

CRAY INC
Form 10-K
February 12, 2019
UNITED STATES SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K

☒ ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the Fiscal Year Ended December 31, 2018

☐ 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: 000-26820

CRAY INC.

(Exact Name of Registrant as Specified in Its Charter)

Washington 93-0962605

(State or Other Jurisdiction of (I.R.S. Employer

Incorporation or Organization) Identification No.)

901 Fifth Avenue, Suite 1000 98164

Seattle, Washington (Zip Code)

(Address of Principal Executive Offices)

Registrant's telephone number, including area code:

(206) 701-2000

Securities Registered Pursuant to Section 12(b) of the Act:

Title of Each Class	Name of Each Exchange on Which Registered
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Common Stock, \$0.01 par value	Nasdaq Stock Market LLC
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Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act:

Yes ☒ No ☐

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act: Yes ☐ No ☒

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days: Yes ☒ No ☐

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

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§ 229.405 of this chapter) is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. ☒

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, 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 is a shell company (as defined in Rule 12b-2 of the Act). Yes ☐ No ☒

The aggregate market value of the Common Stock held by non-affiliates of the registrant as of June 30, 2018, was approximately \$976,274,271 based upon the closing price of \$24.60 per share as reported on June 30, 2018, on The Nasdaq Global Market.

As of February 7, 2019, there were 40,890,189 shares of Common Stock issued and outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the Proxy Statement to be delivered to shareholders in connection with the registrant's Annual Meeting of Shareholders to be held on or around June 11, 2019, are incorporated by reference into Part III.

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Cray, ClusterStor, DataWarp, Sonexion, and Urika are registered trademarks of Cray Inc. in the United States and other countries. The CS and XC families of supercomputers, Chapel, CS-Storm, Shasta, Slingshot, and other Cray technologies are all trademarks of Cray Inc. This annual report on Form 10-K contains additional trade names, trademarks, and service marks of other companies that are the property of their respective owners.

Forward-Looking Statements

This annual report on Form 10-K contains forward-looking statements that involve risks and uncertainties, as well as assumptions that, if they never materialize or if they prove incorrect, could cause our actual results to differ materially from those expressed or implied by such forward-looking statements. Forward-looking statements are based on our management's beliefs and assumptions and on information currently available to them. In some cases you can identify forward-looking statements by terms such as "may," "will," "should," "could," "would," "expect," "plans," "anticipates," "believe," "continue," "estimates," "projects," "predicts", "likely", "forecast" and "potential" and similar expressions, but the absence of such words does not mean that a statement is not forward-looking. All statements other than statements of historical fact are statements that could be deemed forward-looking statements, and examples of forward-looking statements include any projections of earnings, revenue or other results of operations or financial results; any statements of the plans, strategies, objectives and beliefs of our management; any statements concerning proposed new products, technologies or services such as our next generation "Shasta" system; any statements regarding potential new markets or applications for our products or our ability to sell into any market or to any customer; any statements regarding the effects of the acquisition of Seagate's ClusterStor line of business; any statements regarding technological developments or trends; any statements regarding future research and development or co-funding for such efforts; any statements regarding future market and economic conditions; any statements regarding the expected vesting of our performance-based equity awards; and any statements of assumptions underlying any of the foregoing. These forward-looking statements are subject to the safe harbor created by Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended, or the Exchange Act. Our actual results could differ materially from those anticipated in these forward-looking statements for many reasons, including the risks faced by us and described in Item 1A. Risk Factors in Part I and other sections of this report and our other filings with the U.S. Securities and Exchange Commission, or SEC. You should not place undue reliance on these forward-looking statements, which apply only as of the date of this report. You should read this report completely and with the understanding that our actual future results may be materially different from what we expect. We assume no obligation to update these forward-looking statements, whether as a result of new information, future events, or otherwise, except as otherwise required by law.

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PART I

Item 1. Business

General

At Cray, we believe the questions visionaries pose are a force for discovery, especially those that challenge the limits of possibility. For decades, we have partnered with these visionaries, arming them with advanced and creative supercomputing capabilities so they can question, investigate, and, ultimately, shape the future.

As we look ahead, we see opportunities at the convergence of data and discovery—where artificial intelligence (AI) and data analytics unite with supercomputing. We believe Cray is uniquely positioned at this intersection to partner with visionaries who aspire to turn insight into application and discovery into disruption.

Our focus is on the design, development, manufacture, marketing, and servicing of computing products that magnify and enhance human capital, foster discovery and innovation, and create scientific break-throughs, as well as competitive advantages. That means our products are aimed primarily at the high end of the high-performance computing (HPC), data analytics, and AI markets—the segments populated by the pioneers, executives, and entrepreneurs leading their industries in both the public and private sectors. These products include compute systems commonly known as supercomputers, as well as high-performance storage, data analytics, and AI solutions. We offer them individually, integrated into a complete solution, or hosted in the cloud, depending on a customer's needs. We also provide related software and system maintenance, support, and engineering services.

We provide solutions based on four main models: (1) tightly integrated supercomputing designed throughout for scalability and sustained performance; (2) customizable cluster supercomputing based on highest-performance, industry-standard components; (3) robust high-performance storage solutions; and (4) integrated solutions for graph analysis, large-scale analytics, and AI applications.

Close customer partnerships are fundamental to our business. The questions driving our customers' work inform our product direction and, in turn, our products combined with our customer engagement enable users to ask the next, more complex questions to investigate, discover, and further their efforts. To facilitate customer success, we also provide customized service from installation to 24x7 on-site support. Our customers include domestic and foreign governments and government-funded entities, academic institutions, and commercial companies.

Our continuing strategy is to gain market share by extending our technology leadership and differentiation, as well as expanding our addressable market in areas where we can leverage our experience and technology, such as in AI applications and data analytics. Underpinning this strategy is our focus on understanding our customers' needs and building products that continually extend their capabilities.

As computing continues to scale higher, we firmly believe that many of tomorrow's greatest challenges will be solved with a combination of our partners' creative ingenuity and our supercomputing expertise.

Overview

Huge growth in data volumes and data complexity, the development of advanced algorithmic techniques, and increased time-to-value requirements are driving the need for supercomputing-class architectures. We believe that our experience building some of the largest supercomputers in the world has positioned us to address the data analytics and fast-growing AI markets with products that apply supercomputing technologies to solve the most challenging use cases at scale.

Our supercomputing products span a broad performance spectrum and address the critical computing resource challenges HPC users face today: achieving massive scaling to tens of thousands of processors, ease of use for increased productivity, and very high levels of sustained performance on applications. We achieve this by partnering with users to understand what is limiting them and then designing and integrating supercomputers that help clear those obstacles. Our systems combine highly capable processors, high-speed interconnect technology, and innovative packaging to address increased thermal requirements driven by density and processor power requirements, upgradability, energy efficiency, and system reliability. In addition, our robust HPC-optimized software environment enhances performance, productivity, and manageability at supercomputing scale across a variety of computing technologies.

Our storage and data management products include integrated data storage solutions designed to support systems requiring the high performance requirements needed for supercomputing and data-intensive workloads. These

solutions leverage years of experience delivering high-performance parallel storage and file systems to leading-edge customers. With our storage solutions,

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users can also rapidly deploy highly scalable and extremely fast file systems that integrate with supercomputer and cluster computing solutions from both Cray and third-party HPC vendors.

Products, Services and Customer Support

We concentrate on building product solutions in two major markets: the supercomputing portion of the HPC market and the high-end of the big data market, including storage and AI solutions. We also provide related software and system maintenance, support, and engineering services that leverage our intimate understanding of our customers and their requirements.

Cray Supercomputing Systems

Today, HPC customers who require the highest levels of scaling and performance choose our Cray XC series supercomputer. The XC series provides optimized compute density, an HPC-integrated software stack, and sustained performance at scale for customers' computing needs. For systems that emphasize flexibility, capacity, custom design, and integration for compute-intensive needs, customers choose our Cray CS series cluster supercomputers, which include our CS500 and CS-Storm systems.

Our supercomputing roadmap, including our next generation "Shasta" system, is designed to take us from today's computational demands to the exascale era (where systems will have exaflops performance, or a billion billion calculations a second—1,000 times faster than the petascale systems that were first introduced only about a decade ago). Our products will continue to integrate diverse technologies into a unified architecture enabling customers to match the computational solution to their desired outcome.

Cray XC Series Supercomputer. The Cray XC series supercomputer is our highly integrated supercomputing system. It provides extreme scale, sustained performance, and heterogeneous computational resources through the combination of processor options, the Aries interconnect and its unique Dragonfly network topology, our fully integrated software environment, and innovative power and cooling technologies. A single Cray XC system can run both a highly scalable custom workload and an industry-standard, independent software vendor (ISV) workload. The Cray XC series supercomputer has the following software features to handle challenging applications: the Cray Linux Environment, a suite of high-performance software optimized over more than a decade; powerful compiler, runtime, and related software leveraging the underlying hardware components; many optimized applications, such as Fortran and C++ applications, applications written in languages such as Python and Scala, as well as Cray's Chapel parallel programming language; and the ability to run applications natively or leverage container technologies. Cray XC users can also run analytics and AI workloads alongside modeling and simulation workloads, using our Urika-XC analytics software, familiar system tools, and schedulers.

The Cray XC50 supercomputer supports the newest generation of processors—Intel x86 processors, Marvell ARM-based processors, and NVIDIA GPUs—which, coupled with the Aries network and Cray's HPC-optimized software stack including the Cray Linux Environment and Cray Programming Environment, deliver our fastest system with peak system performance of up to 500 petaflops (PF) and 1 PF in a single cabinet.

The Cray XC50-AC air-cooled supercomputer offers all the benefits of the Cray XC50 system in a smaller form factor. Like the Cray XC system, it supports the newest generation x86 processors, ARM-based processors, and GPUs. The XC50-AC can deliver up to 236 teraflops peak performance in a 24" cabinet with no requirement for liquid cooling or extra blower cabinets.

Cray CS500 Cluster Supercomputer. The Cray CS500 cluster supercomputing system is a modular, highly scalable, high availability platform designed for a broad range of workloads in an industry standard form factor. It offers an energy-efficient, air-cooled architecture and comes integrated with a comprehensive and easy to manage HPC software stack, software tools compatible with most open source and commercial compilers, tools, schedulers, and libraries. It supports Cray and third-party systems management software solutions.

Cray CS-Storm Accelerated GPU Supercomputer. The CS-Storm supercomputer employs GPUs in a high-density architecture to deliver industry-leading performance, density, and energy efficiency. The CS-Storm 500NX system supports up to eight GPUs connected by the NVIDIA NVLink high-speed network. The CS-Storm 500GT maximizes network bandwidth with up to four network links per node with up to 10 GPU or field-programmable gate array (FPGA) cards per node all running at full power. CS-Storm configurations feature the same HPC software environment as the CS500 cluster system and Urika-CS AI and analytics software making them machine and deep

learning ready.

Shasta: Exascale-Class Supercomputing. We expect the continued advancement of many-core and accelerator processors, the increasing diversity of processor architectures, and the changing memory and storage hierarchy to be advantageous trends for Cray. They complement our strengths in networking, scaling, system software, and cooling and power management technologies. The growing number of cores on each processor continues to amplify scaling issues, and accelerators or coprocessors will further

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stress the system’s communications network. We believe our balanced approach to system design and support for innovative parallel programming methodologies will become increasingly critical to capitalize on the benefits of many-core processing.

In November 2018, we announced our future exascale-class supercomputer product line, the next generation system code-named Shasta, expected to be commercially available in the fourth quarter of 2019. This system will represent an entirely new design and is set to be the technology that underpins the next era of supercomputing—an era characterized by exascale performance capability, new data-centric workloads, and an explosion of processor architectures.

With Shasta, we expect to further realize our long-time vision of adapting supercomputing systems to workloads using optimized processing and networking. The system represents sweeping innovations in hardware and software, incorporating our proprietary next-generation Cray system software to enable modularity and extensibility, a new Cray-designed interconnect, unparalleled flexibility in processing choice within a system, and a software environment that provides for seamless scalability.

Fundamental to Shasta’s exascale capability is Slingshot, our new high-speed, purpose-built supercomputing interconnect. Slingshot will have up to five times more bandwidth per node than our current highly successful Aries network and is designed for data-centric computing. It will feature Ethernet compatibility, advanced adaptive routing, first-of-a-kind congestion control, and sophisticated quality-of-service capabilities.

Workloads today are rapidly evolving, making it difficult to choose the optimal architecture. Shasta is expected to meet the rising demand for single systems to handle converged modeling, simulation, AI, and analytics workloads with a data-centric design that allows it to run diverse workloads and workflows, all at the same time. It will eliminate the distinction between clusters and supercomputers with a single supercomputing system architecture that offers significant flexibility.

Any processor choice—or heterogeneous mix—will be able to be incorporated with a single management and application development infrastructure. Customers will be able to flex from single to multi-socket processor nodes, GPUs, FPGAs, and other processing options that will emerge, such as AI-specialized accelerators, in the same system. Shasta will also allow for interconnect choices with those from Cray (Slingshot), Intel (Omni-Path), or Mellanox (InfiniBand). The Shasta systems’ hardware and software innovations tackle bottlenecks, manageability, and job completion issues that emerge or are magnified as core counts grow, compute node architectures proliferate, and workflows expand to incorporate AI at scale.

Software

Core to our supercomputing leadership is our proprietary Cray software. We have extensive experience designing, developing, and adapting system software as an integral aspect of our product portfolio and distributing that software as part of system sales. This system software includes the operating system, system management, optimized data management, movement and analysis, and programming environment. Our software research and development expertise includes operating system optimizations and scalable hardware control, monitoring and management, including power control, monitoring of environmental data, and hardware diagnostics. Our integrated system software together provides reliability, availability, and serviceability (RAS) for Cray systems. The Cray programming environment includes our own and commercially available third-party compilers, communication and scientific libraries, as well as a rich suite of application development tools and software designed for maximizing application performance. We believe this suite of products provides Cray with a competitive advantage and allows us more flexibility in adopting new processing technologies as they become available.

Cray Analytics and AI Products

Cray Urika-XC and Urika-CS Analytics and AI Software Suites. The Cray Urika software suites extend the use of Cray supercomputers to the world of big data analytics and AI. These suites include Cray-developed libraries to intelligently optimize machine learning model settings, widely used tools and frameworks such as the Apache Spark and Hadoop for big data processing, popular Python-based tools (Anaconda and distributed Dask), and open source deep-learning frameworks (TensorFlow, PyTorch, Keras, Horovod, and others) to take advantage of the performance and scale of Cray XC and Cray CS series supercomputers.

The Urika-XC software suite includes an implementation of what we believe is the world’s most scalable graph database—the Cray Graph Engine. With the Cray Graph Engine, customers can tackle multi-terabyte datasets comprised

of billions of objects to uncover hidden relationships in even the noisiest of data. It can run in conjunction with open analytics tools, enabling users to build complete end-to-end analytics workflows and avoid unnecessary data movement.

Cray Storage and Data Management Products

Cray ClusterStor Storage Systems. Our flagship storage product line, the Cray ClusterStor HPC storage system, embeds the Lustre parallel file system and other software in an optimal configuration to reduce deployment time and total cost of ownership while increasing reliability, capacity, and performance. ClusterStor systems offer an optimal combination of modular scaling

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capacity from terabytes to petabytes and sustained input/output (I/O) performance to over one terabyte per second in a single file system. ClusterStor systems are engineered to be installed and put into production more quickly than other HPC storage solutions and can be attached to Cray XC and Cray CS series systems, as well as industry-standard Linux clusters. Together with ClusterStor storage, we offer storage management software.

Cray View for ClusterStor. Cray View for ClusterStor addresses the challenges in understanding and diagnosing storage performance problems. As the industry's most comprehensive Lustre storage performance analysis application, Cray View for ClusterStor enables administrators to get the insight they need to maximize their resources, optimize system throughput, and provide users with the best results and experience. The application features job runtime variability for real-time and historical views of data, event correlation, trend analysis, and customized alerts all from a single view.

Cray DataWarp Applications Accelerator. Our DataWarp technology addresses a key problem experienced by supercomputing customers: disk-based storage I/O has not been able to keep up with improvements in processor performance and delivering sustainable performance on a spectrum of applications with varying I/O-intensive workloads has become costly and impractical. DataWarp provides a new tier of storage featuring solid-state drives (SSD) and software that is tightly integrated with Cray XC series supercomputing resources. DataWarp supports high application I/O requirements while reducing overall application computing time for I/O-intensive workloads.

Production customers have increased the I/O bandwidth of their production supercomputing systems by over two times, enhancing their ability to make scientific discoveries faster.

Customer Support

Our worldwide customer support organization delivers the "Cray experience." This unique, high-quality support relationship gives us a competitive advantage and plays an important role in our ability to maintain long-term customer relationships. Support services are important to our customers and, in many cases, we locate our support personnel at or near customer sites globally, supported by a central service organization. Our support services include hardware and software maintenance in support of our systems, applications support, installation project management, system installation and de-installation, site preparation, and technical training for our systems. In addition, we offer ancillary services in application consulting, third-party software support, site engineering, on-site analysts for defined projects, and specialized training. Our support arrangements generally provide for support services on an annual basis, although many cover multiple years. While most customers pay for support on an annual basis, others pay on a monthly, quarterly, or multi-year basis. Typically, customers may select levels of support and response times ranging from delivery of parts only to 24x7 coverage with two-hour response times.

Sales and Marketing

We focus our sales and marketing activities on both horizontal and vertical marketing activities ranging from government agencies or government-funded research laboratories to academic institutions and commercial entities requiring HPC, big data systems, and storage. Cray has a bi-modal sales model. We offer solutions through a highly-trained direct sales force operating throughout North America, South America, Asia, Europe, the Middle East, Australia, and Africa. More than half of our sales force is located in the United States and Canada, with the remainder overseas. Cray also sells its systems and technology through a growing network of authorized partners, which currently include Sirius Computer Solutions Inc. and World Wide Technology, while Hewlett Packard Enterprise, Dell Inc., and Atos/Bull are among authorized ClusterStor resellers.

A formal request-for-proposal process for HPC systems or technology drives a majority of our large systems sales and engineering service engagements in the academic and government markets. We utilize pre-sales technical experts to develop technical proposals that meet customer requirements and benchmarking teams to demonstrate the advantages of our particular supercomputing and storage products or services being proposed. For a majority of our larger sales opportunities, the proposal process, including establishing system size, options, pricing, and other commitments, involves a number of resources outside of our sales organization. While we often tailor our supercomputer (including cluster) solutions for individual customers, there is substantial commonality in the underlying components and systems, allowing us to leverage manufacturing and supply chain operations.

Government agencies and government-funded scientific research institutions around the world comprise a large portion of our customer base. We actively manage our relationship with U.S. government agencies and Congress.

Manufacturing and Supply Chain

We subcontract the manufacture of a majority of the hardware sub-assemblies and certain components for our high-end products and custom-engineered systems, including integrated circuits, printed circuit boards, storage enclosures, connectors, cables, and power supplies, on a sole or limited source basis to third-party suppliers. We use contract manufacturers to assemble certain components. Our manufacturing strategy currently centers on build-to-order systems, focusing on obtaining competitive

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assembly and component costs while concentrating our resources on the high-value components, final assembly, test, and quality assurance stages to ensure a positive customer experience. This strategy allows us to avoid the large capital commitment and overhead associated with establishing full-scale manufacturing facilities; helps us to maintain the flexibility to adopt new technologies as they become available without the risk of equipment obsolescence; provides near real-time configuration changes to exploit faster and/or less expensive technologies; and, provides a higher level of large scale system quality. Our manufacturing personnel are located in Chippewa Falls, Wisconsin. Our systems designed for the supercomputer market segment and our custom-engineered solutions incorporate components that are available from single or limited sources, often containing our design input or proprietary designs. Such components include integrated circuits, interconnect systems, and certain memory devices. Prior to the development of a particular product, components are typically competitively bid to a short list of technology partners. The technology partner that provides the highest value solution for the component is often awarded the contract for the life of the component. Once we have engaged a technology partner, changing our product designs to utilize another supplier's standard or custom components can be a costly and time-consuming process. We also have sole or limited sources for less critical components, such as peripherals, power supplies, cooling, and chassis hardware. We obtain key processor components from Intel, NVIDIA, AMD, Marvel, and other vendors from time to time for our Cray XC and cluster systems. We have a license for the Aries interconnect chip that we developed but later transferred to Intel that we purchase from Broadcom Corporation (formerly Avago) that contracts with Taiwan Semiconductor Manufacturing Company for the manufacture of the application specific integrated circuit (ASIC). Our procurements from these vendors are primarily through purchase orders. We have chosen to deal with sole sources in specific cases due to the availability of specific technologies, economic advantages, and other factors. Reliance on single or limited source vendors involves several risks, including the possibility of shortages of key components, long lead times, reduced control over delivery schedules, design or persistent quality issues, and changes in direction by vendors. We have been adversely affected by delays in obtaining qualified competitive components previously.

Our Markets

Our key target markets are (i) the supercomputing portion of the HPC market and (ii) the big data market, encompassing high-end analytics, storage, and AI markets. High performance, real-time analytics and machine learning on large volumes of data is developing into an important success driver for business, government, and academia, and successfully addressing this market is important to our future success. Several of our core strengths and technologies, such as the abilities to process vast amounts of unique data at very high speeds and to drive faster time to actionable insights, are demonstrated capabilities of our supercomputing solutions. Bringing these technologies to market is core to our ability to address anticipated and emerging analytics and AI challenges, enabling us to bring highly differentiated analytics offerings to market. Our target markets are as follows:

- Scientific Research.** Scientific research includes government research laboratories and research universities around the world. In the United States, the Department of Defense, through its High Performance Computing Modernization Program, funds a number of research organizations that are our target customers. The Office of Science in the Department of Energy and its laboratories are key customers, as are the National Science Foundation and the National Aeronautics and Space Administration and similar agencies around the world. These research centers also provide supercomputing and big data resources to their affiliated organizations (such as the Department of Defense contractors) and industrial partners.
- National Security.** Classified work in various worldwide government agencies has represented an important market for us over many years. Certain U.S. government departments have on occasion provided funding support for our research and development efforts to meet their objectives. Current and potential customers include a number of Department of Defense-related classified organizations, the National Nuclear Security Administration of the Department of Energy, and analogous foreign counterparts who have interest in our full range of products.
- Defense.** The defense segment has wide-ranging needs for HPC systems that in some ways are unique and in other ways are similar to our other market segments. HPC systems can assist in the development of defense technologies, equipment, and secure communications infrastructure, as well as in the identification and analysis of military intelligence. Intelligence supports real-time development of defense strategy and decision making, while technology advancements are necessary to maintain military advantages, including deterrents, and to protect the warfighter.

