form S-1 filed with the SEC on March 8, 2010 (File No. 333-163252) and incorporated by reference)
10.2	Form of Indemnification Agreement made by and between Calix, Inc. and each of its directors, executive officers and some employees (filed as Exhibit 10.5 to Amendment No. 6 to Calix's Registration Statement on Form S-1 filed with the SEC on March 8, 2010 (File No. 333-163252) and incorporated by reference)
10.3*	Offer Letter between Calix, Inc. and Carl Russo dated November 1, 2006 (filed as Exhibit 10.8 to Amendment No. 1 to Calix's Registration Statement on Form S-1 filed with the SEC on December 31, 2009 (File No. 333-163252) and incorporated by reference)
10.4*	Offer Letter by and between Calix, Inc. and Michael Weening dated May 20, 2016 (filed as Exhibit 10.1 to Calix's Form 10-Q filed with the SEC on August 3, 2016 (File No. 001-34674) and incorporated by reference)
10.5*	Letter Agreement dated November 27, 2019 by and between Calix, Inc. and Michael Weening (filed as Exhibit 10.2 to Calix's Form 8-K filed with the SEC on December 3, 2019 (File No. 001-34674) and incorporated by reference)
10.6*	Amendment to Letter Agreement dated November 12, 2020 between Calix, Inc. and Michael Weening (filed as Exhibit 10.6 to Calix's Form 10-K filed with the SEC on February 22, 2021 (File No. 001-34674) and incorporated by reference)
10.7*	Offer Letter between Calix, Inc. and Cory Sindelar dated September 28, 2017 (filed as Exhibit 10.2 to Calix's Form 10-Q filed with the SEC on August 11, 2017 (File No. 001-34674) and incorporated by reference)

Exhibit Number	Description
10.8*	Nonstatutory Inducement Stock Option Grant Notice between Calix, Inc. and Cory Sindelar dated October 1, 2017 (filed as Exhibit 10.3 to Calix's Form 10-Q filed with the SEC on August 11, 2017 (File No. 001-34674) and incorporated by reference)
10.9*	Letter Agreement dated November 27, 2019 by and between Calix, Inc. and Cory Sindelar (filed as Exhibit 10.1 to Calix's Form 8-K filed with the SEC on December 3, 2019 (File No. 001-34674) and incorporated by reference)
10.10	Net Lease Agreement by and between Calix, Inc. and Orchard Parkway San Jose, LLC dated March 9, 2018 (filed as Exhibit 10.2 to Calix's Form 10-Q filed with the SEC on May 5, 2018 (File No. 001-34674) and incorporated by reference)
10.11	First Amendment to Net Lease Agreement by and between Calix, Inc. and Orchard Parkway San Jose, LLC dated November 14, 2018 (filed as Exhibit 10.30 to Calix's Form 10-K filed with the SEC on March 1, 2019 (File No. 001-34674) and incorporated by reference)
10.12	Second Amendment to Net Lease Agreement by and between Calix, Inc. and Orchard Parkway San Jose, LLC dated December 10, 2020 (filed as Exhibit 10.12 to Calix's Form 10-K filed with the SEC on February 22, 2021 (File No. 001-34674) and incorporated by reference)
10.13*	Calix, Inc. 2019 Equity Incentive Award Plan (incorporated by reference to Appendix A to the Registrant's definitive proxy statement on Schedule 14A, filed with the SEC on April 1, 2020 (File No. 001-34674))
10.14*	Calix, Inc. 2019 Equity Incentive Award Plan - Form of Notice of Grant of Stock Option and Option Agreement (filed as Exhibit 10.14 to Calix's Form 10-K filed with the SEC on February 22, 2021 (File No. 001-34674) and incorporated by reference)
10.15*	Calix, Inc. Non-Employee Director Cash Compensation Policy, as amended May 16, 2019 (filed as Exhibit 10.1 to Calix's Form 10-Q filed with the SEC on July 25, 2019 (File No. 001-34674) and incorporated by reference)
10.16*	Calix, Inc. Non-Employee Director Equity Compensation Policy, as amended May 16, 2019 (filed as Exhibit 10.2 to Calix's Form 10-Q filed with the SEC on July 25, 2019 (File No. 001-34674) and incorporated by reference)
10.17*	Amended and Restated Employee Stock Purchase Plan effective April 24, 2020 (filed as Exhibit 10.1 to Calix's Form 10-Q filed with the SEC on July 21, 2020 (File No. 001-34674) and incorporated by reference)
10.18*	Amended and Restated 2017 Nonqualified Employee Stock Purchase Plan effective April 24, 2020 (filed as Exhibit 10.2 to Calix's Form 10-Q filed with the SEC on July 21, 2020 (File No. 001-34674) and incorporated by reference)
10.19*	Calix, Inc. Amended and Restated Executive Change in Control and Severance Plan effective March 26, 2021 (filed as Exhibit 10.1 to Calix's Form 10-Q filed with the SEC on April 27, 2021 (File No. 001-34674) and incorporated by reference)
10.20*	Calix, Inc. Non-Employee Director Cash Compensation Policy, as amended February 11, 2021 (filed as Exhibit 10.2 to Calix's Form 10-Q filed with the SEC on April 27, 2021 (File No. 001-34674) and incorporated by reference)
10.21*	Calix, Inc. Non-Employee Director Equity Compensation Policy, as amended February 11, 2021 (filed as Exhibit 10.3 to Calix's Form 10-Q filed with the SEC on July 27, 2021 (File No. 001-34674) and incorporated by reference)
10.22*	Calix, Inc. Non-Employee Director Cash Compensation Policy, as amended August 11, 2021 (filed as Exhibit 10.1 to Calix's Form 10-Q filed with the SEC on October 26, 2021 (File No. 001-34674) and incorporated by reference)
10.23*	Second Amendment to Letter Agreement between Calix, Inc. and Michael Weening dated August 11, 2021 (filed as Exhibit 10.2 to Calix's Form 10-Q filed with the SEC on October 26, 2021 (File No. 001-34674) and incorporated by reference)
21.1	Subsidiaries of the Registrant
23.1	Consent of KPMG LLP, independent registered public accounting firm
24.1	Power of Attorney (included on signature page to this Annual Report on Form 10-K)
31.1	Certification of Principal Executive Officer of Calix, Inc. Pursuant to Rule 13a-14(a) of the Securities Exchange Act of 1934
31.2	Certification of Principal Financial Officer of Calix, Inc. Pursuant to Rule 13a-14(a) of the Securities Exchange Act of 1934
32.1	Certification of Principal Executive Officer and Principal Financial Officer of Calix, Inc. Pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
101.INS	XBRL Instance Document
101.SCH	XBRL Taxonomy Extension Schema Document
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document
101.LAB	XBRL Taxonomy Extension Label Linkbase Document
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document

* Indicates management contract or compensatory plan or arrangement.

† Information in this exhibit identified by [*] is confidential and has been excluded pursuant to Item 601(b)(10)(iv) of Regulation S-K because it (i) is not material or (ii) would likely cause competitive harm to Calix if publicly disclosed.

ITEM 16. Form 10-K Summary

None.

SIGNATURES

Pursuant to the requirements 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.

			Calix, Inc. (Registrant)
Dated:	February 22, 2022	By:	/s/ Carl Russo
			Carl Russo Chairman and Chief Executive Officer (Principal Executive Officer)
Dated:	February 22, 2022	By:	/s/ Cory Sindelar
			Cory Sindelar Chief Financial Officer (Principal Financial Officer)

POWER OF ATTORNEY

Each person whose individual signature appears below hereby authorizes and appoints Carl Russo and Cory Sindelar, and each of them, with full power of substitution and re-substitution and full power to act without the other, as his true and lawful attorney-in-fact and agent to act in his name, place and stead and to execute in the name and on behalf of each person, individually and in each capacity stated below, and to file any and all amendments to this Annual Report on Form 10-K, and to file the same, with all exhibits thereto, and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing, ratifying and confirming all that said attorneys-in-fact and agents or any of them or their or his substitute or substitutes may lawfully do or cause to be done by virtue thereof.

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 indicated on February 22, 2022.