•Earth Sciences. Weather forecasting and climate modeling applications require increasing speed and larger volumes of data. Forecasting models and climate applications have grown increasingly complex with an ever-increasing number of interactive variables, making improved supercomputing, analytics, and storage capabilities increasingly critical. We have a number of customers running weather and climate applications, including customers in Germany, the United Kingdom, South Korea, Brazil, Switzerland, Singapore, Denmark, Finland, India, Spain, Canada, Japan, Australia, New Zealand, and the United States.

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- Energy. Supercomputing in the energy sector is driven largely by oil and gas exploration and processing, from seismic analysis to reservoir simulations. The simulation methods used often require high performance networks and storage subsystems. We currently have commercial customers utilizing both our systems and storage solutions in production.
- Financial Services. Analytics and supercomputing systems are providing competitive advantage in areas as disparate as trading, compliance, marketing optimization, and risk analysis. Financial services applications are very time sensitive, so high performance data analytics solutions are highly sought after.

- Life Sciences. The life sciences industry has demanding data and simulation requirements that test the limits of HPC and big data systems. In the life sciences, HPC methods cover a vast area ranging across modeling systems from the molecular level to the whole cell, next-generation genomic sequencing, and healthcare optimization. Machine learning and analytics are key to making sense and creating insight in the enormous volumes of data being generated. Our solutions can help discover new relationships that can allow existing drugs to help address new medical issues. Our customers are utilizing our products and solutions across these ranges of use cases today.

- Manufacturing. Supercomputers are used to design lighter, safer, and more durable vehicles, study wind noise and airflow around vehicles, improve airplane flight characteristics, and, in many other computer-aided engineering applications, to improve time-to-market and product quality. We currently have aerospace, automotive, and manufacturing customers around the globe that are actively using our HPC and big data solutions.

- Emerging Markets. The rise of analytics and AI across industries has resulted in growing interest in Cray supercomputers. AI is rapidly becoming the next major driver in the HPC market. Deep learning and machine learning, both subsets of AI, are specific use cases within the broader advanced analytics space. Scientific computing is a natural area for both identifying and driving a broader set of deep learning-enabled applications. Further, deep learning core computational motifs are rooted in linear algebra and mathematical optimization, which map well to long-standing focus areas for systems research within the HPC community. Finally, several use cases in scientific data analysis typically require large-scale pattern recognition on multi-dimensional image and time series datasets, and machine learning and deep learning are emerging as valuable tools to handle these use cases. Deep learning applications run at scale on the Cray XC series and Cray CS series supercomputers.

Sales to the United States federal government (U.S. Government) and system acquisitions primarily funded by the U.S. Government accounted for approximately 28%, 53%, and 47% of our total revenue in 2018, 2017, and 2016, respectively. Significant customers with over 10% of our annual total revenue were the U.S. Government and an energy customer in 2018, the U.S. Government and a foreign weather center in 2017, and the U.S. Government and a foreign weather center in 2016.

Competition

The broad HPC market is very competitive and competes on the basis of a number of factors, including product performance, scalability, breadth of features, price, and total cost of ownership. Many of our competitors are established, well-known companies in the HPC market, including HPE, IBM, Lenovo, Dell/EMC, Huawei, NEC, Hitachi, Fujitsu, and Atos-Bull. We also compete with systems builders and resellers of systems that are constructed from commodity components using processors manufactured by Intel, NVIDIA, AMD, and others. IBM, Intel, NEC, and Fujitsu also build systems leveraging their own processors. In addition, certain Chinese companies are investing significantly in HPC and are becoming more aggressive and competitive in the HPC global arena. Our competitors include the previously named companies as well as smaller companies that assemble systems from commercially available commodity products. The Cray CS500 and CS-Storm supercomputing cluster products are designed to help us better address this market by providing flexible HPC alternatives with competitive pricing. To the extent that Intel, AMD, NVIDIA, IBM, and other processor suppliers develop processors or networks with greater capabilities or at lower cost than the processors we use in our products at any given time, including from Intel, AMD, Marvell, and NVIDIA, our systems may be at a competitive disadvantage to systems utilizing such other processors.

The competitive landscape in the big data, AI, and analytics market is quite varied, with competition from vendors offering integrated solutions, such as IBM, commodity cluster systems with either open source or proprietary machine learning and data analytics software, traditional business intelligence vendors, such as Teradata, Oracle, IBM, SAS, and SAP, and offerings from cloud providers. In particular, the AI market is nascent and rapidly evolving. Early adopters who are now deploying large, mission-critical AI and analytics problems have discovered that commodity or

cloud-based approaches do not scale or deliver results in an acceptable timeframe and have recognized the advantages of tightly integrated solutions. Our Cray Urika-XC and Urika-CS AI and analytics software suites, combined with our Cray XC and CS platforms—which compete primarily on the basis of performance, scalability, integration, and total cost of ownership—are an alternative for users at all scales.

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Our storage products compete with a number of manufacturers and integrators of parallel storage solutions, including IBM with its Spectrum Scale parallel file system, as well as solutions from Data Direct Networks, Lenovo, NetApp, Dell EMC, and other storage companies. The parallel storage and file system market is currently fragmented with several competing providers in the HPC marketplace. We believe that our strong storage products, along with our extensive experience and excellent reputation as an HPC systems vendor, compete effectively against our competition, especially when the prospective target market overlaps with our HPC systems target market.

Intellectual Property

We attempt to protect our trade secrets and other proprietary rights through formal agreements with our employees, customers, suppliers and consultants, and others who may have access to such information. Although we intend to protect our rights vigorously, there can be no assurance that our contractual and other security arrangements will be successful.

Our general policy is to seek patent protection for those inventions and improvements that give us a competitive advantage and are likely to be incorporated into our products and services. We have a number of patents and pending patent applications relating to our hardware and software technologies. While we believe our patents and applications have value, no single patent or group of patents is in itself essential to us as a whole or to any of our key products. Any of our proprietary rights could be challenged, invalidated, or circumvented and may not provide significant competitive advantage.

We have licensed certain patents and other intellectual property from others in our industry. These licenses often contain restrictions on our use of the underlying technology. We have also entered into cross-license arrangements with other companies involved in the HPC industry.

Employees

As of December 31, 2018, we had 1,287 employees. We have no collective bargaining agreement with our employees. We have not experienced a work stoppage and believe that our employee relations are very good.

Corporation Information

We were incorporated in the State of Washington in December 1987 under the name Tera Computer Company. We changed our corporate name to Cray Inc. in connection with our acquisition of the Cray Research, Inc. operating assets from Silicon Graphics, Inc. in 2000. Our corporate headquarters are located at 901 Fifth Avenue, Suite 1000, Seattle, Washington 98164. Our telephone number is (206) 701-2000 and our website address is www.cray.com. The contents of our website are not incorporated by reference into this annual report on Form 10-K or our other SEC reports and filings.

Available Information

Our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, and amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Exchange Act are available free of charge at our website at www.cray.com as soon as reasonably practicable after we file such reports with the SEC electronically. The SEC maintains an internet site that contains reports, proxy and information statements, and other information regarding issuers that file electronically with the SEC at www.sec.gov. In addition, we have set forth our Code of Business Conduct, Corporate Governance Guidelines, the charters of the Audit, Compensation, Corporate Governance, and Strategic Technology Assessment Committees of our Board of Directors, and other governance documents on our website, www.cray.com, under “Company – Investors – Corporate Governance.” The contents of our website are not incorporated by reference into this annual report on Form 10-K or our other SEC reports and filings.

Item 1A. Risk Factors

In addition to the other information contained in this annual report on Form 10-K, you should carefully read and consider the following risk factors. If any of these risks occur, our business, financial condition, or operating results could be materially adversely affected and the trading price of our common stock could decline. Additional risks and uncertainties not presently known to us or that we currently believe are not material may also impair our business, financial condition, or operating results.

Our operating results fluctuate significantly and we may not achieve profitability in any given period. Our operating results are subject to significant fluctuations which make predicting revenue and operating results for any specific period very difficult, particularly because a material portion of product revenue recognized in any given quarter or

year typically depends on a limited number of system sales expected for that quarter or year and product revenue generally depends on the timing of product acceptances by customers and contractual provisions affecting revenue recognition. Receiving less than anticipated customer orders, delays in achieving customer acceptances of installed systems, and recognizing revenue from a product transaction or

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transactions due to development or product delivery delays, customer site readiness delays, unexpected manufacturing delays or defects, not receiving components on time or at competitive prices, not receiving components with anticipated quality and performance, the inability of a system to meet performance requirements or targets, or other contractual obligations, among other factors, could have a material adverse effect on our operating results in any specific quarter or year, such as by reducing or delaying associated revenue, gross profit, and cash receipts from one quarter to another, or even from one year to another, particularly in the case of revenue expected to be realized in the fourth quarter of any year, as has happened in the past. In addition, because our revenue can be concentrated in particular quarters, often the fourth quarter, we generally do not expect to sustain profitability over successive quarters even if we are profitable for the year.

Although we recorded positive annual net income between 2010 and 2016, we recorded a net loss in 2017 and 2018, and expect a net loss in 2019, and may well experience a net loss in any future year in addition to quarterly losses. Net income may fluctuate significantly as a result of many factors, including as a result of reduced revenue, gross margins, or significant investments we may make to grow our business which often require many years to come to fruition and may not be realized when expected, if at all. For example, we have incurred and anticipate continuing to incur significant expenditures in connection with ongoing investments in research and development. Due to the inherent difficulty in estimating costs associated with projects of this scale and nature, certain of the costs associated with these potential projects may be higher than estimated and it may take longer than expected to complete, if at all. In addition, while we were profitable in 2016, our revenue declined year over year in both 2016 and 2017, and our profitability declined year over year in 2016, 2017, and 2018, substantially driven by a slow-down in the segments of the high-end of the supercomputing market that we target. While we grew our revenue year over year in 2018, it is uncertain whether or when we will realize any significant benefit from a rebound in the segments of the high-end of the supercomputing market that we target or how strong or long-lived such a rebound will be.

Whether we will be able to increase our revenue and achieve and sustain profitability on a quarterly and annual basis depends on a number of factors, including:

- our ability to secure sufficient orders at high enough gross margins for our Cray XC, Cray CS, and next generation Cray Shasta systems as well as upgrades and successor systems;
- successfully delivering and obtaining sufficient customer acceptances of ordered systems, including attached storage systems;
- our ability to deliver upgraded or new systems in a timely manner, such as our ability to deliver our next generation Shasta systems by the fourth quarter of 2019, as currently planned;
- revenue delays or losses due to customers postponing purchases as a result of delays in available budgets or waiting for the availability of future processors or upgraded or new systems, such as our next generation Shasta systems;
- longer than expected customer acceptance cycles or penalties resulting from system acceptance issues;
- our ability to successfully generate revenue and profitability from sales of our storage, data analytics, and AI solutions;
- our ability to successfully and timely design for, procure, and integrate competitive processors for our Cray XC, Cray CS, and next generation Cray Shasta systems and upgrades and successor systems;
- our expense levels, including research and development expense;
- our ability to secure additional government funding for future development projects;
- our ability to continue to broaden our customer base beyond our traditional customers;
- the level of product gross profit contribution in any given period due to volume, competition, or product mix, particularly with the introduction of flexible commodity-based supercomputers, competitive factors, strategic transactions, product life cycle, currency fluctuations, tariffs, acceptance penalties, and component costs;
- the level of revenue recognized in any given period, which is affected by the very high average sales prices and limited number of significant system sales and resulting potential acceptances in any quarter, the timing of product orders and acceptances by customers, and contractual provisions affecting the timing and amount of revenue recognition;
- the competitiveness of our products, services, and prices;

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maintaining and successfully completing our capital and product development projects on schedule and within budgetary limitations;

our ability to resolve and the costs incurred in connection with any actual or alleged issues with our products, including third-party components of such products, such as those that relate to product defects, such as the recent “Meltdown” and “Spectre” processor vulnerabilities or intellectual property rights;

the level and timing of maintenance contract renewals with existing customers;

our ability to efficiently scale our internal processes to meet necessary peak requirements and growth in our business; and

the terms and conditions of sale or lease for our products and services.

The receipt of orders and the timing of shipments and acceptances impacts our quarterly and annual results, including cash flows, and is affected by events outside our control, such as:

whether or when we will realize any significant benefit from a rebound in the segments of the high-end of the supercomputing market that we target or how strong or long-lived such a rebound will be;

the timely availability of acceptable components, including, but not limited to, processors and memory, in sufficient quantities to meet customer delivery schedules and other customer commitments at a competitive cost and the identification of issues with already-delivered components, including processors, that require remediation and/or impact the performance of our products;

the timing and level of government funding and resources available for product acquisitions and research and development contracts, which have been, and may continue to be, adversely affected by the current global economic and fiscal uncertainties, increased governmental budgetary limitations, and disruptions in the operations of the United States and other governments as has recently occurred;

competitor and supplier pricing strategies;

declining U.S. relations with foreign entities, including between the U.S. government and foreign governments, may make it more difficult or more expensive to sell U.S.-manufactured or U.S.-designed systems to those entities of governments, or in those countries;

currency fluctuations, international conflicts or economic crises, and fluctuations in oil prices that can affect the resources available to potential customers to purchase products;

the introduction or announcement of competitive or key industry supplier products;

- price fluctuations or product shortages in the processors and other commodity electronics and memory markets;

the availability of adequate customer facilities to install and operate new Cray systems;

general economic trends, including changes in levels of customer capital spending; and

our customers’ ability to make future payments in accordance with contractual terms of their purchase or sales-type lease agreements.

Because of the numerous factors affecting our operating results, we may not achieve profitability on a quarterly or annual basis in the future. We anticipate that our quarterly results will fluctuate significantly, and include losses, even in years where we expect or achieve positive annual net income. The timing of availability of acceptable third-party components, product development, receipt of orders and product acceptances, issues with third-party component performance or reliability, reductions in outside funding for our research and development efforts, a reduction in the size in the segments of the high-end of the supercomputing market that we target, the level and timing of approved government fiscal budgets, and achieving contractual development milestones have had a substantial adverse effect on our past results and are expected to continue to have such an effect on our operating results in 2019 and in future years.

Our business could be adversely affected by conditions affecting the HPC market. A substantial portion of our business depends on the demand for HPC products by the U.S. Government and foreign government customers and large enterprises, and we are dependent upon the overall economic health of the high-end of the supercomputing market, and on a relatively small number

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of customers that make up that market. Demand for our products and services depends substantially upon the general demand for supercomputers and associated services, as well as technological needs in the data analytics, AI, and storage markets, which fluctuate based on numerous factors, including large-system purchase cycles, capital spending levels, and growth of our current and prospective customers. Moreover, the purchase of our products is often discretionary and may involve a significant commitment of capital and other resources. As a result, spending priorities for our current and future customers may vary and demand for our products and services may also fluctuate. For instance, while we were profitable in 2016, our revenue declined year over year in both 2016 and 2017 and our profitability declined year over year in 2016, 2017, and 2018, substantially driven by a slow-down in the segments of the high-end of the supercomputing market that we target. While we believe that we have seen early signs of a recovery in the market, we believe that these segments of the market continue to be down from past years. It is uncertain whether or when these segments will recover fully from this downturn. While we believe that the market's long-term growth drivers remain intact, there is no assurance that these markets will continue to rebound or if any rebound will last. A failure of these markets to recover strongly enough or in a sustained fashion could continue to harm our financial condition and results of operations.

If we are unable to sell and deliver our Cray XC systems and successfully develop, sell, and deliver our next generation Shasta systems and successor systems, our operating results will be adversely affected. We expect that a substantial portion of our revenue in the foreseeable future will come from the sale of Cray XC systems and our next generation Shasta systems and successor systems, including systems integrating future processors and accelerators where we are dependent upon third-party suppliers to deliver according to expected plans. The development efforts related to these systems are lengthy and technically challenging processes, and require a significant investment of capital, engineering, and other resources often years ahead of the time when we can be assured that they will result in competitive products. We may invest significant resources that may prove ultimately unsuccessful. The development process for our next generation Shasta systems is particularly complex and challenging, and we are implementing new development techniques as part of our efforts to complete this significant project. Our efforts could be unsuccessful, the changes we are implementing could cause disruption to our development efforts, and unanticipated performance and/or development issues may require more engineers, time, or testing resources than are currently available. Given the breadth of our engineering challenges, changes in the market and technology and our limited engineering and technical personnel resources, we periodically review the anticipated contributions and expense of our product programs to determine their long-term viability, and we may substantially modify or terminate one or more development programs. We may not be successful in meeting our development schedules for technical reasons, including those related to our dependence on third-party suppliers of components such as processors and accelerators, and/or because of insufficient engineering resources, which could result in an uncompetitive product or cause a lack of confidence in our capabilities among our key customers. To the extent that we incur delays in completing the design, development, and production of hardware components, delays in development of requisite system software, cancellation of or changes to programs due to technical or economic infeasibility, inability to source acceptable third-party components such as processors and accelerators or investment in unproductive development efforts, our revenue, results of operations, and cash flows, and the reputation of such systems in the market, could be adversely affected.

In addition, many factors affect our ability to successfully sell and recognize revenue for these systems, including the following:

- the level of product differentiation in our Cray XC systems and our next generation Shasta systems and successor systems. We need to compete successfully against HPC systems from both large, established companies and smaller companies and demonstrate the value of our balanced, tightly integrated systems to our customers in a variety of markets;

- whether potential customers delay purchases of our products because they decide to wait for successor systems or upgrades that we or our suppliers have announced or they believe will be available in the future, as we expect in 2019 following our announcement of our next generation Shasta systems but do not expect them to be available until at least the fourth quarter of 2019;

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our ability to meet all customer requirements for acceptance. Even after a system has been delivered, we sometimes do not meet all of the contract requirements for customer acceptance and ongoing reliability of our systems within the provided-for acceptance period, which has resulted in contract penalties and delays in our ability to recognize revenue from system deliveries. Most often these penalties have adversely affected revenue and gross profit through the provision of additional equipment and services and/or service credits to satisfy delivery delays and performance shortfalls. The risk of contract penalties is increased when we bid for new business prior to us or our suppliers completing development of new products and when we must estimate future system performance and costs, such as has been and will be required with our Cray XC systems, ClusterStor storage systems, and our next generation Shasta systems; and

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our ability to source competitive, key components in appropriate quantities (to have enough to sell without ending up with excess inventory that can lead to obsolescence charges), in a timely fashion and with reasonable costs and terms and conditions, and that meet the performance criteria required.

Failure to successfully sell our Cray XC systems and develop and sell our next generation Shasta systems and successor systems will adversely affect our operating results.

If our current and future products targeting markets outside of our traditional markets, primarily products targeting the data analytics, AI, and commercial markets, are not successful, our ability to grow or even maintain our revenues and achieve and sustain profitability will be adversely affected. Our ability to materially grow or even maintain our revenues and achieve and sustain profitability will be adversely affected if we are unable to generate sufficient revenue from products targeting markets outside of our traditional markets, including if those market segments do not grow significantly. We are currently focusing on data analytics, AI, and storage opportunities as well as the commercial market for all of our products. To grow outside our primary markets, we must successfully and in a cost-effective manner design and develop products utilizing technologies different from our traditional supercomputing products, compete successfully with many established companies and new entrants in these markets, win awards for new contracts, timely perform on existing contracts, develop our capability for broader market sales and business development, and successfully develop and introduce new solution-oriented offerings, notwithstanding that these are relatively new businesses for us and we do not have significant experience targeting these markets. Data analytics, AI, and storage and data management opportunities require significant monetary investments ahead of revenue, including product development efforts, adding experienced personnel and initiating new marketing and sales efforts and therefore may reduce net income in the short term even if ultimately successful in the longer term. As a result of our reliance on our traditional markets, the recent downturn in the high-end of the supercomputing market had a significant negative impact on our business and operating results. In addition, in our traditional markets we are reliant on large-system purchase cycles and on a relatively small number of potential customers. If we are unable to successfully target markets outside of our traditional markets, primarily products targeting the data analytics, AI, and commercial markets, our ability to grow or even maintain our revenues and achieve and sustain profitability will be adversely affected.

Our reliance on third-party suppliers poses significant risks to our operating results, business, and prospects. We rely upon third-party vendors, such as Intel, AMD, and NVIDIA, to supply processors including graphics processing units and memory, and for most of the products, we sell and use service providers to co-develop key technologies. We purchase or subcontract the manufacturing of a majority of the hardware components for our high-end products, including integrated circuits, printed circuit boards, memory parts, hard disk drives and storage product enclosures, cables, and power supplies, on a sole or limited source basis to third-party suppliers, including suppliers located in China. We use contract manufacturers to assemble certain important components for all of our systems. We also rely on third parties to supply important software and hardware capabilities, such as file systems, solution-specific servers, disk drives, and storage subsystems. Because specific components must be designed into our systems well in advance of initial deliveries of those systems, we are particularly reliant on our processor vendors to deliver on the capabilities and pricing expected at the time we design key elements of the system and make binding bids to customers. We are subject to substantial risks because of our reliance on these and other limited or sole source suppliers, including the following risks:

if a supplier does not provide components or systems that meet specifications in sufficient quantities and with acceptable performance, price, or quality on time or deliver when required, or delays future components or systems beyond anticipated delivery dates, then sales, production, delivery, acceptance, and revenue from our systems could be delayed and/or reduced and we could be subject to costly repair and/or delay costs and penalties even once delivered and accepted, which has happened multiple times in the past and has at times significantly lowered our revenue for a particular quarter or year;

if a supplier plans future processors that are made available in a way that encourages customers to delay purchases of our products because they decide to wait for successor systems or upgrades they believe will be available in the future or to purchase products with future processors from our competitors who are willing to take greater risk on delivery, our operating results will be adversely affected;

if a supplier, including those in China or who source components from China, provides us with hardware or software that contains bugs or other errors, defects, or security vulnerabilities, such as happened with the “Meltdown” and “Spectre” processor vulnerabilities, or is different from what we expected, our development projects and production systems may be adversely affected, the production and sales of our systems could be delayed, systems installed at customer sites could require significant, expensive field component replacements or other remediation, we might be required to pay penalties, and the trust customers and potential customers place in our products might be negatively affected;

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if our relationship with a key supplier is adversely affected for any reason, such as due to competitive pressures or changes in company strategies and priorities, our ability to obtain components on competitive financial terms could be adversely affected;

if a supplier cannot provide a competitive key component, for example, due to inadequate performance or a prohibitive price, or eliminates key features from components, such as with the processors we design into our systems, our systems may be less competitive than systems using components with greater capabilities;

if an interruption of supply of our components, services, or capabilities occurs because a supplier changes its technology roadmap, suffers damage to its manufacturing facilities, decides to no longer provide those products or services, increases the price of those products or services significantly, or imposes reduced delivery allocations on its customers, it could take us a considerable period of time to identify and qualify alternative suppliers, to redesign our products as necessary, and to begin to manufacture the redesigned components or otherwise obtain those services or capabilities. In some cases, such as with key integrated circuits and memory parts or processors, we may not be able to redesign such components or find alternate sources that we could use in any realistic timeframe, if at all;

if Cray systems at customer sites develop significant issues with third-party components, as has occurred in the past, the cost to Cray to repair or replace the components or otherwise address such issue may be material. If we are unable to effectively address such problem or a problem causes customer disruption, our relationship with our customers may also be harmed;

if a supplier of a component is subject to a claim that the component infringes a third-party's intellectual property rights, as has happened with multiple suppliers, we may not be able to obtain necessary components or our cost to obtain such components could increase significantly;

if a key supplier is acquired or undergoes a significant business change, as has occurred in the past, the production and sales of our systems and services may be delayed or adversely affected, or our development programs may be delayed or may be impossible to complete;

if a supplier providing us with key research and development and design services or core technology components with respect to integrated circuit design, network communication capabilities, or software is late, fails to provide us with effective functionality, or loses key internal talent, our development programs may be delayed or prove to be impossible to complete; and

some of our key component and service suppliers are small companies with limited financial and other resources, and consequently may be more likely to experience financial and operational difficulties than larger, well-established companies, which increases the risk that they will be unable to deliver products as needed.

Delays in the availability of components with acceptable performance, features, and reliability or our inability to obtain such acceptable components in the quantities we need or at all, the discovery of issues with components after delivery and introduction into our products, and increases in prices and order lead times for certain components have occurred in the past. We have also experienced increased prices and/or delivery timelines of memory and other key components and have had to address the "Meltdown" and "Spectre" security vulnerabilities in processors included in our products. These types of issues have adversely affected our revenue and operating results in multiple prior periods, in some cases significantly, and could result in significant costs and/or effort to address in the future.

If we are unable to compete successfully in the highly competitive HPC market, our business will not be successful. The market for HPC systems is very competitive. An increase in competitive pressures in our market or our failure to compete effectively may result in pricing reductions, reduced gross margins, and loss of market share and revenue. Many of our competitors are established well-known companies in the HPC market, including HPE, IBM, Lenovo, Dell/EMC, Huawei, NEC, Hitachi, Fujitsu, and Atos-Bull. Most of these competitors have substantially greater research, engineering, manufacturing, marketing, and financial resources than we do. In addition, certain Chinese companies are investing significantly in HPC and are becoming more aggressive and more competitive in the HPC global arena.

We also compete with systems builders and resellers of systems that are constructed from commodity components using processors manufactured and/or designed by Intel, ARM, AMD, NVIDIA, and others. These competitors include the companies named above, as well as smaller companies that benefit from the low research and development costs needed to assemble systems from commercially available commodity products. Such companies, because they

can offer high peak performance per dollar, can put pricing pressure on us in certain competitive procurements. In addition, to the extent that Intel, AMD, NVIDIA, IBM, MARVEL,

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and other processor suppliers develop processors with greater capabilities or at a lower cost than the processors we use in our products at any given time, our Cray systems may be at a competitive disadvantage to systems utilizing such other processors until we can design in, integrate, and secure competitive processors, if at all. Also, to the extent any component supplier successfully adds differentiating capabilities to their HPC products that compete with what we provide, such as Intel, we may experience greater competitive pressures.

Our growth initiatives in the data analytics, AI, and storage markets must also compete successfully with many established companies and new entrants, many of whom have significantly greater resources and brand recognition in these markets than we do.

Periodic announcements by our competitors of new HPC, storage, or data analytics systems or plans for future systems and price adjustments may reduce customer demand for our products. Many of our potential customers already own or lease high performance computer, storage, or data analytics systems. Some of our competitors have offered substantial discounts to potential customers. We have in the past been and may again be required to provide substantial discounts to make strategic sales, which may reduce or eliminate any gross profit on such transactions, or we may be required to provide lease financing for our products, which could result in a multi-year deferral of our receipt of cash and revenue for these systems. These developments limit our revenue and financial resources and reduce our ability to be profitable and grow.

The continuing commoditization of HPC hardware and software has resulted in increased pricing pressure and may adversely affect our operating results. The continuing commoditization of HPC hardware, such as processors, interconnects, storage, and other infrastructure, and the growing commoditization of software, including plentiful building blocks and more capable open source software, as well as the potential for integration of differentiated technology into already-commoditized components, has resulted in and may result in increased pricing pressure that may cause us to reduce our pricing in order to remain competitive, which can negatively impact our gross margins and adversely affect our operating results.

If the U.S. Government and other governments purchase, or fund the purchase of, fewer supercomputers or delay such purchases, our revenue would be reduced and our operating results would be adversely affected. Historically, sales to the U.S. Government have represented the largest single market segment for supercomputer sales worldwide, including our products and services. In 2016, 2017, and 2018, approximately 47%, 53%, and 28%, respectively, of our total revenue was derived from such sales. Our plans for the foreseeable future contemplate significant sales to the U.S. Government. Sales to the U.S. Government and other governments, including further sales pursuant to existing contracts, have been, and may continue to be, adversely affected by factors outside our control, such as by: uncertainties relating to priorities of the current administration or adverse decisions by the current administration to reduce or eliminate budgets for governmental agencies or departments that purchase or fund the purchase of our products and services;

- Congressional and executive branch decisions in addressing budget concerns and current policy;
- disruptions in the operations of the U.S. Government, including impacts of the current administration and government “shutdowns” such as has occurred in the past and has recently occurred;
- “sequestration”;
- the downgrading of U.S. Government debt or the possibility of such action;
- the political climate in the United States focusing on cutting or limiting budgets and its effect on government budgets;
- the limits on federal borrowing capacity;
- changes in procurement policies;
- budgetary considerations, including Congressional delays in completing appropriation bills as has occurred in the past;
- domestic crises, such as costs of addressing the damage associated with natural disasters; or
- international political developments, such as the downgrading of European debt or the United Kingdom’s departure from the European Union.

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In particular, the U.S. government has announced plans to procure multiple, large “exascale” systems for delivery in future years and provide funding for certain research and development efforts associated with those system deliveries. If we are unable to secure a sufficient portion of that funding for research and development of those exascale systems sales, our ability to grow in future years and our ability to offset research and development expenses leading up to those deliveries may be adversely affected. In addition, if agencies and departments of the United States or other governments were to stop, reduce, or delay their use and purchases of supercomputers, our revenue and operating results would be adversely affected.

Changes in U.S. trade policy, including the imposition of tariffs and the resulting consequences, may harm our business. The U.S. government has adopted a new approach to trade policy and in some cases to renegotiate, or potentially terminate, certain existing bilateral or multi-lateral trade agreements. It has also imposed tariffs on certain components and products sourced or manufactured outside of the United States, most notably China, including, but not limited to, printed circuit board and related components, certain storage devices, and potentially certain microprocessors that are used in Cray systems. These measures may materially increase costs for goods imported into the United States, requiring us to materially increase prices to our customers which may reduce demand, or, if we are unable to increase prices, result in lowering our margin on products sold. In addition, certain foreign governments have imposed tariffs, taxes, and other limitations on products and services that are manufactured or designed in the United States in response to these new policies. These changes and related trade disputes could make it more difficult or costly for us to compete with our competitors outside the United States.

If we cannot retain, attract, and motivate key personnel, we may be unable to effectively implement our business plan. Our success depends in large part upon our ability to retain, attract, and motivate highly skilled management, development, marketing, sales, and service personnel. The loss of and failure to replace key technical management and personnel could adversely affect multiple development efforts, including those related to our next generation Shasta systems. Recruitment and retention of senior management and skilled technical, sales, and other personnel is very competitive, and we may not be successful in either attracting or retaining such personnel. We have lost key personnel to other high technology companies, and many larger companies with significantly greater resources than us have aggressively recruited, and continue to aggressively recruit, key personnel. As part of our strategy to attract and retain key personnel, we may offer equity compensation through grants of stock options, restricted stock awards, or restricted stock units. Potential employees, however, may not perceive our equity incentives as attractive enough. In addition, due to the intense competition for qualified employees, we may be required to, and have had to, increase the level of compensation paid to existing and new employees, which could materially increase our operating expenses. In July 2017, we implemented a restructuring plan that included a reduction of our workforce and as a result we may have lost important talent and skill sets and may have a more difficult time retaining and motivating those employees not directly impacted by the restructuring as well as attracting new employees.

Customers and other third parties may make statements speculating about or announcing the purchase, acceptance, or intention to complete purchases or acceptances of our products, or the selection or award of government procurements, before such purchases, acceptances, or selection or awards are substantially certain, and these proposed purchases, acceptances, or selections or awards may not be completed when or as expected, if at all. From time to time, customers and other third parties may make statements speculating about or announcing a potential purchase of our products, or the selection or award of government procurements, before we have been selected or awarded a procurement, obtained an order for such purchases, or completed negotiations and signed a contract for the purchase of such products or relating to such procurement. In some instances, government and government-funded customers may announce possible purchases even before they have obtained the necessary budget to procure the products. As a result, these statements, postings, or announcements do not mean that we will ultimately be able to secure the sale when or as expected or at all, or will be selected or awarded a procurement, for a number of reasons, including that it is not certain that the contract or order negotiations will be completed successfully or as expected or that the customer will be able to obtain the budget they hope for or expect. In addition, from time to time, customers and other third parties may make statements speculating about or announcing the completion of an acceptance process of a delivery system before such acceptance is completed or certain. As a result, these statements or announcements do not mean that we will ultimately be able to obtain the acceptance when or as expected or recognize revenue.

We may infringe or be subject to claims that we infringe the intellectual property rights of others. We are and may in the future be subject to patent infringement and other intellectual property claims and lawsuits in various jurisdictions, and we cannot be certain that our products or activities do not violate the patents, trademarks, or other intellectual property rights of third-parties. Companies in the technology industry, and other patent, copyright, and trademark holders seeking to profit from royalties, own large numbers of patents, copyrights, trademarks, domain names, and trade secrets and frequently commence litigation based on allegations of infringement, misappropriation, or other violations of intellectual property or other rights. As we face increasing competition and gain an increasingly high profile, the intellectual property rights claims against us have grown and will likely continue to grow. For example, we are currently involved in litigation with Raytheon Company (Raytheon) which is described in

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Note 12 — Commitments and Contingencies in the Notes to Consolidated Financial Statements in Item 15. Exhibits and Financial Statement Schedules in Part IV of this annual report on Form 10-K.

We intend to vigorously defend and prosecute these litigation matters and, based on our reviews to date, we believe we have valid defenses with respect to each of these matters. However, litigation is inherently uncertain, and any judgment or injunctive relief entered against us or any adverse settlement could materially and adversely impact our business, financial condition, operating results, and prospects. As a result of these or other intellectual property infringement claims, we could be required or otherwise decide that it is appropriate to:

- pay third-party infringement claims;
- discontinue manufacturing, using, or selling particular products subject to infringement claims;
- discontinue using the technology or processes subject to infringement claims;
- develop other technology not subject to infringement claims, which could be time-consuming and costly or may not be possible; and/or
- license technology from third-parties, which license may not be available on commercially reasonable terms, or at all.

In addition, litigation can involve significant management time and attention and be expensive, as it has been with Raytheon, regardless of outcome. During the course of these litigation matters, there may be announcements of the results of hearings and motions, and other interim developments related to the litigation matters. If securities analysts or investors regard these announcements as negative, the market price of our common stock may decline.

If our cluster systems are not successful, our operating results could be adversely affected. Our cluster products were first introduced in late 2012. Cluster-based solutions face intense competition in the marketplace with buying decisions often driven by price, and if we cannot successfully sell these solutions with acceptable margins, our operating results will be adversely affected.

We have made and entered into in the past, and may make and enter into in the future, acquisitions or strategic transactions which could require significant management attention, disrupt our business, result in dilution to our shareholders, deplete our cash reserves, increase our business risks, and adversely affect our financial results. Acquisitions and strategic transactions, such as our 2017 acquisition of the ClusterStor business from Seagate, involve numerous risks, including the following:

- difficulties in successfully integrating the operations, systems, technologies, products, sales channels, manufacturing processes, offerings, and personnel of the acquired company or companies, assets, and/or business;
- insufficient revenue, margin, or other benefits to offset increased expenses or other negative impacts associated with acquisitions or strategic transactions;
- diversion of management's attention from normal daily operations of the business and the challenges of managing larger and more widespread operations resulting from acquisitions or strategic transactions, including other customers of an acquired business;
- potential difficulties in completing projects associated with in-process research and development intangibles;
- difficulties in entering markets in which we have no or limited direct prior experience and where competitors in such markets have stronger market positions;
- initial dependence on unfamiliar supply chains or relatively small supply partners;
- the potential loss of key employees, customers, distributors, vendors, and other business partners of the companies or businesses we acquire following and continuing after announcement of any transaction; and
- the potential to invest significant time and resources into a potential acquisition or strategic transaction that does not ultimately complete or close.

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Acquisitions or strategic transactions may also cause us to:

- use a substantial portion of our cash reserves or incur debt;
- issue equity securities or grant equity incentives to acquired employees that would dilute our current shareholders' percentage ownership;
- assume or incur liabilities, including potentially unknown or underestimated liabilities;
- record goodwill and non-amortizable intangible assets that are subject to impairment testing on a regular basis and potential periodic impairment charges;
- incur amortization expenses related to certain intangible assets;
- incur large and immediate write-offs and restructuring and other related expenses; or
- become subject to intellectual property litigation or other litigation.

Acquisitions of high-technology companies, assets, and/or businesses are inherently risky and subject to many factors outside of our control, and no assurance can be given that our previously completed, currently planned, or future acquisitions or strategic transactions will be successful and will not materially adversely affect our business, operating results, or financial condition. Failure to manage and successfully integrate acquisitions could materially harm our business and operating results.

We maintain confidential and proprietary information on our computer networks and employ security measures designed to protect this information from unauthorized access. If our security measures are breached, we could lose proprietary data and may suffer economic losses. We maintain confidential information on our computer networks, including information and data that are proprietary to our customers and third parties, as well as to us. Although we have designed and employed and continue to enhance a multitude of security measures to protect this information from unauthorized access, security breaches may occur, and in the past have occurred, as a result of third-party action, including computer hackers, employee error, inherent hardware or software vulnerabilities (including in products or components sourced from suppliers in China), malfeasance, or otherwise. Any breach, malfeasance, or human or technological error could result in unauthorized access to disclosure, modification, misuse, loss, or destruction of Cray, customer, supplier, or other third-party data, including trade secrets and other confidential business information. Because the techniques employed by hackers to obtain unauthorized access or to sabotage systems change frequently, we may be unable to anticipate these techniques or to implement adequate preventative measures. If this should happen, we could be exposed to potentially significant legal liability, remediation expense, harm to our reputation, and other harm to our business.

As a global enterprise, the regulatory environment with respect to cybersecurity, privacy, and data protection is increasingly complex and may have impacts on the company's business, including increased risk, costs, and expanded compliance obligations. The General Data Protection Regulation that came into force in the European Union in May 2018 will also cause us to incur additional compliance costs and potential financial or other exposure if we were found to fail to comply with such regulations.

We may not be able to protect our proprietary information and rights adequately. We rely on a combination of patent, copyright, trademark and trade secret protection, nondisclosure agreements, and licensing arrangements to establish, protect, and enforce our proprietary information and rights. We have a number of patents and have additional applications pending. There can be no assurance, however, that patents will be issued from the pending applications or that any issued patents will adequately protect those aspects of our technology to which such patents will relate. Despite our efforts to safeguard and maintain our proprietary rights, we cannot be certain that we will succeed in doing so or that our competitors will not independently develop or patent technologies that are substantially equivalent or superior to our technologies. The laws of some countries do not protect intellectual property rights to the same extent or in the same manner as do the laws of the United States. Additionally, under certain conditions, the U.S. government might obtain non-exclusive rights to certain of our intellectual property. Although we continue to implement protective measures and intend to defend our proprietary rights vigorously, these efforts may not be successful.

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We are subject to market and financial risks due to our international operations that could adversely affect those operations or our profitability and operating results. Our international operations include sales and service offices in Europe, the Middle East, South America, Asia, Australia, and Canada. Our operations in countries outside of the United States, which accounted for approximately 52% of our total revenue in 2018, expose us to greater risks associated with international sales and operations. Our profitability and international operations are, and will continue to be, subject to a number of risks and potential costs, including:

- supporting multiple languages;
- recruiting sales and technical support personnel internationally with the skills to sell and support our products and the potentially high cost related to employee separations;
- complying with governmental regulations, including obtaining required import or export approval for our products;
- additional tariffs, taxes, and penalties;
- increased complexity and costs of managing international operations;
- increased exposure to foreign currency exchange rate fluctuations;
- trade protection measures and business practices that favor local competition, including as a result of recent measures and threats by the United States to levy tariffs on certain products;
- risks and costs associated with employee-favorable labor laws in many foreign jurisdictions;
- longer sales cycles and manufacturing lead times;
- financial risks such as longer payment cycles and difficulties in collecting accounts receivable;
- difficulties associated with repatriating cash generated or held abroad in a tax-efficient manner;
- ineffective legal protection, including of intellectual property rights;
- more complicated logistics and distribution arrangements;
- inadequate local infrastructure that could result in business disruptions;
- global political and economic instability; and
- other factors beyond our control such as natural disasters, terrorism, civil unrest, war, and infectious disease.

Our global operations are also subject to numerous U.S. and foreign laws and regulations, including those related to anti-corruption, tax, corporate governance, imports and exports, privacy and data security, financial and other disclosures, and labor relations. These laws and regulations are complex and may have differing, conflicting, and evolving legal standards, making compliance difficult and costly. If we or our employees, contractors, or agents violate these laws and regulations, we could be subject to fines, penalties, or criminal sanctions and may be prohibited from conducting business in one or more countries. Any violations, individually or in the aggregate, could have a material adverse effect on our operations and financial condition.

In addition, the United Kingdom gave formal notice of withdrawal from the European Union in March 2017. Consequently, the British government is currently negotiating the terms of the United Kingdom's future relationship with the European Union. The negotiated measures could potentially disrupt some of our target markets and jurisdictions in which we operate, including the United Kingdom and Germany, such as by adversely affecting tax benefits or liabilities in these or other jurisdictions or by restricting the movement of employees between the United Kingdom and other countries. Any such changes may adversely affect our operations and financial results.

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We are subject to increasing government regulations and other requirements due to the nature of our business, which may adversely affect our business operations. In 2016, 2017, and 2018, approximately 47%, 53%, and 28%, respectively, of our total revenue was derived from U.S. Government sales. In addition to normal business risks, our contracts with the U.S. government are subject to unique risks, some of which are beyond our control. Our contracts with the U.S. government are subject to particular risks, including:

The funding of U.S. government programs is subject to Congressional appropriations. Many of the U.S. government programs in which we participate may extend for several years; however, these programs are normally funded annually. Changes in U.S. strategy and priorities may affect our future procurement opportunities and existing programs. Long-term government contracts and related orders are subject to cancellation, or delay, if appropriations for subsequent performance periods are not made. The termination of funding for existing or new U.S. government programs could result in a material adverse effect on our results of operations and financial condition.

The U.S. government may modify, curtail, or terminate its contracts with us. The U.S. government may modify, curtail, or terminate its contracts and subcontracts with us without prior notice at its convenience upon payment for work done. Modification, curtailment, or termination of our major programs or contracts could have a material adverse effect on our results of operations and financial condition.

Our U.S. government contract costs are subject to audits by U.S. government agencies. U.S. government representatives may audit the costs we incur on certain U.S. government contracts, including allocated indirect costs. Such audits could result in adjustments to our contract costs. Any costs found to be improperly allocated to a specific contract will not be reimbursed, and such costs already reimbursed must be refunded. If any audit uncovers improper or illegal activities or non-compliance with the terms of a specific contract, we may be subject to civil and criminal penalties and administrative sanctions, including termination of contracts, forfeiture of profits, suspension of payments, fines, and suspension or prohibition from doing business with the U.S. government.

Our business is subject to potential U.S. government inquiries and investigations. We may be subject to U.S. government inquiries and investigations of our business practices due to our participation in government contracts. Any such inquiry or investigation could potentially result in a material adverse effect on our results of operations and financial condition.

Our U.S. government business is also subject to specific procurement regulations and other requirements. These requirements, although customary in U.S. government contracts, increase our performance and compliance costs. These costs might increase in the future, reducing our margins, which could have a negative effect on our financial condition. Failure to comply with these regulations and requirements could lead to suspension or debarment, for cause, from U.S. government contracting or subcontracting for a period of time or the inability to participate in certain procurements and could have a negative effect on our reputation and ability to secure future U.S. government contracts.

U.S. export controls could hinder our ability to make sales to foreign customers and our future prospects. The U.S. government regulates the export of HPC systems such as our products. We have experienced delays for up to several months in receiving appropriate approvals necessary for certain sales, which have delayed the shipment of our products. Delay or denial in the granting of any required licenses could make it more difficult to make sales to certain foreign customers, eliminating an important source of potential revenue. Restrictions on the export of information needed to manufacture our products has in the past impacted and could in the future impact our ability to have certain products and components made in certain lower cost jurisdictions.

Our stock price is volatile. The trading price of our common stock is subject to significant fluctuations in response to many factors, including stock market trends and shareholder profile, our quarterly operating results, changes in analysts' estimates or our outlook, our capital raising activities, announcements of technological innovations and customer contracts by us or our competitors, others in the industry or our customers, a significant aggressive seller or buyer, litigation activities, general economic conditions, and conditions in our industry. From January 1, 2018 through December 31, 2018, the closing sales price of our common stock on The Nasdaq Global Market ranged from \$18.89 to \$28.00 per share. Because our stock price has been volatile, investing in our common stock is risky.

We incorporate software licensed from third parties into the operating systems for our products as well as in our tools to design products and any significant interruption in the availability of these third-party software products or defects

in these products could reduce the demand for our products or cause delay in development. The operating system as well as other software we develop for our supercomputers contains components that are licensed to us under open source software licenses. Our business could be disrupted if this software, or functional equivalents of this software, were either no longer available to us or no longer offered to us on commercially reasonable terms. In either case we would be required to redesign our operating system software to function with alternative third-party software, or develop these components ourselves, which would result in increased

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costs and could result in delays in product shipments. Our supercomputer systems utilize software system variants that incorporate Linux technology. The open source licenses under which we have obtained certain components of our operating system software may not be enforceable. Any ruling by a court that these licenses are not enforceable, or that Linux-based operating systems, or significant portions of them, may not be copied, modified, or distributed as provided in those licenses, would adversely affect our ability to sell our systems. In addition, as a result of concerns about the risks of litigation and open source software generally, we may be forced to protect our customers from potential claims of infringement. In any such event, our financial condition and results of operations may be adversely affected.

We also incorporate proprietary software from third parties, such as for file systems, job scheduling, and storage subsystems. We have experienced functional issues in the past with implementing such software with our supercomputer systems. In addition, we may not be able to secure needed software systems on acceptable terms, or at all, which may make our systems less attractive to potential customers. These issues may result in lost revenue, additional expense by us, and/or loss of customer confidence.