Signature	Title	Date
/s/ Carl Russo Carl Russo	Chairman and Chief Executive Officer (Principal Executive Officer)	February 22, 2022
/s/ Cory Sindelar Cory Sindelar	Chief Financial Officer (Principal Financial Officer)	February 22, 2022
/s/ Don Listwin Don Listwin	Lead Independent Director	February 22, 2022
/s/ Christopher Bowick Christopher Bowick	Director	February 22, 2022
/s/ Kathy Crusco Kathy Crusco	Director	February 22, 2022
/s/ Kevin DeNuccio Kevin DeNuccio	Director	February 22, 2022
/s/ Michael Everett Michael Everett	Director	February 22, 2022
/s/ Kira Makagon Kira Makagon	Director	February 22, 2022
/s/ Michael Matthews Michael Matthews	Director	February 22, 2022
/s/ Kevin Peters Kevin Peters	Director	February 22, 2022
/s/ J. Daniel Plants J. Daniel Plants	Director	February 22, 2022

Exhibit 21.1

SUBSIDIARIES OF THE REGISTRANT

Entity Name	Jurisdiction
Calix Network Technology Development (Nanjing) Co. Ltd.	China
Calix Networks UK, Ltd.	England, UK
CIDC Private Limited	India
Calix International, Inc.	United States
Calix Brasil Servicos Ltda.	Brazil

Exhibit 23.1

Consent of Independent Registered Public Accounting Firm

The Board of Directors
Calix, Inc.:

We consent to the incorporation by reference in the registration statements (No. 333-166245, 333-172379, 333-185025, 333-194054, 333-202496, 333-209732, 333-216323, 333-218066, 333-223637, 333-226682, 333-230023, 333-234355, 333-240106, and 333-258197) on Form S-8 and (No. 333-240105) on Form S-3 of our report dated February 22, 2022, with respect to the consolidated financial statements of Calix, Inc. and the effectiveness of internal control over financial reporting.

/s/ KPMG LLP

San Francisco, California
February 22, 2022

Exhibit 31.1

**CERTIFICATION OF PRINCIPAL EXECUTIVE OFFICER
PURSUANT TO SECTION 302 OF
THE SARBANES-OXLEY ACT OF 2002**

I, Carl Russo, certify that:

1. I have reviewed this annual report on Form 10-K of Calix, Inc. for the year ended December 31, 2021;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, 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;

   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting;

5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: February 22, 2022

/s/ Carl Russo
Carl Russo
Chairman and Chief Executive Officer
(Principal Executive Officer)

Exhibit 31.2

CERTIFICATION OF PRINCIPAL FINANCIAL OFFICER
PURSUANT TO SECTION 302 OF
THE SARBANES-OXLEY ACT OF 2002

I, Cory Sindelar, certify that:

1. I have reviewed this annual report on Form 10-K of Calix, Inc. for the year ended December 31, 2021;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, 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;

   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting;

5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: February 22, 2022

/s/ Cory Sindelar
Cory Sindelar
Chief Financial Officer
(Principal Financial Officer)

Exhibit 32.1

**CERTIFICATION OF PRINCIPAL EXECUTIVE OFFICER AND PRINCIPAL FINANCIAL OFFICER
PURSUANT TO 18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

I, Carl Russo, certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that the Annual Report of Calix, Inc. (the "Company") on Form 10-K for the fiscal year ended December 31, 2021 fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934 and that information contained in such Annual Report on Form 10-K fairly presents in all material respects the financial condition and results of operations of the Company.

Date: February 22, 2022

/s/ Carl Russo
Carl Russo
Chairman and Chief Executive Officer
(Principal Executive Officer)

I, Cory Sindelar, certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that the Annual Report of Calix, Inc. (the "Company") on Form 10-K for the fiscal year ended December 31, 2021 fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934 and that information contained in such Annual Report on Form 10-K fairly presents in all material respects the financial condition and results of operations of the Company.

Date: February 22, 2022

/s/ Cory Sindelar
Cory Sindelar
Chief Financial Officer
(Principal Financial Officer)

This certification accompanies the Form 10-K to which it relates, is not deemed filed with the Securities and Exchange Commission and is not to be incorporated by reference into any filing of Calix, Inc. under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended (whether made before or after the date of the Form 10-K), irrespective of any general incorporation language contained in such filing.