The “conflict minerals” rule of the SEC has caused us to incur additional expenses, could limit the supply and increase the cost of certain metals used in manufacturing our products, and could make us less competitive in our target markets. The SEC requires public companies to disclose the origin, source, and chain of custody of specified minerals, known as conflict minerals, that are necessary to the functionality or production of products manufactured or contracted to be manufactured by us. Companies must obtain sourcing data from suppliers, engage in supply chain due diligence, and file annually with the SEC a specialized disclosure report on Form SD covering the prior calendar year. Implementation of our conflict minerals policy could limit our ability to source at competitive prices and to secure sufficient quantities of certain minerals used in the manufacture of our products, specifically tantalum, tin, gold, and tungsten, as the number of suppliers that provide conflict-free minerals may be limited. In addition, we have incurred, and may continue to incur, material costs associated with complying with the conflict minerals rule, such as costs related to the determination of the origin, source, and chain of custody of the minerals used in our products, the adoption of conflict minerals-related governance policies, processes, and controls, and possible changes to products or sources of supply as a result of such activities. Within our supply chain, we may not be able to sufficiently verify the origins of the relevant minerals used in our products through the data collection and due diligence procedures that we implement, which may harm our reputation. Furthermore, we may encounter challenges in satisfying those customers that require that all of the components of our products be certified as conflict free, and if we cannot satisfy these customers, they may choose a competitor’s products. We continue to investigate the presence of conflict materials within our supply chain.

We are required to evaluate our internal control over financial reporting under Section 404 of the Sarbanes-Oxley Act of 2002 at the end of each fiscal year, and any adverse results from such future evaluations could result in a loss of investor confidence in our financial reports and have an adverse effect on our stock price. Pursuant to Section 404 of the Sarbanes-Oxley Act of 2002, we are required to furnish a report by our management and a report by our independent registered public accounting firm on our internal control over financial reporting in our annual reports on Form 10-K as to whether we have any material weaknesses in our internal controls over financial reporting. Depending on their nature and severity, any future material weaknesses could result in our having to restate financial statements, could make it difficult or impossible for us to obtain an audit of our annual financial statements, or could result in a qualification of any such audit. In such events, we could experience a number of adverse consequences, including our inability to comply with applicable reporting and listing requirements, a loss of market confidence in our publicly available information, delisting from The Nasdaq Global Market, an inability to complete a financing, loss of other financing sources such as our line of credit, and litigation based on the events themselves or their consequences.

Our reported financial results may be adversely affected by changes in accounting principles generally accepted in the United States. Generally accepted accounting principles in the United States are subject to interpretation by the Financial Accounting Standards Board, the SEC, and various bodies formed to promulgate and interpret appropriate accounting principles. A change in these principles or interpretations could have a significant effect on our reported financial results, and could affect the reporting of transactions completed before the announcement of a change.

U.S. federal income tax reform could adversely affect us. On December 22, 2017, the Tax Cuts and Jobs Act was signed into law, enacting a broad range of changes to the U.S. Internal Revenue Code. The Tax Cuts and Jobs Act, among other things, includes changes to U.S. federal tax rates, imposes significant additional limitations on the deductibility of interest and net operating losses, allows for the expensing of certain capital expenditures, and puts into effect a number of changes impacting operations outside of the United States. In the fourth quarter of 2017, we reduced our deferred tax asset by approximately \$28.9 million as a result. The Company will continue to assess the impact of the new tax legislation on its net deferred tax assets and liabilities and will continue to examine the impact this tax legislation may have on our business.

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Provisions of our Restated Articles of Incorporation and Amended and Restated Bylaws could make a proposed acquisition of our business that is not approved by our Board of Directors more difficult. Provisions of our Restated Articles of Incorporation and Amended and Restated Bylaws could make it more difficult for a third-party to acquire us. These provisions could limit the price that investors might be willing to pay in the future for our common stock.

For example, our Restated Articles of Incorporation and Amended and Restated Bylaws provide for:

- removal of a director only in limited circumstances and only upon the affirmative vote of not less than two-thirds of the shares entitled to vote to elect directors;
- the ability of our Board of Directors to issue up to 5,000,000 shares of preferred stock, without shareholder approval, with rights senior to those of the common stock;
- no cumulative voting of shares;
- the right of shareholders to call a special meeting of the shareholders only upon demand by the holders of not less than 30% of the shares entitled to vote at such a meeting;
- the affirmative vote of not less than two-thirds of the outstanding shares entitled to vote on an amendment, unless the amendment was approved by a majority of our continuing directors, who are defined as directors who have either served as a director since August 31, 1995, or were nominated to be a director by the continuing directors;
- special voting requirements for mergers and other business combinations, unless the proposed transaction was approved by a majority of continuing directors;
- special procedures to bring matters before our shareholders at our annual shareholders' meeting; and
- special procedures to nominate members for election to our Board of Directors.

These provisions could delay, defer, or prevent a merger, consolidation, takeover, or other business transaction between us and a third-party that is not approved by our Board of Directors.

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Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

Our principal properties are as follows:

Location of Property	Uses of Facility	Approximate Square Footage
Chippewa Falls, WI	Manufacturing, hardware development, central service and warehouse	213,600
Bloomington, MN	Software development, sales and marketing	87,705
Seattle, WA	Executive offices, hardware and software development, sales and marketing	51,643
San Jose, CA	Hardware and software development	21,733
Austin, TX	Hardware development	20,916
Longmont, CO	ClusterStor product development	18,558

We own 205,478 square feet of manufacturing, development, service, and warehouse space in Chippewa Falls, Wisconsin, and lease the remaining space described above.

We lease a total of 10,800 square feet, primarily for sales and service offices and product development, in other domestic locations. In addition, various foreign sales and service subsidiaries have leased an aggregate of approximately 30,000 square feet of office space in international locations. We believe our facilities are adequate to meet our needs at least through 2019.

Item 3. Legal Proceedings

For a discussion of legal proceedings, see Note 12 — Commitments and Contingencies in the Notes to Consolidated Financial Statements in Item 15. Exhibits and Financial Statement Schedules in Part IV of this annual report on Form 10-K.

Item 4. Mine Safety Disclosures

Not applicable.

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PART II

Item 5. Market for the Registrant's Common Equity, Related Shareholder Matters and Issuer Purchases of Equity Securities

Market Information, Holders of Record and Dividends

Our common stock is traded on The Nasdaq Global Market under the symbol CRAY. As of February 7, 2019, we had 40,890,189 shares of common stock outstanding that were held by 475 holders of record.

We have not paid cash dividends on our common stock and we do not anticipate paying any cash dividends on our common stock in the foreseeable future. Any determination to pay dividends in the future will be at the discretion of our Board of Directors and will be dependent on a number of factors, including our earnings, capital requirements and overall financial conditions.

Equity Compensation Plan Information

The following table provides information as of December 31, 2018, with respect to compensation plans under which shares of our common stock are authorized for issuance, including plans previously approved by our shareholders and plans not previously approved by our shareholders.

Plan Category	Number of Shares of Common Stock to be Issued Upon Exercise of Outstanding Options	Weighted-Average Exercise Price of Outstanding Options	Number of Shares of Common Stock Available for Future Issuance Under Equity Compensation Plans (excluding shares reflected in 1st column)
Equity compensation plans approved by shareholders ⁽¹⁾	1,863,019	\$ 18.93	2,325,135
Equity compensation plans not approved by shareholders ⁽²⁾	14,583	\$ 3.74	—
Total	1,877,602		2,325,135

The shareholders approved our 1995, 1999 and 2003 stock option plans, our 2004, 2006 and 2009 long-term equity compensation plans, our 2013 equity incentive plan, as amended and restated, and our 2001 employee stock purchase plan, as amended. Our 1995, 1999 and 2003 stock option plans and our 2004, 2006 and 2009 long-term equity compensation plans have terminated and no more awards may be granted under those plans. Pursuant to our 2013 equity incentive plan, incentive options may be granted to employees (including officers) and nonqualified options may be granted to employees, officers, directors, agents and consultants with exercise prices at least equal to the fair market value of the underlying common stock at the time of grant. While our Board of Directors may grant options with varying vesting periods under these plans, most options granted to employees vest over four (1) years, with 25% of the options vesting after one year and the remaining options vesting monthly over the next three years, and most option grants to non-employee directors vesting immediately. Also pursuant to our 2013 equity incentive plan, our Board of Directors may grant restricted stock awards, stock bonus awards, stock appreciation rights, restricted stock units, performance shares and performance units to employees, directors, consultants, independent contractors and advisors. As of December 31, 2018, under our 2013 equity incentive plan, an aggregate of 2,325,135 shares were available for grant as stock options or stock appreciation rights. Using the plan's fungible ratio of 1.55:1 for full-value awards, 1,500,087 shares were available for restricted stock awards, stock bonus awards, restricted stock units, performance shares or performance units to employees, directors, consultants, independent contractors and advisors.

(2) The shareholders did not approve our 2000 non-executive employee stock option plan. Under the 2000 non-executive employee stock option plan approved by our Board of Directors on March 30, 2000, an aggregate of 1,500,000 shares pursuant to non-qualified options could be issued to employees, agents and consultants but not to officers or directors. Otherwise, our 2000 non-executive employee stock option plan is

similar to the stock option plans described in footnote (1) above. On March 30, 2010, our 2000 non-executive employee stock option plan was terminated, which ended future grants but did not affect then outstanding options. As of December 31, 2018, under our 2000 non-executive employee stock plan, we had options for 14,583 shares outstanding.

Unregistered Sales of Securities

We had no unregistered sales of our securities in 2018 not previously reported.

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Issuer Repurchases

We did not repurchase any of our common stock in 2018, other than in connection with the forfeiture of common stock by holders of restricted stock and restricted stock units in exchange for payments by the Company of statutory tax withholding amounts on behalf of the holders arising as a result of the vesting of restricted stock and restricted stock units.

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STOCK PERFORMANCE GRAPHS

The graph below compares the cumulative total return to shareholders for our common stock with the comparable return of the Nasdaq US Benchmark TR Index and the Nasdaq OMX Global Indexes ICB: 9572 Computer Hardware Index.

The graph assumes that a shareholder invested \$100 in our common stock on December 31, 2013, and that all dividends were reinvested. We have never paid cash dividends on our common stock. All return information is historical and is not necessarily indicative of future performance.

COMPARISON OF CUMULATIVE TOTAL RETURN AMONG OUR COMMON STOCK,
THE NASDAQ US BENCHMARK TR INDEX AND THE ICB: 9572
COMPUTER HARDWARE INDEX THROUGH DECEMBER 31, 2018

	12/31/2013	12/31/2014	12/31/2015	12/31/2016	12/31/2017	12/31/2018
Cray Inc.	\$ 100.0	\$ 125.6	\$ 118.2	\$ 75.4	\$ 88.1	\$ 78.6
Nasdaq US Benchmark TR Index	100.0	112.5	113.0	127.7	155.0	146.6
ICB: 9572 Computer Hardware Index	100.0	135.6	123.4	142.3	204.6	191.6

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Item 6. Selected Consolidated Financial Data

The following table presents selected historical consolidated financial data for Cray Inc. and its subsidiaries, which is derived from our audited consolidated financial statements:

	Year Ended December 31,				
	2018	2017	2016	2015	2014
	(in thousands, except for per share data)				
Operating Data:					
Product revenue	\$312,873	\$250,195	\$499,432	\$601,294	\$460,748
Service revenue	143,075	142,314	130,377	123,395	100,858
Total revenue	455,948	392,509	629,809	724,689	561,606
Cost of product revenue	252,264	188,830	332,016	426,821	321,554
Cost of service revenue	73,706	72,975	77,578	72,185	55,638
Total cost of revenue	325,970	261,805	409,594	499,006	377,192
Gross profit	129,978	130,704	220,215	225,683	184,414
Research and development, net	115,174	98,777	112,130	96,563	94,048
Sales and marketing	63,159	59,894	64,893	60,150	57,785
General and administrative	25,417	29,113	34,053	27,966	23,381
Restructuring	476	8,568	—	—	—
Operating expenses	204,226	196,352	211,076	184,679	175,214
Income (loss) from operations	(74,248)	(65,648)	9,139	41,004	9,200
Other income (expense), net	595	5,002	(1,365)	365	(9)
Interest income, net	3,343	3,276	2,147	1,408	506
Gain on strategic transaction	—	4,480	—	—	—
Income (loss) before income taxes	(70,310)	(52,890)	9,921	42,777	9,697
Benefit (provision) for income taxes	(1,371)	(80,939)	694	(15,240)	52,626
Net income (loss)	\$(71,681)	\$(133,829)	\$10,615	\$27,537	\$62,323
Net income (loss) per common share:					
Basic	\$(1.76)	\$(3.33)	\$0.27	\$0.70	\$1.61
Diluted	\$(1.76)	\$(3.33)	\$0.26	\$0.68	\$1.54
Weighted average outstanding shares:					
Basic	40,666	40,139	39,833	39,257	38,634
Diluted	40,666	40,139	41,012	40,691	40,435
Cash Flow Data:					
Cash provided by (used in):					
Operating activities	\$101,850	\$(73,341)	\$(52,313)	\$147,756	\$(58,109)
Investing activities (1)	3,748	(12,375)	7,328	(6,229)	(19,649)
Financing activities	(677)	(332)	(540)	(1,373)	(70)
Depreciation and amortization	16,065	16,760	14,684	17,017	16,324
Purchases of property and equipment	5,265	17,467	7,503	7,467	17,193
Balance Sheet Data:					
Cash, cash equivalents, restricted cash and investments	\$245,764	\$147,317	\$224,617	\$284,891	\$145,796
Working capital	290,906	354,300	373,028	376,559	325,541
Total assets	517,132	618,757	714,572	694,175	651,434
Shareholders' equity	343,379	400,297	525,476	492,510	453,854

(1) Prior period amounts have been adjusted to reflect the impact of ASU 2016-18 which we adopted at the beginning of the first quarter of 2018. Changes in restricted cash are no longer reflected in investing activities.

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

Overview and Executive Summary

Our focus is on the design, development, manufacture, marketing, and servicing of computing products that magnify and enhance human capital, foster discovery and innovation, and create scientific break-throughs, as well as competitive advantages. That means our products are aimed primarily at the high end of the high-performance computing (HPC), data analytics, and artificial intelligence (AI) markets—the segments populated by the pioneers, executives, and entrepreneurs leading their industries in both the public and private sectors. These products include compute systems commonly known as supercomputers, as well as high-performance storage, data analytics, and AI solutions. We offer them individually, integrated into a complete solution, or hosted in the cloud, depending on a customer’s needs. We also provide related software and system maintenance, support, and engineering services. Our customers include domestic and foreign government and government-funded entities, academic institutions, and commercial companies. We provide solutions based on four main models: (1) tightly integrated supercomputing designed throughout for scalability and sustained performance; (2) customizable cluster supercomputing based on highest-performance, industry-standard components; (3) robust high-performance storage solutions; and (4) integrated solutions for graph analysis, large-scale analytics, and AI applications. All of our solutions also emphasize total cost of ownership, scalable performance, and data center flexibility as key features. Our continuing strategy is to gain market share by extending our technology leadership, and differentiation, as well as expanding our addressable market in areas where we can leverage our experience and technology, such as in AI applications and data analytics. Underpinning this strategy is our focus on understanding our customers’ needs and building products that continually extend their capabilities.

Summary of 2018 Results

Total revenue increased by \$63.4 million in 2018 compared to 2017, from \$392.5 million to \$455.9 million, driven by increased product revenue. Service revenue in 2018 was in line with the prior year period. The year over year increase in product revenue was driven by an improvement in the overall market in which we operate. Revenue in our Japan and APAC region increased significantly due to two large acceptances, while revenue in the Americas and EMEA continued to be impacted by the market slowdown.

Product gross profit margin decreased from 25% in 2017 to 19% in 2018. Product gross profit margins for 2018 and 2017 were below our target margins. In the third quarter of 2017, it was determined that a large contract with product deliveries scheduled in the first and second quarters of 2018 would be performed at a loss of \$4.1 million. The loss was attributable in part to higher component costs, predominantly for memory, changes in the configuration of the system from the time of bid, and changes in the exchange rate. We recorded the full amount of the loss in the third quarter of 2017 and no material gross profit on the accepted systems and related services in the first and second quarters of 2018, which negatively impacted gross profit margins for both years. Product gross margin in 2018 was also negatively impacted by several other relatively large lower margin sales and a higher mix of cluster sales, which typically carry lower margins. Gross profit margin from services were largely in line for 2018 and 2017 at 48% and 49%, respectively.

We recorded a loss from operations of \$74.2 million in 2018 compared to a loss from operations of \$65.6 million in 2017. The increase in the loss from operations was primarily attributable to the decrease in product gross profit margin discussed above and a \$16.4 million increase in research and development expense, partially offset by a \$3.7 million decrease in general and administrative expense and an \$8.1 million decrease in restructuring.

We recorded a net loss of \$71.7 million in 2018 compared to a net loss of \$133.8 million in 2017. The year over year change was primarily driven by a \$79.6 million decrease in income tax expense for 2018 compared to 2017, as well as by the factors impacting our loss from operations discussed above. Income tax expense for 2017 included \$28.9 million directly attributable to the enactment of the Tax Cuts and Jobs Act that required us to revalue our U.S. deferred tax assets as a result of a reduction in the U.S. federal corporate income tax rate to 21% and income tax expense of \$74.1 million as a result of our decision to increase the valuation allowance held against our U.S. deferred tax assets.

Net cash provided by operations during 2018 was \$101.9 million, compared to net cash used in operations of \$73.3 million in 2017. Net cash provided by operations during 2018 was primarily driven by collections from customers that

resulted in a decrease of \$71.0 million in accounts and other receivables, and a decrease of \$96.2 million in inventory due to customer acceptances of systems that were delivered during 2018. These amounts were partially offset by the net loss, adjusted for non-cash expenses, of \$41.4 million. Working capital decreased from \$354.3 million at December 31, 2017 to \$290.9 million at December 31, 2018.

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Market Overview and Challenges

Significant trends in the HPC industry include:

- convergence of traditional supercomputing modeling simulation with big data analytics and AI;
- supercomputing with many-core commodity processors driving increasing scalability requirements;
- increased micro-architectural diversity, including increased usage of many-core processors and accelerators (such as graphics processors or GPUs), as the rate of increases in per-core performance slows;
- data I/O and storage capacity needs growing as fast as computational needs;
- the rise of AI, machine learning, and deep learning algorithms that utilize HPC technologies for performance and scale;
- technology innovations in memory and storage allowing for faster data access such as high bandwidth memory, non-volatile memory and storage, solid state and flash devices;
- the increasing commoditization of HPC hardware, particularly processors and system interconnects;
- the growing concentration of very large suppliers of key computing, memory and storage components in the industry;
- the growing commoditization of software, including more capable open source software;
- electrical power and system cooling requirements becoming a design constraint and driver in total cost of ownership determinations;
- increasing use of AI and analytics technologies in both the HPC and big data markets;
- increased adoption of cloud computing as a solution for loosely-coupled HPC applications;
- much higher memory costs in recent years; and
- significant variability in market demand for high-end supercomputers from quarter-to-quarter and year-to-year.

Several of these trends have recently impacted the growth rate and related improvements in price-performance of products in the industry and has contributed to the expansion and acceptance of loosely-coupled cluster systems using processors manufactured by Intel, AMD and others combined with commercially available, commodity networking and other components, particularly in the middle and lower portions of the supercomputing market. These systems may offer higher theoretical peak performance for equivalent cost, and “price/peak performance” is sometimes the dominant factor in HPC procurements. Vendors of such systems often put pricing pressure on us, resulting in lower margins in competitive procurements.

In the market for the largest, and most scalable systems, those often costing in excess of \$10 million, the use of generally available network components can result in increasing data transfer bottlenecks as these components do not balance processor power with network communication and system software capability. With increasing processor core counts due to new many-core processors, these unbalanced systems will typically have lower productivity, especially in larger systems running more complex applications. We and others augment standard microprocessors with other processor types, such as graphics processing units, in order to increase computational power, further complicating programming models. In addition, with increasing scale, bandwidth and processor core counts, large computer systems use progressively higher amounts of power to operate and require special cooling capabilities.

To position ourselves to meet the market’s demanding needs, we concentrate our research and development efforts on technologies that enable our supercomputers to perform at scale - that is, to continue to increase actual performance as systems and applications grow ever larger in size - and in areas where we can leverage our core expertise in other markets whose applications demand these tightly coupled architectures. We also invest relatively significantly in next-generation technology to successfully and uniquely address the challenges of “Exascale computing” (systems with exaflops-levels of performance, which is an order of magnitude more processing power than the current top systems). In addition, we are industry leaders in developing an integrated supercomputing software stack with demonstrated expertise in system and performance software for several processor architectures. We expect to be in a comparatively advantageous position as larger many-core processors become available and as multiple processing technologies become integrated into single systems in heterogeneous environments. In addition, we have continued to expand our addressable market by leveraging our technologies, customer base, the Cray brand and by introducing complementary

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products and services to new and existing customers, as demonstrated by our emphasis on strategic initiatives, such as big data analytics, AI and storage.

In analytics and AI, we are developing and delivering high performance data discovery, advanced analytics, machine learning and deep learning solutions. These solutions use both Cray developed and open source software, delivering faster time-to-solution and advanced capabilities that are key drivers for many of our data analytics and AI customers. We support open source technologies such as Hadoop, Spark and Jupyter Notebook to design large-scale data analytics stacks that simplify analyses of scientific data, other open source libraries like Keras to enable the quick development of neural networks, and commercial application and Python and R, distributed Dask, BigDL, TensorFlow and TensorBoard for advanced AI solutions, as well as many others.

In storage, we are developing and delivering high value products for the high performance parallel storage market. Our 2017 transaction with Seagate enhances our capabilities in storage and data management. Our storage products are primarily positioned to enable tight integration of storage with computing solutions and/or utilize parallel file processing technologies and facilitate storage across multiple data tiers. We support open source parallel file systems and protocols such as Lustre.

We have also expanded our addressable market by providing cluster systems and solutions to the supercomputing market that allow us to offer flexible platforms to incorporate best of breed components to allow customers to optimize the system to fit their unique requirements.

Key Performance Indicators

Our management monitors and analyzes several key performance indicators in order to manage our business and evaluate our financial and operating performance, including:

Revenue. Product revenue generally constitutes the major portion of our revenue in any reporting period and, for the reasons discussed in this annual report on Form 10-K, is subject to significant variability from period to period and is very difficult to forecast. In the short term, we closely review the status of customer proposals, customer contracts, product shipments, installations and acceptances in order to forecast revenue and cash receipts. In the longer-term, we monitor the status of the pipeline of product sales opportunities and product development cycles. We believe product revenue growth measured over several quarters is a better indicator of whether we are achieving our objective of growth and increased market share in the supercomputing market. The Cray XC and Cray CS products, along with our longer-term product roadmap are efforts to increase product revenue. We have increased our business and product development efforts in big data analytics, AI and storage and data management. Service revenue related to our maintenance offerings is subject to less variations in the short term and may assist, in part, to offset the impact that the variability in product revenue has on total revenue.

Gross profit margin. Gross profit margin is impacted by the level of revenue, different customer requirements, competitive considerations, product type and our anticipated and actual, compared to expected, cost to build and deliver our products and services. Our services tend to carry higher gross profit margins than our products. We often bid contracts and commit to future system performance where certain key components are not available in the market at the time of bid and/or whose price might change from what was expected. While we have significant experience doing so, such actions are inherently risky and can impact our gross profit margin significantly in any period. For example, memory prices, although currently in decline, have more than doubled in less than a year which has had a significant impact on our reported product gross profit margin in both 2018 and 2017. Our costs are also currently being impacted by tariffs on certain parts we buy from suppliers. To mitigate this and other similar risks, we monitor the cost of components, manufacturing, and installation of our products. In assessing our service gross profit margin, we monitor headcount levels and third-party costs.

Operating expenses. Our operating expenses are driven primarily by headcount and compensation expense, including variable incentive compensation and contracted third-party research and development services. As part of our ongoing expense management efforts, we continue to monitor headcount levels in specific geographic and operational areas. With the reduction in revenue levels, we reduced the size of our workforce in 2017. However, the 2017 transaction with Seagate has partially offset this reduction.

Liquidity and cash flows. Due to the variability in product revenue, new contracts, acceptance and payment terms, our cash position also varies significantly from quarter-to-quarter and within a quarter. We monitor our expected cash

levels, particularly in light of increased inventory purchases for large system installations and the risk of delays in product shipments, customer acceptances and, in the long-term, product development. Cash receipts generally lag customer acceptances by an average of approximately thirty days.

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Results of Operations

Revenue and Gross Profit

Our product and service revenue for the indicated years ended December 31 were (in thousands, except for percentages):

	Year Ended December 31,		
	2018	2017	2016
Product revenue	\$312,873	\$250,195	\$499,432
Less: Cost of product revenue	252,264	188,830	332,016
Product gross profit	\$60,609	\$61,365	\$167,416
Product gross profit percentage	19	% 25	% 34
Service revenue	\$143,075	\$142,314	\$130,377
Less: Cost of service revenue	73,706	72,975	77,578
Service gross profit	\$69,369	\$69,339	\$52,799
Service gross profit percentage	48	% 49	% 40
Total revenue	\$455,948	\$392,509	\$629,809
Less: Total cost of revenue	325,970	261,805	409,594
Total gross profit	\$129,978	\$130,704	\$220,215
Total gross profit percentage	29	% 33	% 35

Product Revenue

Product revenue for 2018 increased by \$62.7 million, or 25%, compared to 2017, driven by an improvement in the overall market in which we operate. Revenue in our Japan and APAC region increased significantly due to two large acceptances, while revenue in the Americas and EMEA continued to be impacted by the market slowdown.

Product revenue for 2017 decreased by \$249.2 million, or 50%, compared to 2016, substantially driven by a slow-down in the high-end segments of the supercomputing market that we target, as well as the timing of contracts and deliveries. Some 2017 deliveries were impacted by certain customer site readiness issues.

Service Revenue

Service revenue for 2018 was in line with the prior year period. An \$11.0 million increase in maintenance revenue was largely offset by a reduction in revenue from engineering services.

Service revenue for 2017 increased by \$11.9 million, or 9%, compared to 2016. The year over year increase in service revenue was primarily driven by increased maintenance revenue, which continues to be driven by our larger installed system base, including the benefit from longer lifetimes of installed systems due to the slowdown in acquisitions of new replacement systems.

Cost of Product Revenue and Product Gross Profit

Cost of product revenue for 2018 increased by \$63.4 million compared to 2017, driven by higher product revenue. Product gross profit percentage was 19% in 2018 compared to 25% in 2017. Product gross profit margins for 2018 and 2017 were below our target margins. In the third quarter of 2017, it was determined that a large contract with product deliveries scheduled in the first and second quarters of 2018 would be performed at a loss of \$4.1 million. The loss was attributable in part to higher component costs, predominantly for memory, changes in the configuration of the system from the time of bid, and changes in the exchange rate. We recorded the full amount of the loss in the third quarter of 2017 and no material gross profit on the accepted systems and related services in the first and second quarters of 2018, which negatively impacted gross profit margins for both years. Product gross margin in 2018 was also negatively impacted by several relatively large lower margin sales and a higher mix of cluster sales, which typically carry lower margins.

Cost of product revenue for 2017 decreased by \$143.2 million compared to 2016, driven primarily by lower product revenue. Product gross profit percentage was 25% in 2017 compared to 34% in 2016. The decrease in gross profit margin from 2017 to 2016 was largely driven by the \$4.1 million loss discussed above as well as one relatively large sale to a U.S. government customer

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in the second quarter of 2017 and one relatively large sale to a foreign customer in the fourth quarter of 2017, both of which carried lower margins.

Cost of Service Revenue and Service Gross Profit

Cost of service revenue and service gross profit margin in 2018 were largely in line with the prior year period.

Cost of service revenue decreased by \$4.6 million in 2017 compared to 2016, primarily driven by \$3.0 million of costs incurred in 2016 to replace a high-value third party component in a customer system and lower outside service costs in 2017. Service gross profit margin increased from 40% in 2016 to 49% in 2017. Service gross profit margins for 2016 were unusually low as the result of the \$3.0 million of costs incurred to replace a high-value third party component in a customer system. The improved gross profit margin also benefited, in part, from the leveraging of fixed costs with improved revenue.

Operating Expenses**Research and Development**

Research and development expenses for the indicated years ended December 31 were as follows (in thousands, except for percentages):

	Year Ended December 31,		
	2018	2017	2016
Gross research and development expenses	\$158,077	\$141,289	\$130,006
Less: Amounts included in cost of revenue	(2,618)	(9,473)	(12,621)
Less: Reimbursed research and development (excludes amounts in revenue)	(40,285)	(33,039)	(5,255)
Net research and development expenses	\$115,174	\$98,777	\$112,130
Percentage of total revenue	25	% 25	% 18

Gross research and development expenses in the table above reflect all research and development expenditures.

Research and development expenses include personnel expenses, depreciation, allocations for certain overhead expenses, software, prototype materials and third party contract engineering expenses.

In 2018, gross research and development expenses increased by \$16.8 million compared to 2017, primarily due to higher compensation and third party costs. Compensation, including incentive and share-based compensation costs, increased by \$7.2 million compared to 2017 due to increased average headcount and higher incentive compensation. Third party costs increased by \$7.2 million compared to 2017, driven primarily by expenditures under co-funding arrangements for which we were partially reimbursed. Net research and development expenses increased by \$16.4 million compared to 2017 as a result of the increase in gross research and development expenses. An increase in reimbursed research and development was largely offset by a decrease in amounts included in cost of revenue. The amount and timing of research and development costs related to engineering development contracts and the level of reimbursement from third parties for research and development projects varies significantly from period to period, often due to the timing of milestone acceptances, and can have a significant impact on net reported research and development expense in any period. We anticipate that reimbursed research and development will remain at relatively high levels over the next year as a result of ongoing development projects, primarily related to our next generation “Shasta” system.

In 2017, gross research and development expenses increased by \$11.3 million compared to 2016, primarily due to increased investments in the development of new products. We also increased our average headcount which resulted in compensation costs increasing by \$6.4 million compared to 2016. Net research and development expenses decreased by \$13.4 million compared to 2016 as a result of increased reimbursements from third-parties related to projects for the development of new products, primarily our next generation “Shasta” system.

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Other Operating Expenses

Our sales and marketing and general and administrative expenses for the indicated years ended December 31 were (in thousands, except for percentages):

	Year Ended December 31,		
	2018	2017	2016
Sales and marketing	\$63,159	\$59,894	\$64,893
Percentage of total revenue	14 %	15 %	10 %
General and administrative	\$25,417	\$29,113	\$34,053
Percentage of total revenue	6 %	7 %	5 %

Sales and Marketing. Sales and marketing expense increased by \$3.3 million in 2018 compared to 2017, primarily driven by an increase in commissions and incentive compensation.

Sales and marketing expense decreased by \$5.0 million in 2017 compared to 2016. We lowered our average headcount which resulted in compensation costs decreasing by \$4.7 million compared to 2016.

General and Administrative. General and administrative expense decreased by \$3.7 million in 2018 compared to 2017, primarily due to a \$3.6 million decrease in legal costs, from \$5.5 million in 2017 to \$1.9 million in 2018, related to our ongoing litigation with Raytheon, see Note 12 — Commitments and Contingencies in the Notes to Consolidated Financial Statements in Item 15. Exhibits and Financial Statement Schedules in Part IV of this annual report on Form 10-K. Due to our ongoing litigation with Raytheon, legal expenses may vary over the next several quarters.

The \$4.9 million decrease in general and administrative expense in 2017 compared to 2016 was primarily due to a \$2.3 million termination fee for our St. Paul facility that was expensed in 2016 and a \$2.0 million decrease in legal costs, from \$7.5 million in 2016 to \$5.5 million in 2017, related to our ongoing litigation with Raytheon.

Restructuring

In the third quarter of 2017, we implemented a restructuring plan to reduce our operating costs and better align our workforce with long-term business strategies. The restructuring plan reduced our workforce by approximately 190 employees, with the majority of such terminations effective in July 2017. For the years ended December 31, 2018 and 2017, we recorded \$0.5 million and \$8.6 million, respectively, in expense in connection with the restructuring plan, primarily related to employee severance.

Other Income (Expense), Net

We recorded \$0.6 million and \$5.0 million of net other income for the years ended December 31, 2018 and 2017, respectively, and \$1.4 million of net other expense for the year ended December 31, 2016. Net other income and expense includes gains and losses from foreign currency transactions, investments and disposals of assets. Net other income for 2017 included a \$3.3 million gain from the sale of an investment in a private company.

Interest Income, Net

Our interest income and interest expense for the indicated years ended December 31 were (in thousands):

	Year Ended December 31,		
	2018	2017	2016
Interest income	\$3,454	\$3,386	\$2,120
Interest expense	(111)	(110)	27
Net interest income	\$3,343	\$3,276	\$2,147

Interest income is earned on cash and cash equivalents, investment balances and the investment in sales-type lease.

Gain on Strategic Transaction

In the third quarter of 2017, we completed a strategic transaction with Seagate Cloud Systems Inc. (Seagate) centered around the transfer of Seagate's ClusterStor high-performance storage business to Cray. As part of the transaction, we assumed customer

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support obligations associated with the ClusterStor product line and added more than 125 employees and contractors. For the year ended December 31, 2017, we recognized a gain of approximately \$4.5 million associated with the transaction.

Taxes

We recorded income tax benefit (expense) for the indicated years ended December 31 as follows (in thousands, except percentages):

	Year Ended December 31,		
	2018	2017	2016
Net income (loss) before income taxes	\$(70,310)	\$(52,890)	\$9,921
Tax benefit (expense)	(1,371)	(80,939)	694
Net income (loss)	\$(71,681)	\$(133,829)	\$10,615
Effective tax rate	(2)%	(153)%	(7)%

For the year ended December 31, 2018, the difference between the income tax benefit at the federal statutory rate of 21% and our income tax expense at the effective rate of (2)% was the result of our decision to continue to provide a full valuation allowance against the Company's U.S. federal deferred tax assets offset, in part, by foreign taxes. For the year ended December 31, 2017, the difference between the income tax benefit at the federal statutory rate of 35% and our income tax provision at the effective income tax rate of (153)% was the result of the reduction in the U.S. federal corporate income tax rate as a result of the Tax Cuts and Jobs Act and its impact on the carrying value of our U.S. deferred tax assets and our decision after the Tax Cuts and Jobs Act was enacted to increase the valuation allowance held against our U.S. deferred tax assets, offset, in part, by research and development tax credits. For the year ended December 31, 2016, the difference between the income tax provision at the federal statutory rate of 35% and our income tax benefit at the effective rate of (7)% was the result of research and development tax credits and additional tax deductions from share-based payments, sometimes referred to as excess tax benefits, partially offset by state taxes, non-deductible expenses and other permanent items. Excess tax benefits arise when tax deductions that we recognize with respect to share-based compensation exceed the compensation cost attributable to share-based compensation that was recognized in our consolidated financial statements.

The Tax Cuts and Jobs Act, which was signed into law on December 22, 2017, made significant changes to existing U.S. tax law, including, but not limited to, a permanent reduction to the U.S. federal corporate income tax rate from 35% to 21%, imposition of a one-time tax on deferred foreign income ("Repatriation Transition Tax"), adoption of a participation exemption system with respect to the taxation of future dividends received from foreign corporations, and repeal of the corporate alternative minimum tax system. Other significant changes in the Tax Cuts and Jobs Act include taxing payments made to foreign related parties that are deemed to be excessive, imposing a minimum tax on certain foreign earnings, requiring (beginning after December 31, 2021) the capitalization and subsequent amortization of certain research and development related expenses, and placing additional limits on the use of net operating losses and the deductibility of certain executive compensation.

During the year ended December 31, 2017, we recorded a reduction, in the amount of \$28.9 million, in the carrying value of our U.S. deferred tax assets as a result of a reduction in the U.S. federal corporate income tax rate to 21% and provisional tax expense, in the amount of \$0.3 million, attributable to the Repatriation Transition Tax and provisional tax expense, in the amount of \$0.3 million, as a result of our decision to no longer consider the undistributed earnings of our foreign subsidiaries to be permanently reinvested outside of the United States. Given the significance of the Tax Cuts and Jobs Act, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update No. 2018-05, Income Taxes (Topic 740): Amendments to SEC Paragraphs Pursuant to SEC Staff Accounting Bulletin No. 118 that recognized that a company's review of the income tax effects attributable to the enactment of the Tax Cuts and Jobs Act may have been incomplete at the time financial statements were issued for the reporting period that included the date of enactment and allowed a company to record provisional amounts during a one year measurement period. During the measurement period, income tax effects attributable to the enactment of the Tax Cuts and Jobs Act could be adjusted and recognized, as a discrete item in the applicable reporting period, as information became available, prepared or analyzed. The measurement period was deemed to have ended when the company had obtained, prepared and analyzed the information necessary to finalize its accounting. During the third quarter of 2018, we

finalized our accounting with respect to the items for which provisional tax expense was recorded. No significant adjustments were made to the provisional amounts we recorded.

During 2017, our valuation allowance increased by \$74.1 million, substantially all of which was attributable to our decision to increase the valuation allowance held against our U.S. deferred tax assets on December 31, 2017. The assessment of our ability to utilize our U.S. deferred tax assets is based upon all available positive and negative evidence, which includes, among other things, our recent results of operations, forecasted domestic and international earnings over a number of years, all known business

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risks and industry trends, and applicable tax planning strategies. We consider our actual historical results over several years to have stronger weight than other more subjective indicators, including forecasts, when considering whether to establish or reduce a valuation allowance on deferred tax assets. We have significant difficulty projecting future results due to the nature of the business and the industry in which we operate.

As of December 31, 2018, we have continued to provide a full valuation allowance against our U.S. federal deferred tax assets and against the majority of our state and foreign deferred tax assets due to the fact that we have experienced a significant decline in revenue, gross profit, and operating income since 2015, have reported a cumulative pre-tax loss in recent years and are currently forecasting to report a pre-tax loss for the year ending December 31, 2019. Our conclusion about the realizability of our deferred tax assets, and therefore the appropriateness of the valuation allowance, is reviewed quarterly and could change in future periods depending on our future assessment of all available evidence.

As of December 31, 2018, we had U.S. federal net operating loss carryforwards of approximately \$103.3 million and U.S. federal research and development tax credit carryforwards of approximately \$39.9 million. Approximately \$70.5 million of our federal net operating loss carryforwards will expire between 2019 and 2037; the remainder can be carried forward indefinitely. The research and development tax credits will expire from 2021 through 2038 if not utilized.

New Accounting Pronouncements

In May 2014, the FASB issued Accounting Standards Update No. 2014-09, Revenue from Contracts with Customers: Topic 606 (ASU 2014-09) to supersede nearly all existing revenue recognition guidance under GAAP. The core principle of ASU 2014-09 is to recognize revenues when promised goods or services are transferred to customers in an amount that reflects the consideration that is expected to be received for those goods or services. ASU 2014-09 defines a five step process to achieve this core principle and, in doing so, it is possible more judgment and estimates may be required within the revenue recognition process than required under prior GAAP, including identifying performance obligations in the contract, estimating the amount of variable consideration to include in the transaction price and allocating the transaction price to each separate performance obligation. The new guidance also requires additional disclosures and several terminology changes, such as amounts previously referred to as deferred revenue now being referred to as customer contract liabilities. We adopted ASU 2014-09 at the beginning of the first quarter of 2018 using the modified retrospective method. The comparative information for the years ended December 31, 2017 and 2016, and as of December 31, 2017 and 2016 has not been restated and continues to be reported under the accounting standards in effect for those periods. The effect of initially applying the new revenue standard had an immaterial effect on our financial statements. Adoption of the new standard did not have a material impact on our net loss during the year ended December 31, 2018. We expect the impact of the adoption of the new standard to be immaterial to our net income on an ongoing basis.

In January 2016, FASB issued Accounting Standards Update No. 2016-01, Recognition and Measurement of Financial Assets and Financial Liabilities: Topic 825 (ASU 2016-01). The updated guidance enhances the reporting model for financial instruments, which includes amendments to address aspects of recognition, measurement, presentation and disclosure. We adopted ASU 2016-01 at the beginning of the first quarter of 2018. Adoption of ASU 2016-01 did not have a material impact on our consolidated financial statements.

In February 2016, FASB issued Accounting Standards Update No. 2016-02, Leases: Topic 842 (ASU 2016-02), that replaces existing lease guidance. The new standard is intended to provide enhanced transparency and comparability by requiring lessees to record right-of-use assets (ROU) and corresponding lease liabilities on the balance sheet. Under the new guidance, leases will continue to be classified as either finance or operating, with classification affecting the pattern of expense recognition in the Consolidated Statements of Operations. Lessor accounting is largely unchanged under ASU 2016-02. Adoption of ASU 2016-02 is required for fiscal reporting periods beginning after December 15, 2018, including interim reporting periods within those fiscal years with early adoption being permitted. The new standard initially required application with a modified retrospective approach to each prior reporting period presented with various optional practical expedients. In July 2018, this requirement was amended with the issuance of Accounting Standards Update No. 2018-11, Leases: Topic 842: Targeted Improvements (ASU 2018-11), which permits an additional (and optional) transition method to adopt the new leases standard. Under this new transition

method, an entity initially applies the new leases standard at the adoption date and recognizes a cumulative-effect adjustment to the opening balance of retained earnings in the period of adoption. Consequently, an entity's reporting for the comparative periods presented in the financial statements in which it adopts the new leases standard will continue to be in accordance with current GAAP (Topic 840, Leases). An entity that elects this additional (and optional) transition method must provide the required Topic 840 disclosures for all periods that continue to be in accordance with Topic 840. The amendments do not change the existing disclosure requirements in Topic 840. We expect to adopt the standard using this additional transition method on January 1, 2019 using the effective date as our date of initial application.

We expect that this standard will have a material impact on our consolidated financial statements. While we continue to assess all of the impacts of adoption, we currently believe the most significant impact relates to the recognition of new ROU assets

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and lease liabilities on our consolidated balance sheet for our real estate and our computer equipment operating leases. On adoption, we currently expect to recognize lease liabilities of approximately \$45 million, with corresponding ROU assets of approximately \$35 million. The approximately \$45 million of lease liabilities includes approximately \$10 million that is currently included in other liabilities on our consolidated balance sheet as of December 31, 2018, primarily related to lease incentives, that will be reclassified at the time of adoption.

In August 2016, FASB issued Accounting Standards Update No. 2016-15, Statement of Cash Flows (Topic 230): Classification of Certain Cash Receipts and Cash Payments (ASU 2016-15). The updated guidance clarifies how companies present and classify certain cash receipts and cash payments in the statement of cash flows. We adopted ASU 2016-15 at the beginning of the first quarter of 2018. Adoption of ASU 2016-15 did not have a material impact on our consolidated financial statements.

In November 2016, FASB issued Accounting Standards Update No. 2016-18, Statement of Cash Flows (Topic 230): Restricted Cash (ASU 2016-18), which amends ASC 230 to add or clarify guidance on the classification and presentation of restricted cash in the statement of cash flows. The amended guidance requires that amounts that are deemed to be restricted cash and restricted cash equivalents be included in the cash and cash-equivalent balances in the statement of cash flows. A reconciliation between the consolidated balance sheet and the statement of cash flows must be disclosed when the consolidated balance sheet includes more than one line item for cash, cash equivalents, restricted cash, and restricted cash equivalents. The guidance also requires that changes in restricted cash and restricted cash equivalents that result from transfers between cash, cash equivalents, and restricted cash and restricted cash equivalents should not be presented as cash flow activities in the statement of cash flows. An entity with a material balance of amounts generally described as restricted cash and restricted cash equivalents must disclose information about the nature of the restrictions. We adopted ASU 2016-18 at the beginning of the first quarter of 2018. Restricted cash amounts have been combined with the cash and cash equivalent balances in the Consolidated Statement of Cash Flows for each period presented. Adoption of ASU 2016-18 did not have a material impact on our consolidated financial statements.

In August 2017, FASB issued Accounting Standards Update No. 2017-12, Derivatives and Hedging (Topic 815): Targeted Improvements to Accounting for Hedging Activities (ASU 2017-12). The new standard simplifies and expands the eligible hedging strategies for financial and nonfinancial risks. It also enhances the transparency of how hedging results are presented and disclosed. Further, the new standard provides partial relief on the timing of certain aspects of hedge documentation and eliminates the requirement to recognize hedge ineffectiveness separately in earnings. Adoption of ASU 2017-12 is required for fiscal reporting periods beginning after December 15, 2018, including interim reporting periods within those fiscal years with early adoption being permitted. We do not expect the adoption of ASU 2017-12 to have a material impact on our consolidated financial statements.

In February 2018, FASB issued Accounting Standards Update No. 2018-02, Income Statement - Reporting Comprehensive Income (Topic 220): Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income (ASU 2018-02). The new standard amends ASC 220 to allow a reclassification from accumulated other comprehensive income to retained earnings for stranded tax effects resulting from the Tax Cuts and Jobs Act and requires entities to provide certain disclosures regarding stranded tax effects. Adoption of ASU 2018-02 is required for fiscal reporting periods beginning after December 15, 2018, including interim reporting periods within those fiscal years with early adoption being permitted. We will adopt ASU 2018-02 on January 1, 2019 and currently expect to elect to reclassify stranded tax effects resulting from the Tax Cuts and Jobs Act from accumulated other comprehensive income to accumulated deficit. We will be required to make additional disclosures but do not expect the adoption of ASU 2018-02 to have a material impact on our consolidated financial statements.

In August 2018, FASB issued Accounting Standards Update No. 2018-13, Fair Value Measurement (Topic 820): Disclosure Framework—Changes to the Disclosure Requirements for Fair Value Measurement (ASU 2018-13). The new standard makes various modifications to the disclosure requirements on fair value measurement in Topic 820. Adoption of ASU 2018-13 is required for fiscal reporting periods beginning after December 15, 2019, including interim reporting periods within those fiscal years with early adoption being permitted. We do not expect the adoption of ASU 2018-13 to have a material impact on our consolidated financial statements.

Liquidity and Capital Resources

We generate cash from operations predominantly from the sale of supercomputing systems and related services. We typically have a small number of significant contracts that make up the majority of total revenue. We also have a sales-type lease agreement with a customer, under which we will receive quarterly payments over the term of the lease, which expires in September 2020. Material changes in certain of our balance sheet accounts were due to the level and timing of: product deliveries and customer acceptances, contractually determined billings, cash collections of receivables, inventory purchased for future deliveries, and incentive compensation. Working capital requirements, including inventory purchases and normal capital expenditures, are generally funded with cash from operations. Total cash and investments increased from \$147.3 million at December 31, 2017 to \$245.8 million at December 31, 2018. As of December 31, 2018, \$21.9 million of our total cash and investments balance was held by foreign subsidiaries. As of

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December 31, 2018, we had \$17.3 million in restricted cash associated with certain letters of credit outstanding to secure customer prepayments. As of December 31, 2018, we had working capital of \$290.9 million compared to \$354.3 million as of December 31, 2017.

Cash flow information for the indicated years ended December 31 included the following (in thousands):

	2018	2017	2016
Cash provided by (used in):			
Operating Activities	\$101,850	\$(73,341)	\$(52,313)
Investing Activities	3,748	(12,375)	7,328
Financing Activities	(677)	(332)	(540)

Operating Activities. For the year ended December 31, 2018, cash provided by operating activities was primarily driven by collections from customers that resulted in a decrease of \$71.0 million in accounts and other receivables, and a decrease of \$96.2 million in inventory due to customer acceptances of systems that were delivered during 2018. These amounts were partially offset by the net loss, adjusted for non-cash expenses, of \$41.4 million. For the year ended December 31, 2017, cash used in operating activities was primarily driven by an increase of \$97.7 million in inventory as a result of system builds for future deliveries and the net loss, adjusted for non-cash and non-operating items, of \$31.7 million. These amounts were partially offset by collections from customers that resulted in a decrease of \$38.7 million in accounts and other receivables. For the year ended December 31, 2016, cash used in operating activities was primarily driven by a \$78.4 million increase in our accounts and other receivable balance from December 31, 2015 to December 31, 2016. This was due to a number of large customer acceptances in the fourth quarter of 2016 for which we collected cash in the first quarter of 2017.

Investing Activities. For the year ended December 31, 2018, cash provided by investing activities was primarily due to sales and maturities of debt securities of \$7.0 million and \$1.6 million in additional cash received from the strategic transaction with Seagate. These amounts were partially offset by purchases of property and equipment of \$5.3 million. For the year ended December 31, 2017, cash used in investing activities was primarily due to purchases of debt securities of \$94.9 million and purchases of property and equipment of \$17.5 million, mostly related to leasehold improvements for our facilities in Bloomington, Minnesota. These amounts were partially offset by sales and maturities of debt securities of \$87.5 million and \$8.0 million of cash received as part of the strategic transaction with Seagate. For the year ended December 31, 2016, cash provided by investing activities was principally due to sales and maturities of debt securities of \$31.0 million, partially offset by purchases of debt securities of \$16.2 million and purchases of property and equipment of \$7.5 million.

Financing Activities. Net cash used in financing activities in 2018, 2017 and 2016 resulted primarily from statutory tax withholding amounts made in exchange for the forfeiture of common stock by holders of vesting restricted stock, partially offset by cash received from the issuance of common stock from the exercise of options and, for the years ended December 31, 2017 and 2016, from the issuance of stock through our employee stock purchase plan.

Over the next twelve months, we expect our significant cash requirements will relate to operational expenses. Operational expenses consist primarily of personnel costs, costs of inventory associated with certain product deliveries, outside engineering expenses, and the acquisition of property and equipment. In addition, we lease certain equipment and facilities used in our operations under operating leases in the normal course of business.

The following table summarizes our contractual cash obligations as of December 31, 2018 (in thousands):

Contractual Obligations	Amounts Committed by Year				
	Total	1 Year	Years 2-3	Years 4-5	Thereafter
Development agreements	\$20,026	\$17,642	\$2,308	\$76	\$—
Operating leases	61,856	7,285	13,336	12,381	28,854
Total contractual cash obligations	\$81,882	\$24,927	\$15,644	\$12,457	\$28,854

On April 20, 2018 we amended our Credit Facility with Wells Fargo. Pursuant to the amendment, the Credit Facility was reduced from \$50.0 million to \$15.0 million. The Credit Facility is for general corporate purposes, including working capital requirements and to support the issuance of letters of credit. The Credit Facility is secured by a first priority lien on up to \$15.0 million of our investments account held with Wells Fargo Bank. We had \$15.0 million in long-term restricted cash associated with the Credit Facility as of December 31, 2018. The amended Credit Facility

expires on March 1, 2020.

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We made no draws and had no outstanding cash borrowings on the line of credit as of December 31, 2018.

As of December 31, 2018, we had \$17.3 million in total restricted cash. We had \$13.9 million in USD equivalent value in outstanding letters of credit, the majority of which was supported by the Wells Fargo Credit Facility, as of December 31, 2018.

In our normal course of operations, we have development arrangements under which we engage outside engineering resources to work on our research and development projects. For the year ended December 31, 2018, we incurred \$24.7 million for such arrangements.

At any particular time, our cash position is affected by the timing of cash receipts for product sales, maintenance contracts, government co-funding for research and development activities and our payments for inventory, resulting in significant fluctuations in our cash balance from quarter-to-quarter and within a quarter. Our principal sources of liquidity are our cash and cash equivalents, short-term investments and cash from operations. We expect our cash resources to be adequate for at least the next twelve months.

Beyond the next twelve months, the adequacy of our cash resources will largely depend on our success in achieving profitable operations and positive operating cash flows on a sustained basis.

Critical Accounting Policies and Estimates

This discussion, as well as disclosures included elsewhere in this annual report on Form 10-K, is based upon our financial statements, which have been prepared in accordance with GAAP. The preparation of these consolidated financial statements requires us to make estimates and judgments that affect the reported amounts of assets, liabilities, revenue and expenses, and related disclosure of contingencies. In preparing our financial statements in accordance with GAAP, there are certain accounting policies that are particularly important. These include revenue recognition, inventory valuation, accounting for income taxes and research and development expenses. We believe these accounting policies and others set forth in Note 2 — Summary of Significant Accounting Policies of the Notes to Consolidated Financial Statements in Item 15. Exhibits and Financial Statement Schedules in Part IV of this annual report on Form 10-K should be reviewed as they are integral to understanding our results of operations and financial condition. In some cases, these policies represent required accounting. In other cases, they may represent a choice between acceptable accounting methods or may require substantial judgment or estimation.

Additionally, we consider certain judgments and estimates to be significant, including those relating to the allocation of transaction price to each performance obligation in revenue recognition, collectibility of receivables, determination of inventory at the lower of cost or net realizable value, the value of used equipment returned or to be returned associated with customer contracts, useful lives for depreciation and amortization, determination of future cash flows associated with impairment testing of long-lived assets, including goodwill and other intangibles, determination of the implicit interest rate used in the sales-type lease calculation, estimated warranty liabilities, determination of the fair value of stock options and other assessments of fair value, evaluation of the probability of vesting of performance-based restricted stock and restricted stock units, calculation of deferred income tax assets, including estimates of future financial performance in the determination of the likely recovery of deferred income tax assets, our ability to utilize such assets, potential income tax assessments, the outcome of any legal proceedings and other contingencies. We base our estimates on historical experience, current conditions and on other assumptions that we believe to be reasonable under the circumstances. Actual results may differ materially from these estimates and assumptions.

Our management has discussed the selection of significant accounting policies and the effect of judgments and estimates with the Audit Committee of our Board of Directors.

Revenue Recognition

On January 1, 2018, we adopted and applied the new accounting standard ASC 606, Revenue from Contracts with Customers, which superseded nearly all existing revenue recognition guidance under GAAP, to all contracts using the modified retrospective method. The comparative information has not been restated and continues to be reported under the accounting standards in effect for those periods. Adoption of the new standard did not have a material impact on our net loss during the year ended December 31, 2018. We expect the impact of the adoption of the new standard to be immaterial to our net income on an ongoing basis.

Our performance obligations are satisfied over time as work is performed or at a point in time. The majority of our revenue is recognized at a point in time when products are accepted, installed or delivered. Most of our revenue is derived from long-term contracts that can span several years. Revenue is recognized when performance obligations under the terms of a contract with the customer are satisfied; generally, this occurs with the transfer of control of our systems or services. In general, this does not occur until the products have been shipped or services provided to the customer, risk of loss has transferred to the customer, and, where applicable, a customer acceptance has been obtained. Revenue is measured as the amount of consideration we expect to receive in exchange for transferring goods or providing services. Sales, value add, and other taxes that we collect concurrent with revenue-

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producing activities are excluded from revenue. Incidental items that are immaterial in the context of the contract are recognized as expense.

To determine the proper revenue recognition method for contracts, we evaluate whether two or more contracts should be combined and accounted for as one single contract and whether the combined or single contract should be accounted for as more than one performance obligation. Contracts are often modified to account for changes in contract specifications and requirements. To determine the proper revenue recognition method for contract modifications, we evaluate whether the contract modification should be accounted for as a separate contract, part of an existing contract, or termination of an existing contract and the creation of a new contract. This evaluation requires significant judgment and the decision to combine a group of contracts or separate the combined or single contract into multiple performance obligations could change the amount of revenue and profit recorded in a given period. For contracts with multiple performance obligations, we allocate the contract's transaction price to each performance obligation using our estimate of the standalone selling price of each distinct good or service in the contract.

We determine the transaction price by reviewing the established contractual terms and other relevant information. Contracts can include penalty clauses and contracts with government customers may not be fully funded, both of which represent variable consideration. Generally, we include both the funded and unfunded portions of a contract with a government customer in the transaction price, as most often it is deemed the contract will become fully funded. We also assess the likelihood of certain penalties that would result in contract price reductions and, if deemed probable, the transaction price is adjusted.

The majority of our contracts include multiple promised goods and services, which are assessed at contract inception. Each distinct good or service is identified as a performance obligation, which may be an individual good or service or a bundle of goods or services. In order to determine whether the promises are distinct, we assess the use of our products and services by customers to determine whether the customer can benefit from the good or service on its own or from other readily available resources, and whether the promised transfer of goods or services is separately identifiable from other promises in the contract.

The majority of our revenues are from product solutions which include supercomputers, storage, and data analytics systems, each of which are usually separate performance obligations. Revenue is recognized when obligations under the terms of a contract with a customer are satisfied. Product revenue is typically recognized upon customer acceptance, or upon installation or delivery if formal acceptance is not required. Service revenue is typically recognized over time and consists mainly of system maintenance, analyst services, and engineering services, each of which are usually separate performance obligations. System maintenance commences upon customer acceptance or installation, depending on the contract terms, and revenue is recognized ratably over the remaining term of the maintenance contract. On-site analysts provide specialized services to customers, the revenue for which is recognized ratably over the contract period. Service revenue is recognized on a straight-line basis over the service period as the services are available continuously to the customer. Revenue from engineering services can be recognized as services are performed or as milestones are achieved, depending on the terms of the contract and nature of services performed. If, in a contract, the customer has an option to acquire additional goods or services, that option gives rise to a performance obligation if the option provides a material right to the customer that it would not receive without entering into that contract. Revenue from purchase options can be recognized as those future goods or services are transferred or when the option expires.

Generally, billing occurs subsequent to product revenue recognition and payment is expected within 30 days, resulting in contract assets. However, we sometimes receive advances or deposits from customers before revenue is recognized, resulting in customer contract liabilities (formerly deferred revenue). These assets and liabilities are reported on the Consolidated Balance Sheet on a contract-by-contract basis at the end of each reporting period. Our payment terms vary from contract to contract. Contracts may require payment before, at or after our performance obligations have been satisfied.

We perform an assessment to determine whether a significant financing component is present in a contract. If a contract is determined to include a significant financing component, the interest rate used in the calculation is based on the prevailing interest rates at contract inception and the entity's creditworthiness. When the period between providing a good or service to the customer is expected to be less than one year from payment, we apply the practical

expedient and do not adjust the consideration for the effects of a significant financing component.

Occasionally, our contracts include noncash consideration. This typically consists of returned parts when a system is upgraded or de-installed. Noncash consideration is measured at contract inception at estimated fair value.

The total transaction price is allocated to each performance obligation identified in the contract based on its relative standalone selling price. We do not have directly observable standalone selling prices for the majority of our performance obligations due to a relatively small number of customer contracts that differ in system size and contract terms which can be due to infrequently selling each performance obligation separately, not pricing products within a narrow range, or only having a limited sales history, such as in the case of certain advanced and emerging technologies. When a directly observable standalone selling price is not available, we estimate the standalone selling price. In determining the estimated standalone selling price, we use the cost to provide the product or service plus a margin, or considers other factors. When using cost plus a margin, we consider the total cost of the

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product or service, including customer-specific and geographic factors as appropriate. We also consider the historical margins of the product or service on previous contracts and several other factors including any changes to pricing methodologies, competitiveness of products and services, and cost drivers that would cause future margins to differ from historical margins.

We occasionally offer discounts to our customers. As these discounts are offered on bundles of goods and services, the discounts are applied to all performance obligations in the contract on a pro-rata basis.

Our incremental direct costs of obtaining a contract come primarily from sales commissions, a portion of which are paid upon contract signing. These commissions are generally capitalized upon payment and expensed at the time of revenue recognition. These deferred commissions are included in prepaid expenses in the Consolidated Balance Sheet. As of December 31, 2018 and 2017, we had \$2.0 million and \$1.3 million, respectively, of deferred commissions. For the years ended December 31, 2018, 2017 and 2016, we recognized \$6.0 million, \$4.0 million and \$5.6 million, respectively, in commissions expense.

Our remaining performance obligations reflect the deliverables within contracts with customers that will have revenue recognized in a future period (this may also be referred to as backlog). Due to the nature of our business and the size of individual transactions, forecasting the timing and total amount of revenue recognition is subject to significant uncertainties. As of December 31, 2018, we had an aggregate of \$517 million in remaining performance obligations stemming from a mixture of system contracts with their related service obligations and other service obligations. Included in this balance are \$1.6 million in gains resulting from hedged foreign currency transactions, which offset the related decrease in revenue from currency fluctuations. These gains will be reclassified from accumulated other comprehensive income to revenue in the period the related transactions are recognized as revenue. These obligations are anticipated to be recognized as revenue over approximately the next six years. We estimate that about 55% of these obligations are expected to be recognized as revenue in the next 18 months, with the remainder thereafter.

Inventory Valuation

We record our inventory at the lower of cost or net realizable value, with cost computed on a first-in, first-out basis (FIFO). We regularly evaluate the technological usefulness and anticipated future demand for our inventory components. Due to rapid changes in technology and the increasing demands of our customers, we are continually developing new products. Additionally, during periods of product or inventory component upgrades or transitions, we may acquire significant quantities of inventory to support estimated current and future production and service requirements. As a result, it is possible that older inventory items we have purchased may become obsolete, be sold below cost or be deemed in excess of quantities required for production or service requirements. When we determine it is not likely we will recover the cost of inventory items through future sales, we write-down the related inventory to our estimate of its net realizable value.

Because the products we sell have high average sales prices and because a high number of our prospective customers receive funding from U.S. or foreign governments, it is difficult to estimate future sales of our products and the timing of such sales. It also is difficult to determine whether the cost of our inventories will ultimately be recovered through future sales. While we believe our inventory is stated at the lower of cost or net realizable value and that our estimates and assumptions to determine any adjustments to the cost of our inventories are reasonable, our estimates may prove to be inaccurate. We have sold inventory previously reduced in part or in whole to zero, and we may have future sales of previously written-down inventory. We also may incur additional expenses to write-down inventory to its estimated net realizable value. Adjustments to these estimates in the future may materially impact our operating results.

Accounting for Income Taxes

Deferred tax assets and liabilities are determined based on differences between financial reporting and tax bases of assets and liabilities and operating loss and tax credit carryforwards and are measured using the enacted tax rates and laws that will be in effect when the differences and carryforwards are expected to be recovered or settled.

A valuation allowance for deferred tax assets is provided when we estimate that it is more likely than not that all or a portion of the deferred tax assets will not be realized through future operations. This assessment is based upon consideration of all available positive and negative evidence, which includes, among other things, our recent results of operations, forecasted domestic and international earnings over a number of years, all known business risks and industry trends, and applicable tax planning strategies that should, if implemented, enable us to utilize our deferred tax

assets before they expire. We consider our actual historical results over several years to have stronger weight than other more subjective indicators, including forecasts, when considering whether to establish or reduce a valuation allowance on deferred tax assets. We have significant difficulty projecting future results due to the nature of the business and the industry in which we operate.

The Tax Cuts and Jobs Act subjects a U.S. corporation to tax on its global intangible low taxed income (GILTI). Under GAAP, we are required to make an accounting policy election to either treat taxes due on our future GILTI inclusions as either a

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current period expense or to account for such taxes in the measurement of our deferred tax assets. We have elected to account for any tax due on our GILTI as a current period expense. As a result of changes made by the Tax Cuts and Jobs Act we no longer consider the earnings of our foreign subsidiaries to be permanently reinvested outside of the United States.

As of December 31, 2018, we continued to provide a full valuation allowance against our U.S. federal deferred tax assets and against the majority of our state and foreign deferred tax assets as the realization of such assets is not considered to be more likely than not at this time. In a future period our assessment of the realizability of our deferred tax assets and therefore the appropriateness of the valuation allowance could change based on an assessment of all available evidence, both positive and negative in that future period. If our conclusion about the realizability of our deferred tax assets and therefore the appropriateness of the valuation allowance changes in a future period we could record a substantial tax benefit in our Consolidated Statement of Operations when that occurs. We recognize the income tax benefit from a tax position only if it is more likely than not that the tax position will be sustained on examination by the applicable taxing authorities, based on the technical merits of our position. The tax benefit recognized in the financial statements from such a position is measured based on the largest benefit that has a greater than fifty percent likelihood of being realized upon ultimate settlement.

As of December 31, 2018, we had approximately \$102.9 million of net deferred tax assets before application of a valuation allowance. As of December 31, 2018, net deferred tax assets after reduction by the valuation allowance of \$101.6 million were \$1.3 million. Included in our deferred tax assets is a deferred tax asset of \$21.7 million related to federal net operating loss carryforwards and a deferred tax asset of \$39.9 million related to federal research and development tax credits. Approximately \$14.8 million of the deferred tax asset related to our federal net operating losses will expire between 2019 and 2037; the remainder can be carried forward indefinitely. The deferred tax asset related to federal research and development tax credits will expire between 2021 and 2038.

Estimated interest and penalties are recorded as a component of interest expense and other expense, respectively.

Research and Development Expenses

Research and development expenses include costs incurred in the development and production of our hardware and software, costs incurred to enhance and support existing product features, costs incurred to support and improve our development processes, and costs related to future product development. Research and development costs are expensed as incurred, and may be offset by co-funding from third parties. We may also enter into arrangements whereby we make advance, non-refundable payments to a vendor to perform certain research and development services. These payments are deferred and recognized over the vendor's estimated performance period.

We classify amounts to be received from funded research and development projects as either revenue or a reduction of research and development expense based on the specific facts and circumstances of the contractual arrangement, considering total costs expected to be incurred compared to total expected funding and the nature of the research and development contractual arrangement. In the event that a particular arrangement is determined to represent revenue, the corresponding costs are classified as cost of revenue.

Amounts to be received under co-funding arrangements with the U.S. government, other customers or suppliers are based on either contractual milestones or costs incurred. These co-funding payments are recognized as a reduction of research and development expense as performance is estimated to be completed and are measured as milestone achievements occur or as costs are incurred. These estimates are reviewed on a periodic basis and are subject to change, including in the near term. If an estimate is changed, net research and development expense could be impacted significantly.

We do not record a receivable from the U.S. government prior to completing the requirements necessary to bill for a milestone or cost reimbursement. Funding from the U.S. government is subject to certain budget restrictions and milestones may be subject to completion risk, and as a result, there are often periods in which research and development costs are expensed as incurred for which no reimbursement is recorded, as milestones have not been completed or the U.S. government has not funded an agreement. Accordingly, there can be substantial variability in the amount of net research and development expenses from quarter to quarter and year to year.

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Item 7A. Quantitative and Qualitative Disclosures About Market Risk

We are exposed to financial market risks, including changes in interest rates and equity price fluctuations.

Interest Rate Risk: We invest our available cash in money market mutual funds whose underlying investments include investment-grade debt instruments of corporate issuers and in debt instruments of the U.S. government and its agencies. We do not have any derivative instruments or auction rate securities in our investment portfolio. We protect and preserve invested funds by limiting default, market and reinvestment risk. Investments in both fixed-rate and floating-rate interest earning instruments carry a degree of interest rate risks. Fixed-rate securities may have their fair market value adversely affected due to a rise in interest rates, while floating-rate securities may produce less income than expected if interest rates fall. Due in part to these factors, our future investment income may fall short of expectations due to changes in interest rates or we may suffer losses in principal if forced to sell securities which have declined in market value due to changes in interest rates. Although we are subject to the above noted risks, we believe that a 0.5% change in interest rates would not be material.

Foreign Currency Risk: We sell our products primarily in North America, Asia and Europe. As a result, our financial results could be affected by factors such as changes in foreign currency exchange rates or weak economic conditions in foreign markets. Our products are generally priced based on U.S. dollars, and a strengthening of the U.S. dollar could make our products less competitive in foreign markets. While we often sell products with payments in U.S. dollars, our product sales contracts may call for payment in foreign currencies, subjecting us to foreign exchange rate risk. We are also subject to foreign exchange rate risk on certain short-term or long-term transactions that we engage in with our foreign subsidiaries.

As of December 31, 2018, we had entered into foreign currency exchange contracts that were designated as cash flow hedges that hedge approximately \$41.6 million of anticipated cash receipts on specific foreign currency denominated sales contracts. These foreign currency exchange contracts hedge the risk of foreign exchange rate changes between the time that the related contracts were signed and when the cash receipts are expected to be received. As of December 31, 2018, we had entered into foreign currency exchange contracts that had been dedesignated for the purposes of hedge accounting treatment totaling \$40.6 million. Unrealized gains or losses recorded in the Consolidated Statements of Operations related to these contracts are generally offset by foreign currency adjustments on related receivables. These foreign currency exchange contracts are considered to be economic hedges.

Our foreign maintenance contracts are typically paid in local currencies and provide a partial natural hedge against foreign exchange exposure. To the extent that we wish to repatriate any of these funds to the United States, however, we are subject to foreign exchange risks. We do not hold or purchase any currency forward exchange contracts for trading purposes. As of December 31, 2018, a hypothetical 10% unfavorable change in foreign currency exchange rates would impact our annual operating results and cash flows by approximately \$0.7 million.

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Item 8. Financial Statements and Supplementary Data

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* The Financial Statements are located following page F-1.

The selected quarterly financial data required by this item is set forth in Note 21 - Quarterly Data of the Notes to Consolidated Financial Statements in Item 15. Exhibits and Financial Statement Schedules in Part IV of this annual report on Form 10-K

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

None.

Item 9A. Controls and Procedures

Disclosure Controls and Procedures

We maintain disclosure controls and procedures that are designed to ensure that information required to be disclosed in our reports under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms, and that such information is accumulated and communicated to management, as appropriate, to allow timely decisions regarding required disclosure. Our management, with the participation and under the supervision of our Chief Executive Officer, Chief Financial Officer and Chief Accounting Officer/Corporate Controller, evaluated the effectiveness of our disclosure controls and procedures as of the end of the period covered by this report, and based on that evaluation, our Chief Executive Officer and Chief Financial Officer determined that our disclosure controls and procedures were effective.

Changes in Internal Control over Financial Reporting

There have been no changes in our internal controls over financial reporting during the fourth quarter of 2018 that have materially affected, or are reasonably likely to materially affect, our internal controls over financial reporting.

Management's Report on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting as defined by Rule 13a-15(f) under the Exchange Act. 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 accounting principles generally accepted in the United States of America.

Our internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect our transactions and dispositions of assets; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with accounting principles generally accepted in the United States of America, and that our receipts and expenditures are being made only in accordance with authorizations of our management and directors; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of our 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.

Our management, including our Chief Executive Officer and Chief Financial Officer, conducted an evaluation of the effectiveness of our internal control over financial reporting based on the framework in "Internal Control — Integrated Framework (2013)" issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on this evaluation, our management concluded that our internal control over financial reporting was effective as of December 31, 2018.

Peterson Sullivan LLP, an independent registered public accounting firm, has expressed an unqualified opinion on the effectiveness of our internal control over financial reporting as of December 31, 2018.

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Shareholders and Board of Directors
Cray Inc.

Opinion on Internal Control over Financial Reporting

We have audited Cray Inc. and Subsidiaries' ("the Company") internal control over financial reporting as of December 31, 2018, based on criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO"). In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2018, based on the criteria established in Internal Control - Integrated Framework (2013) issued by COSO.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) ("PCAOB"), the consolidated balance sheets of the Company as of December 31, 2018 and 2017, the related consolidated statements of operations, comprehensive income (loss), shareholders' equity, and cash flows for each of the years in the three-year period ended December 31, 2018, and the related notes (collectively referred to as the "consolidated financial statements") and our report dated February 12, 2019, expressed an unqualified opinion on those consolidated financial statements.

Basis for Opinion

The Company's management is responsible 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 internal control over financial reporting based on our audit. We are a public accounting firm registered with the 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 audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. 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 audit also included performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

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 accounting principles generally accepted in the United States. 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 accounting principles generally accepted in the United States, 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.

/S/ PETERSON SULLIVAN LLP

Seattle, Washington

February 12, 2019

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Item 9B. Other Information
None.

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PART III

Item 10. Directors, Executive Officers and Corporate Governance

The information required by this Item is contained in the proxy statement for our annual meeting of shareholders scheduled to be held on or around June 11, 2019, and such information is incorporated herein by reference.

Item 11. Executive Compensation

The information required by this Item is contained in the proxy statement for our annual meeting of shareholders scheduled to be held on or around June 11, 2019, and such information is incorporated herein by reference.

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

The information required by this Item is contained in the proxy statement for our annual meeting of shareholders scheduled to be held on or around June 11, 2019, and such information is incorporated herein by reference.

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

The information required by this Item is contained in the proxy statement for our annual meeting of shareholders scheduled to be held on or around June 11, 2019, and such information is incorporated herein by reference.

Item 14. Principal Accounting Fees and Services

The information required by this Item is contained in the proxy statement for our annual meeting of shareholders scheduled to be held on or around June 11, 2019, and such information is incorporated herein by reference.

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PART IV

Item 15. Exhibits and Financial Statement Schedules

(a)(1) Financial Statements

Consolidated Balance Sheets at December 31, 2018 and December 31, 2017

Consolidated Statements of Operations for the years ended December 31, 2018, 2017 and 2016

Consolidated Statements of Comprehensive Income (Loss) for the years ended December 31, 2018, 2017 and 2016

Consolidated Statements of Shareholders' Equity for the years ended December 31, 2018, 2017 and 2016

Consolidated Statements of Cash Flows for the years ended December 31, 2018, 2017 and 2016

Notes to Consolidated Financial Statements

Report of Independent Registered Public Accounting Firm

(a)(2) Financial Statement Schedules

Schedule II — Valuation and Qualifying Accounts — The financial statement schedule for the years ended December 31, 2018, 2017, and 2016 should be read in conjunction with the consolidated financial statements of Cray Inc. filed as part of this annual report on Form 10-K.

Schedules other than that listed above have been omitted since they are either not required, not applicable, or because the information required is included in the consolidated financial statements or the notes thereto.

(a)(3) Exhibits

The Exhibits listed in the Exhibit Index are filed as part of this annual report on Form 10-K. Each management contract or compensatory plan or agreement listed on the Exhibit Index is identified by an asterisk.

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EXHIBIT INDEX

Exhibit Number	Exhibit Description	Incorporated by Reference			
		Form	File No.	Filing Date	Exhibit/Filed Annex Herewith
2.1	<u>Asset Purchase Agreement between Intel Corporation and the Company, dated April 24, 2012</u>	8-K	000-26820	04/25/12	2.1
3.1	<u>Restated Articles of Incorporation</u>	8-K	000-26820	06/08/06	3.3
3.2	<u>Amended and Restated Bylaws</u>	8-K	000-26820	02/12/07	3.1
3.3	<u>First Amendment to Amended and Restated Bylaws</u>	8-K	000-26820	04/19/12	3.1
3.4	<u>Second Amendment to Amended and Restated Bylaws</u>	8-K	000-26820	02/28/17	3.1
10.1*	<u>2000 Non-Executive Employee Stock Option Plan</u>	S-8	333-57970	03/30/01	4.2
10.2*	<u>Amended and Restated 2001 Employee Stock Purchase Plan</u>	10-K	000-26820	03/04/11	10.28
10.3*	<u>2003 Stock Option Plan</u>	DEF 14A	000-26820	03/31/03	A
10.4*	<u>2004 Long-Term Equity Compensation Plan</u>	DEF 14A	000-26820	03/24/04	B
10.5*	<u>2006 Long-Term Equity Compensation Plan</u>	DEF 14A	000-26820	04/28/06	B
10.6*	<u>2009 Long-Term Equity Compensation Plan</u>	DEF 14A	000-26820	03/31/09	A
10.7*	<u>Amended and Restated 2013 Equity Incentive Plan</u>	DEF 14A	000-26820	04/25/16	A
10.8*	<u>Form of Officer Non-Qualified Stock Option Agreement</u>	10-K	000-26820	04/01/05	10.32
10.9*	<u>Form of Officer Incentive Stock Option Agreement</u>	10-K	000-26820	04/01/05	10.33
10.10*	<u>Form of 2013 Equity Incentive Plan Notice of Stock Option Grant and Stock Option Award Agreement</u>	8-K	000-26820	07/03/13	99.1
10.11*	<u>Form of 2013 Equity Incentive Plan Notice of Restricted Stock Award and Restricted Stock Purchase Agreement</u>	8-K	000-26820	07/03/13	99.2
10.12*	<u>Form of 2013 Equity Incentive Plan Notice of Restricted Stock Award and Restricted Stock Purchase Agreement</u>	8-K	000-26820	12/17/14	10.1
10.13*	<u>Form of 2013 Equity Incentive Plan Notice of Stock Option Grant and Stock Option Award Agreement</u>	8-K	000-26820	12/17/14	10.2
10.14*	<u>Form of 2013 Equity Incentive Plan Notice of Restricted Stock Unit Award and Restricted Stock Unit Award Agreement</u>	8-K	000-26820	12/17/14	10.3
10.15*	<u>Form of 2013 Equity Incentive Plan Notice of Stock Appreciation Right Award Grant and Stock Appreciation Right Award Agreement</u>	8-K	000-26820	12/17/14	10.4
10.16*	<u>Letter Agreement between the Company and Peter J. Ungaro, dated March 4, 2005</u>	8-K	000-26820	03/08/05	10.1
10.17*	<u>Offer Letter between the Company and Brian C. Henry, dated May 16, 2005</u>	10-Q	000-26820	11/09/05	10.1

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Exhibit Number	Exhibit Description	Incorporated by Reference			
		Form	File No.	Filing Date	Exhibit/Filed Annex Herewith
10.18*	<u>Offer Letter between the Company and Charles A. Morreale, dated March 14, 2004</u>	10-Q	000-26820	05/02/17	10.2
10.19*	<u>Offer Letter between the Company and Efstathios Papaefstathiou, dated November 11, 2016</u>	10-K	000-26820	02/15/18	10.23
10.20*	<u>Offer Letter between the Company and Michael C. Piraino, dated August 31, 2009</u>	10-Q	000-26820	04/29/14	10.2
10.21*	<u>Form of Management Retention Agreement entered into with executive officers prior to September 27, 2011 (including Annex A-1 and Annex A-2 applicable only to Peter J. Ungaro and Brian C. Henry)</u>	8-K	000-26820	12/22/08	10.1
10.22*	<u>Form of Management Retention Agreement entered into with executive officers from September 27, 2011 forward</u>	10-K	000-26820	02/13/14	10.20
10.23*	<u>Executive Severance Policy, as adopted on December 13, 2010</u>	8-K	000-26820	12/17/10	10.1
10.24*	<u>Amended and Restated Non-Employee Director Compensation Policy</u>				X
10.25*	<u>2018 Executive Bonus Plan</u>				X
10.26*	<u>Form of Indemnification Agreement</u>	8-K	000-26820	02/08/11	10.1
10.27	<u>Lease Agreement between North Pad Office, LLC and the Company, dated as of April 21, 2016</u>	8-K	000-26820	04/27/16	10.10
10.28	<u>Intellectual Property Agreement between Intel Corporation and the Company, dated May 2, 2012</u>	8-K	000-26820	05/03/12	10.1
10.29	<u>Amended and Restated Credit Agreement between Wells Fargo Bank, National Association and the Company, dated January 7, 2016, as amended</u>	10-K	000-26820	02/15/18	10.34
10.30	<u>Revolving Line of Credit Note between Wells Fargo Bank, National Association and the Company, dated January 7, 2016</u>	8-K	000-26820	01/11/16	10.2
21.1	<u>Subsidiaries of the Company</u>				X
23.1	<u>Consent of Peterson Sullivan LLP, Independent Registered Public Accounting Firm</u>				X
24.1	<u>Power of Attorney for directors and officers (included on the signature page of this report)</u>				X
31.1	<u>Rule 13a-14(a)/15d-14(a) Certification of Mr. Ungaro, Chief Executive Officer</u>				X

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Exhibit Number	Exhibit Description	Incorporated by Reference				
		Form	File No.	Filing Date	Exhibit/Filed Annex	Herewith
31.2	<u>Rule 13a-14(a)/15d-14(a) Certification of Mr. Henry, Chief Financial Officer</u>					X
32.1	<u>Certification pursuant to 18 U.S.C. Section 1350 by the Chief Executive Officer and the Chief Financial Officer</u>					X
101.INS	XBRL Instance Document					X
101.SCH	XBRL Taxonomy Extension Schema Document					X
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document					X
101.LAB	XBRL Taxonomy Extension Label Linkbase Document					X
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document					X
	Management contract or * compensatory plan or arrangement.					

Excluded from this list of exhibits, pursuant to Paragraph (b)(4)(iii)(a) of Item 601 of Regulation S-K, may be one or more instruments defining the rights of holders of long-term debt of the Company. The Company hereby agrees that it will, upon request of the Securities and Exchange Commission, furnish to the Commission a copy of any such instrument.

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Item 16. Form 10-K Summary

None.

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SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Seattle, State of Washington, on February 12, 2019.

CRAY INC.

By /s/ PETER J. UNGARO

Peter J. Ungaro

Chief Executive Officer and President

Each of the undersigned hereby constitutes and appoints Peter J. Ungaro, Brian C. Henry and Michael C. Piraino and each of them, the undersigned's true and lawful attorney-in-fact and agent, with full power of substitution, for the undersigned and in his or her name, place and stead, in any and all capacities, to sign any or all amendments to this Annual Report on Form 10-K and any other instruments or documents that said attorneys-in-fact and agents may deem necessary or advisable, to enable Cray Inc. to comply with the Securities Exchange Act of 1934 and any requirements of the Securities and Exchange Commission in respect thereof, and to file the same, with all exhibits thereto, 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 requisite and necessary to be done, as fully to all intents and purposes as the undersigned might or could do in person, hereby ratifying and confirming all that each such attorney-in-fact and agent, or his substitute, may lawfully do or cause to be done by virtue hereof.

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 Company and in the capacities indicated on February 12, 2019.

Signature

Title

By /s/ PETER J. UNGARO

Peter J. Ungaro

Chief Executive Officer, President and Director
(Principal Executive Officer)

By /s/ BRIAN C. HENRY

Brian C. Henry

Chief Financial Officer and Executive Vice President
(Principal Financial Officer)

By /s/ CHARLES D. FAIRCHILD

Charles D. Fairchild

Chief Accounting Officer, Controller and Vice President
(Principal Accounting Officer)

By /s/ PRITHVIRAJ BANERJEE

Prithviraj Banerjee

Director

By /s/ CATRIONA M. FALLON

Catriona M. Fallon

Director

By /s/ STEPHEN C. KIELY

Stephen C. Kiely

Director

By /s/ SALLY G. NARODICK

Sally G. Narodick

Director

By /s/ DANIEL C. REGIS

Daniel C. Regis

Director

By /s/ MAX L. SCHIRESON Director
Max L. Schireson

By /s/ BRIAN V. TURNER Director
Brian V. Turner

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CRAY INC. AND SUBSIDIARIES
CONSOLIDATED BALANCE SHEETS
(In thousands, except share data)

	December 31, 2018	December 31, 2017
ASSETS		
Current assets:		
Cash and cash equivalents	\$ 228,434	\$ 137,326
Restricted cash	1,300	1,964
Short-term investments	—	6,997
Accounts and other receivables, net	87,819	162,034
Inventory	80,360	186,307
Prepaid expenses and other current assets	22,331	25,015
Total current assets	420,244	519,643
Long-term restricted cash	16,030	1,030
Long-term investment in sales-type lease, net	9,586	23,367
Property and equipment, net	35,737	36,623
Goodwill	14,182	14,182
Intangible assets other than goodwill, net	3,178	4,345
Other non-current assets	18,175	19,567
TOTAL ASSETS	\$ 517,132	\$ 618,757
LIABILITIES AND SHAREHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	\$ 32,847	\$ 57,207
Accrued payroll and related expenses	23,703	18,546
Other accrued liabilities	10,805	9,471
Customer contract liabilities	61,983	80,119
Total current liabilities	129,338	165,343
Long-term customer contract liabilities	32,021	38,622
Other non-current liabilities	12,394	14,495
TOTAL LIABILITIES	173,753	218,460
Commitments and contingencies (Note 12)		
Shareholders' equity:		
Preferred stock — Authorized and undesignated, 5,000,000 shares; no shares issued or outstanding	—	—
Common stock and additional paid-in capital, par value \$.01 per share — Authorized, 75,000,000 shares; issued and outstanding 40,893,807 and 40,464,963 shares, respectively	647,045	633,408
Accumulated other comprehensive income	3,208	915
Accumulated deficit	(306,874)	(234,026)
TOTAL SHAREHOLDERS' EQUITY	343,379	400,297
TOTAL LIABILITIES AND SHAREHOLDERS' EQUITY	\$ 517,132	\$ 618,757
The accompanying notes are an integral part of these consolidated financial statements		

Table of ContentsCRAY INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF OPERATIONS

(In thousands, except per share data)

	Years Ended December 31,		
	2018	2017	2016
Revenue:			
Product	\$312,873	\$250,195	\$499,432
Service	143,075	142,314	130,377
Total revenue	455,948	392,509	629,809
Cost of revenue:			
Cost of product revenue	252,264	188,830	332,016
Cost of service revenue	73,706	72,975	77,578
Total cost of revenue	325,970	261,805	409,594
Gross profit	129,978	130,704	220,215
Operating expenses:			
Research and development, net	115,174	98,777	112,130
Sales and marketing	63,159	59,894	64,893
General and administrative	25,417	29,113	34,053
Restructuring	476	8,568	—
Total operating expenses	204,226	196,352	211,076
Income (loss) from operations	(74,248)	(65,648)	9,139
Other income (expense), net	595	5,002	(1,365)
Interest income, net	3,343	3,276	2,147
Gain on strategic transaction	—	4,480	—
Income (loss) before income taxes	(70,310)	(52,890)	9,921
Income tax benefit (expense)	(1,371)	(80,939)	694
Net income (loss)	\$(71,681)	\$(133,829)	\$10,615
Basic net income (loss) per common share	\$(1.76)	\$(3.33)	\$0.27
Diluted net income (loss) per common share	\$(1.76)	\$(3.33)	\$0.26
Basic weighted average shares outstanding	40,666	40,139	39,833
Diluted weighted average shares outstanding	40,666	40,139	41,012
The accompanying notes are an integral part of these consolidated financial statements			

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CRAY INC. AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME (LOSS)

(In thousands)

	Years Ended December 31,		
	2018	2017	2016
Net income (loss)	\$(71,681)	\$(133,829)	\$10,615
Other comprehensive income (loss), net of tax:			
Unrealized gain (loss) on available-for-sale investments	7	(7) 8
Foreign currency translation adjustments	(1,005) (490) 426
Unrealized gain (loss) on cash flow hedges	2,774	(1,457) 8,030
Reclassification adjustments on cash flow hedges included in net income (loss)	517	87	(13,324)
Other comprehensive income (loss)	2,293	(1,867) (4,860)
Comprehensive income (loss)	\$(69,388)	\$(135,696)	\$5,755
The accompanying notes are an integral part of these consolidated financial statements			

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CRAY INC. AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF SHAREHOLDERS' EQUITY

(in thousands)

	Common Stock and Additional Paid In Capital Number of Shares	Amount	Accumulated Other Comprehensive Income	Accumulated Deficit	Total
BALANCE, December 31, 2015	40,694	\$610,279	\$ 7,642	\$(125,411)	\$492,510
Issuance of shares under employee stock purchase plan	27	718			718
Exercise of stock options	169	2,121			2,121
Restricted shares issued for compensation, net of forfeitures and taxes	(133)	(1,665)		(1,714)	(3,379)
Share-based compensation	—	11,151			11,151
Other comprehensive loss			(4,860)		(4,860)
Cumulative-effect adjustment resulting from adoption of ASU 2016-09 (Note 13)				16,600	16,600
Net income				10,615	10,615
BALANCE, December 31, 2016	40,757	\$622,604	\$ 2,782	\$(99,910)	\$525,476
Issuance of shares under employee stock purchase plan	20	365			365
Exercise of stock options	157	1,342			1,342
Restricted shares issued for compensation, net of forfeitures and taxes	(469)	(1,752)		(287)	(2,039)
Share-based compensation	—	10,849			10,849
Other comprehensive loss			(1,867)		(1,867)
Net loss				(133,829)	(133,829)
BALANCE, December 31, 2017	40,465	\$633,408	\$ 915	\$(234,026)	\$400,297
Exercise of stock options	251	2,383			2,383
Restricted shares issued for compensation, net of forfeitures and taxes	178	(1,893)		(1,167)	(3,060)
Share-based compensation	—	13,147			13,147
Other comprehensive income			2,293		2,293
Net loss				(71,681)	(71,681)
BALANCE, December 31, 2018	40,894	\$647,045	\$ 3,208	\$(306,874)	\$343,379

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

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CRAY INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF CASH FLOWS
(In thousands)

	Years Ended December 31,		
	2018	2017	2016
Operating activities:			
Net income (loss)	\$(71,681)	\$(133,829)	\$10,615
Adjustments to reconcile net income (loss) to net cash provided by (used in) operating activities:			
Depreciation and amortization	16,065	16,760	14,684
Share-based compensation expense	13,147	10,849	11,151
Deferred income taxes	(547)	81,468	(1,861)
Gain on strategic transaction	—	(4,480)	—
Gain on sale of equity investment	(429)	(3,349)	—
Other	2,018	837	2,850
Cash provided (used) due to changes in operating assets and liabilities:			
Accounts and other receivables	70,958	38,660	(78,396)
Long-term investment in sales-type lease, net	13,071	10,129	(17,224)
Inventory	96,246	(97,688)	15,343
Prepaid expenses and other assets	(1,255)	(5,306)	2,265
Accounts payable	(24,368)	11,527	16,903
Accrued payroll and related expenses and other liabilities	12,668	7,572	(21,073)
Customer contract liabilities	(24,043)	(6,491)	(7,570)
Net cash provided by (used in) operating activities	101,850	(73,341)	(52,313)
Investing activities:			
Sales and maturities of available-for-sale investments	7,000	87,513	30,990
Purchases of available-for-sale investments	—	(94,902)	(16,159)
Cash received in strategic transaction	1,584	8,000	—
Proceeds from sale of equity investment	429	4,481	—
Purchases of property and equipment	(5,265)	(17,467)	(7,503)
Net cash provided by (used in) investing activities	3,748	(12,375)	7,328
Financing activities:			
Proceeds from issuance of common stock through employee stock purchase plan	—	365	718
Purchase of employee restricted shares to fund related statutory tax withholding	(3,060)	(2,039)	(3,379)
Proceeds from exercise of options	2,383	1,342	2,121
Net cash used in financing activities	(677)	(332)	(540)
Effect of foreign exchange rate changes on cash, cash equivalents and restricted cash	523	1,751	176
Net increase (decrease) in cash, cash equivalents and restricted cash	105,444	(84,297)	(45,349)
Cash, cash equivalents and restricted cash:			
Beginning of period	140,320	224,617	269,966
End of period	\$245,764	\$140,320	\$224,617
Supplemental disclosure of cash flow information:			
Cash paid for interest	\$—	\$14	\$31
Cash paid for income taxes	957	930	2,441
Non-cash investing and financing activities:			

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Inventory transfers to property and equipment and service spares	\$7,910	\$2,429	\$5,292
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Strategic transaction:

Non-cash assets acquired:

Receivable from Seagate	\$—	\$1,782	\$—
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Inventory	—	4,120	—
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Property and equipment	—	2,915	—
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Intangible assets	—	3,350	—
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Liabilities assumed:

Deferred revenue	\$—	\$12,168	\$—
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Deferred tax liabilities	—	3,019	—
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Other liabilities	—	500	—
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The following is a reconciliation of cash, cash equivalents and restricted cash reported within the Consolidated Balance Sheets that sum to the total of the same such amounts shown in the Consolidated Statements of Cash Flows:

	December 31, 2018	December 31, 2017
Cash and cash equivalents	\$ 228,434	\$ 137,326
Restricted cash (1)	1,300	1,964
Long-term restricted cash (1)	16,030	1,030
Total cash, cash equivalents and restricted cash	\$ 245,764	\$ 140,320

(1) Restricted cash primarily associated with certain letters of credit to secure customer prepayments and other customer related obligations.

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

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CRAY INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

NOTE 1 DESCRIPTION OF BUSINESS

Cray Inc. (Cray or the Company) designs, develops, manufactures, markets, and services products primarily at the high-end of the high performance computing (HPC), data analytics, and artificial intelligence (AI) markets. These products include compute systems commonly known as supercomputers, as well as storage, data analytics and AI solutions leveraging more than four decades of delivering the world's most advanced computing systems. The Company also provides related software and system maintenance, support, and engineering services. The Company's customers include domestic and foreign governments and government-funded entities, academic institutions and commercial companies.

NOTE 2 SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Accounting Principles

The consolidated financial statements and accompanying notes are prepared in accordance with accounting principles generally accepted in the United States of America (GAAP).

Principles of Consolidation

The consolidated financial statements include the accounts of the Company and its wholly-owned subsidiaries. All material intercompany balances and transactions have been eliminated.

Reclassifications

Certain prior year amounts have been reclassified to conform with the current year presentation. There has been no impact on previously reported net income (loss) or shareholders' equity from such reclassifications.

Use of Estimates

The preparation of financial statements in accordance with GAAP requires management to make estimates and assumptions that affect the amounts reported in the Company's consolidated financial statements and accompanying notes. Actual results could differ materially from those estimates.

Cash, Cash Equivalents and Restricted Cash

Cash and cash equivalents consist of highly liquid financial instruments that are readily convertible to cash and have maturities of three months or less at the time of acquisition. The Company maintains cash and cash equivalent balances with financial institutions that exceed federally insured limits. As of December 31, 2018 and 2017, the Company had \$17.3 million and \$3.0 million, respectively, in restricted cash associated with certain letters of credit to secure customer prepayments and other customer related obligations.

Investments

The Company's investments consist primarily of commercial paper, corporate debt, and other debt securities. Debt securities are classified as available-for-sale and are reported at fair value with unrealized gains and losses, net of applicable taxes, recorded in accumulated other comprehensive income, a component of shareholders' equity. The realized gains and losses for available-for-sale securities are included in other income and expense in the Consolidated Statements of Operations. Realized gains and losses are calculated based on the specific identification method. The Company monitors its investment portfolio for impairment on a periodic basis. When the carrying value of an investment in debt securities exceeds its fair value and the decline in value is determined to be an other-than-temporary decline, and when the Company does not intend to sell the debt security and it is not more likely than not that the Company will be required to sell the debt securities prior to recovery of its amortized cost basis, the Company records an impairment charge in the amount of the credit loss and the balance, if any, to other comprehensive income (loss).

Investments that mature between three months and one year from the purchase date are initially classified as short-term investments in the Consolidated Balance Sheet. Investments that mature beyond one year from the purchase date are initially classified as long-term investments in the Consolidated Balance Sheet.

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS - (Continued)

Foreign Currency Derivatives

The Company uses foreign currency exchange contracts to hedge certain foreign currency exposures. Foreign currency exchange contracts are cash flow hedges of the Company's foreign currency exposures on certain revenue contracts and are recorded at the contract's fair value. Most of the Company's foreign currency exchange contracts are designated as cash flow hedges for the purposes of hedge accounting treatment and any gains or losses on the effective portion of the foreign currency exchange contract is initially reported in "Accumulated other comprehensive income," a component of shareholders' equity, with a corresponding asset or liability recorded based on the fair value of the foreign currency exchange contract. When the hedged transaction is recognized, any unrecognized gains or losses on the hedged transaction are reclassified into results of operations in the same period. Any hedge ineffectiveness is recorded to operations in the current period. The Company measures hedge effectiveness by comparing changes in fair values of the foreign currency exchange contract and expected cash flows based on changes in the spot prices of the underlying currencies. Cash flows from foreign currency exchange contracts accounted for as cash flow hedges are classified in the same category as the cash flows from the items being hedged. The Company typically dedesignates its cash flow hedges for the purposes of hedge accounting treatment when the receivable related to the hedged cash flow is recorded. Unrealized gains or losses related to foreign currency exchange contracts that are not designated as cash flow hedges for the purposes of hedge accounting treatment are recorded in other income (expense) in the Consolidated Statements of Operations and are generally offset by foreign currency adjustments on related receivables. The Company does not use derivative financial instruments for speculative purposes.

Concentration of Credit Risk

Financial instruments that potentially subject the Company to significant concentrations of credit risk consist primarily of cash and cash equivalents, available-for-sale investments, accounts receivable, short-term and long-term restricted cash and foreign currency exchange contracts.

The Company maintains cash and cash equivalents, available-for-sale securities and foreign currency exchange contracts with various financial institutions. As part of its risk management process, the Company performs periodic evaluations of the relative credit standing of the financial institutions. The Company has not sustained any credit losses from instruments held at financial institutions. The Company utilizes foreign currency exchange contracts to protect against the effects of foreign currency fluctuations. Such contracts involve the risk of non-performance by the counterparty, which could result in a material loss.

The Company currently derives a significant portion of its revenue from sales of products and services to the U.S. Government. See Note 17 — Segment Information for additional information. Given the type of customers, the Company does not believe its accounts receivable represent significant credit risk.

The Company currently has a long-term investment in a sales-type lease it entered into with one of its customers. See Note 8 — Sales-type Lease for additional information. Given the credit standing of the customer, the Company does not believe that this investment represents a significant credit risk.

Other Concentration

The Company obtains certain components from single-source suppliers due to technology, availability, price, quality or other considerations. The loss of a single-source supplier, the single-source supplier's inability to deliver the required components or intellectual property due to natural disaster or other reasons, the deterioration of the relationship with a single-source supplier, or any unilateral modification of contract terms under which the Company is supplied components by a single-source supplier could have a significant adverse effect on the Company's revenue and gross margins.

Accounts Receivable

Accounts receivable are stated at principal amounts and are primarily comprised of amounts contractually due from customers for products and services and amounts due from government research and development contracts. The Company provides an allowance for doubtful accounts based on an evaluation of customer past due account balances. In determining whether to record an allowance for a specific customer, the Company considers a number of factors, including prior payment history and financial information for the customer.

Fair Values of Financial Instruments

The Company measures certain financial assets and liabilities at fair value based on the exchange price that would be received for an asset or paid to transfer a liability (an exit price) in the principal or most advantageous market for the asset or liability in an orderly transaction between market participants. The Company's financial instruments primarily consist of debt securities, time

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CRAY INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS - (Continued)

deposits, money market funds, and foreign currency derivatives. See Note 4 — Fair Value Measurement for a further discussion on fair value of financial instruments.

Inventories

Inventories are valued at the lower of cost or net realizable value, with cost computed on a first-in, first-out basis (FIFO). The Company regularly evaluates the technological usefulness and anticipated future demand for various inventory components and the expected use of the inventory. When the Company determines it is not likely the cost of inventory items will be recovered through future sales, the Company writes-down the related inventory to its estimated net realizable value.

In connection with certain of its sales agreements, the Company may receive used equipment from a customer. This inventory generally will be recorded at no value based on the expectation that the Company will not be able to resell or otherwise use the equipment. In the event that the Company has a specific contractual plan for resale or there is an expected scrap value at the date the inventory is acquired, the inventory is recorded at its estimated fair value.

Property and Equipment and Intangible Assets, Net

Property and equipment are recorded at cost less accumulated depreciation and amortization. Additions and improvements are capitalized and maintenance and repairs are expensed as incurred. Depreciation is calculated on a straight-line basis over the estimated useful lives of the related assets, ranging from eighteen months to seven years for furniture and fixtures, three years for computer equipment, and eight to twenty-five years for buildings and land improvements. Leasehold improvements are depreciated over the life of the lease or asset, whichever is shorter. The Company amortizes purchased intangible assets with finite lives using the straight-line method over the estimated economic lives of the assets, ranging from two to ten years.

Service Spares

Service spares are valued at the lower of cost or net realizable value and represent inventory used to support service and maintenance agreements with customers. As inventory is utilized, replaced items are returned to the Company and are either repaired or scrapped. Costs incurred to repair inventory to a usable state are charged to expense as incurred. Service spares are recorded at cost and amortized over the estimated service life of the related product platform (generally four years).

Impairment of Long-Lived Assets and Intangibles

The Company evaluates property, plant and equipment and intangible assets with finite lives for impairment whenever events or changes in circumstances indicate the carrying value of an asset may not be recoverable. The Company assesses the recoverability of the assets based on the undiscounted future cash flow the assets are expected to generate and recognizes an impairment loss when estimated undiscounted future cash flow expected to result from the use of the asset plus net proceeds expected from disposition of the asset, if any, are less than the carrying value of the asset. When the Company identifies an impairment, the carrying value of the asset is reduced to its estimated fair value based on a discounted cash flow approach or, when available and appropriate, to comparable market values.

Goodwill

Goodwill is not amortized but is tested for impairment at least annually. The Company reviews goodwill for impairment annually at the beginning of its second fiscal quarter and whenever events or changes in circumstances indicate that the fair value of a reporting unit may be less than its carrying amount (a triggering event). The Company first assesses qualitative factors to determine whether it is more likely than not that the fair value of a reporting unit is less than its carrying amount as a basis for determining whether it is necessary to perform the quantitative goodwill impairment test described in ASC Topic 350. The more likely than not threshold is defined as having a likelihood of more than 50 percent. If, after assessing the totality of events or circumstances, the Company determines that it is not more likely than not that the fair value of a reporting unit is less than its carrying amount, then performing the quantitative goodwill impairment test is unnecessary and goodwill is considered to be unimpaired. However, if based on the qualitative assessment the Company concludes that it is more likely than not that the fair value of a reporting unit is less than its carrying amount, the Company will proceed with performing the quantitative goodwill impairment test.

In performing the quantitative goodwill impairment test, the Company determines the fair value of each reporting unit and compares it to its carrying value. If the fair value of the reporting unit exceeds the carrying value of the net assets assigned to that

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CRAY INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS - (Continued)

unit, goodwill is not impaired. If the carrying value of a reporting unit exceeds its fair value, the Company records an impairment loss equal to the difference.

The Company performed its qualitative assessment during the second fiscal quarter of 2018 and concluded that it was more likely than not that the fair values of its reporting units were greater than their carrying amounts. After reaching this conclusion, the quantitative goodwill impairment test was unnecessary and no further testing was performed. The qualitative factors that were considered included, but were not limited to, general economic conditions, outlook for the HPC and big data markets, recent and forecasted financial performance and the price of the Company's common stock.

Business Combinations

The Company accounts for business combinations using the acquisition method of accounting and allocates the purchase price to the tangible and intangible assets acquired and the liabilities assumed based upon their estimated fair values at the acquisition date. The excess of the purchase price over the fair value of the net assets acquired is recorded as goodwill. If the fair value of the net assets acquired exceeds the purchase price the Company records a bargain purchase gain. The Company uses estimates and assumptions to value assets acquired and liabilities assumed at the acquisition date. During the measurement period, which may be up to one year from the acquisition date, any refinements made to the fair value of the assets and liabilities assumed are recorded in the period in which the adjustments are recognized.

The fair values of intangible assets acquired are estimated using a discounted cash flow approach with Level 3 inputs. Under this method, an intangible asset's fair value is equal to the present value of the incremental after-tax cash flows (excess earnings) attributable solely to the intangible asset over its remaining useful life. To calculate fair value, the Company uses risk-adjusted cash flows discounted at rates considered appropriate given the inherent risks associated with each type of asset. The Company believes the level and timing of cash flows appropriately reflects market participant assumptions.

Revenue Recognition

On January 1, 2018, the Company adopted and applied the new accounting standard ASC 606, Revenue from Contracts with Customers, which superseded nearly all existing revenue recognition guidance under GAAP, to all contracts using the modified retrospective method. The comparative information has not been restated and continues to be reported under the accounting standards in effect for those periods. Adoption of the new standard did not have a material impact on the Company's net loss during the year ended December 31, 2018. The Company expects the impact of the adoption of the new standard to be immaterial to its net income on an ongoing basis.

The Company's performance obligations are satisfied over time as work is performed or at a point in time. The majority of the Company's revenue is recognized at a point in time when products are accepted, installed or delivered. Most of the Company's revenue is derived from long-term contracts that can span several years. Revenue is recognized when performance obligations under the terms of a contract with the customer are satisfied; generally, this occurs with the transfer of control of the Company's systems or services. In general, this does not occur until the products have been shipped or services provided to the customer, risk of loss has transferred to the customer, and, where applicable, a customer acceptance has been obtained. Revenue is measured as the amount of consideration the Company expects to receive in exchange for transferring goods or providing services. Sales, value add, and other taxes that the Company collects concurrent with revenue-producing activities are excluded from revenue. Incidental items that are immaterial in the context of the contract are recognized as expense.

To determine the proper revenue recognition method for contracts, the Company evaluates whether two or more contracts should be combined and accounted for as one single contract and whether the combined or single contract should be accounted for as more than one performance obligation. Contracts are often modified to account for changes in contract specifications and requirements. To determine the proper revenue recognition method for contract modifications, the Company evaluates whether the contract modification should be accounted for as a separate contract, part of an existing contract, or termination of an existing contract and the creation of a new contract. This evaluation requires significant judgment and the decision to combine a group of contracts or separate the combined or single contract into multiple performance obligations could change the amount of revenue and profit recorded in a

given period. For contracts with multiple performance obligations, the Company allocates the contract's transaction price to each performance obligation using the Company's estimate of the standalone selling price of each distinct good or service in the contract.

The Company determines the transaction price by reviewing the established contractual terms and other relevant information. Contracts can include penalty clauses and contracts with government customers may not be fully funded, both of which represent variable consideration. Generally, the Company includes both the funded and unfunded portions of a contract with a government customer in the transaction price, as most often it is deemed the contract will become fully funded. The Company also assesses

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CRAY INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS - (Continued)

the likelihood of certain penalties that would result in contract price reductions and, if deemed probable, the transaction price is adjusted.

The majority of the Company's contracts include multiple promised goods and services, which are assessed at contract inception. Each distinct good or service is identified as a performance obligation, which may be an individual good or service or a bundle of goods or services. In order to determine whether the promises are distinct, the Company assesses the use of its products and services by its customers to determine whether the customer can benefit from the good or service on its own or from other readily available resources, and whether the promised transfer of goods or services is separately identifiable from other promises in the contract.

The majority of the Company's revenues are from product solutions which include supercomputers, storage, and data analytics systems, each of which are usually separate performance obligations. Revenue is recognized when obligations under the terms of a contract with a customer are satisfied. Product revenue is typically recognized upon customer acceptance, or upon installation or delivery if formal acceptance is not required. Service revenue is typically recognized over time and consists mainly of system maintenance, analyst services, and engineering services, each of which are usually separate performance obligations. System maintenance commences upon customer acceptance or installation, depending on the contract terms, and revenue is recognized ratably over the remaining term of the maintenance contract. On-site analysts provide specialized services to customers, the revenue for which is recognized ratably over the contract period. Service revenue is recognized on a straight-line basis over the service period as the services are available continuously to the customer. Revenue from engineering services can be recognized as services are performed or as milestones are achieved, depending on the terms of the contract and nature of services performed. If, in a contract, the customer has an option to acquire additional goods or services, that option gives rise to a performance obligation if the option provides a material right to the customer that it would not receive without entering into that contract. Revenue from purchase options can be recognized as those future goods or services are transferred or when the option expires.

The Company performs an assessment to determine whether a significant financing component is present in a contract. If a contract is determined to include a significant financing component, the interest rate used in the calculation is based on the prevailing interest rates at contract inception and the entity's creditworthiness. When the period between providing a good or service to the customer is expected to be less than one year from payment, the Company applies the practical expedient and does not adjust the consideration for the effects of a significant financing component.

Occasionally, the Company's contracts include noncash consideration. This typically consists of returned parts when a system is upgraded or de-installed. Noncash consideration is measured at contract inception at estimated fair value. The total transaction price is allocated to each performance obligation identified in the contract based on its relative standalone selling price. The Company does not have directly observable standalone selling prices for the majority of its performance obligations due to a relatively small number of customer contracts that differ in system size and contract terms which can be due to infrequently selling each performance obligation separately, not pricing products within a narrow range, or only having a limited sales history, such as in the case of certain advanced and emerging technologies. When a directly observable standalone selling price is not available, the Company estimates the standalone selling price. In determining the estimated standalone selling price, the Company uses the cost to provide the product or service plus a margin, or considers other factors. When using cost plus a margin, the Company considers the total cost of the product or service, including customer-specific and geographic factors as appropriate. The Company also considers the historical margins of the product or service on previous contracts and several other factors including any changes to pricing methodologies, competitiveness of products and services, and cost drivers that would cause future margins to differ from historical margins.

The Company sometimes offers discounts to its customers. As these discounts are offered on bundles of goods and services, the discounts are applied to all performance obligations in the contract on a pro-rata basis.

The following table provides information about contract receivables, contract assets, and contract liabilities from contracts with customers (in thousands) and includes both short-term and long-term portions:

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	December 31, 2018	December 31, 2017	Change
Contract receivables	\$ 78,634	\$ 167,346	\$(88,712)
Contract assets	6,404	9,321	(2,917)
Contract liabilities	94,004	118,741	(24,737)

Contract receivables consist of amounts billed to customers and include the Company's investment in a sales type lease, a portion of which is due beyond one year. Generally, billing occurs subsequent to product revenue recognition and payment is expected within 30 days. Contract assets primarily relate to the Company's rights to consideration for work completed but not

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS - (Continued)

billed where right to payment is not just subject to the passage of time. Contract assets become contract receivables when the rights become unconditional. The Company sometimes receives advances or deposits from customers before revenue is recognized, resulting in customer contract liabilities (formerly deferred revenue). These assets and liabilities are reported on the Consolidated Balance Sheet on a contract-by-contract basis at the end of each reporting period. The Company's payment terms vary from contract to contract. Contracts may require payment before, at or after the Company's performance obligations have been satisfied. The decrease in the Company's contract asset balance for the year ended December 31, 2018 is primarily due to the transfer from contract assets to contract receivables that were included in the contract asset balance at the beginning of the period, partially offset by the addition of new contract assets.

For the year ended December 31, 2018, the Company recognized \$76.5 million in revenues from the contract liability balance at the beginning of the year.

The Company's incremental direct costs of obtaining a contract come primarily from sales commissions, a portion of which are paid upon contract signing. These commissions are generally capitalized upon payment and expensed at the time of revenue recognition. These deferred commissions are included in prepaid expenses in the Consolidated Balance Sheet. As of December 31, 2018 and 2017, the Company had \$2.0 million and \$1.3 million, respectively, of deferred commissions. For the years ended December 31, 2018, 2017 and 2016, the Company recognized \$6.0 million, \$4.0 million and \$5.6 million, respectively, in commissions expense.

The following data presents the Company's operating segment revenues disaggregated by primary geographic market, which is determined based on a customer's geographic location (in thousands). Regions represent Europe, the Middle East, and Africa (EMEA); Asia-Pacific and Japan; and the United States, Canada, and Latin America (Americas). Revenues were reduced by \$0.5 million for the year ended December 31, 2018 related to hedging gains and losses which do not represent revenues recognized from contracts with customers.

	Americas	EMEA	Asia Pacific & Japan	Total
Year Ended December 31, 2018				
Supercomputing	\$177,506	\$54,119	\$131,899	\$363,524
Storage and Data Management	34,286	13,667	22,961	70,914
Maintenance and Support	82,892	29,797	22,820	135,509
Engineering Services and Other	16,238	672	4,600	21,510
Elimination of inter-segment revenue	(82,892)	(29,797)	(22,820)	(135,509)
Total revenue	\$228,030	\$68,458	\$159,460	\$455,948

The Company's remaining performance obligations reflect the deliverables within contracts with customers that will have revenue recognized in a future period (this may also be referred to as backlog). Due to the nature of the Company's business and the size of individual transactions, forecasting the timing and total amount of revenue recognition is subject to significant uncertainties. As of December 31, 2018, the Company has an aggregate of \$517 million in remaining performance obligations stemming from a mixture of system contracts with their related service obligations and other service obligations. Included in this balance are \$1.6 million in gains resulting from hedged foreign currency transactions, which offset the related decrease in revenue from currency fluctuations. These gains will be reclassified from accumulated other comprehensive income to revenue in the period the related transactions are recognized as revenue. These obligations are anticipated to be recognized as revenue over approximately the next six years. The Company estimates that about 55% of these obligations are expected to be recognized as revenue in the next 18 months, with the remainder thereafter.

Sales-type leases

When the Company leases a system to a customer, the accounting involves specific determinations, which often involve complex provisions and significant judgments. The four criteria of the accounting standard that the Company uses in the determination of whether a lease is a sales-type lease or an operating lease are: (a) a review of the lease

term to determine if it is equal to or greater than 75% of the economic life of the system; (b) a review of the minimum lease payments to determine if they are equal to or greater than 90% of the fair value of the system; (c) a determination of whether or not the lease transfers ownership to the lessee at the end of the lease term; and (d) a determination of whether or not the lease contains a bargain purchase option. If the lease transaction meets one of the four criteria, then it is recorded as a sales-type lease; otherwise it is an operating lease. Additionally, the Company assesses whether collectibility of the lease payments is reasonably assured and whether there are any significant uncertainties related to costs that it has yet to incur with respect to the lease.

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS - (Continued)

The Company considers the economic lives of most of its products to range from three to five years. There is no significant after-market for the Company's used products and the Company believes that the economic lives are representative of the periods during which its products are expected to be economically usable, with normal service, for the purposes for which they were intended. Residual values are not significant.

The discount rate implicit in the sales-type lease is used to calculate the present value of minimum lease payments, which the Company records as a lease receivable. The minimum lease payment consists of the gross lease payments net of executory costs and contingencies, if any. While revenue is recognized at inception of the lease, the cash flow from the sales-type lease occurs over the course of the lease, which results in interest income. Unearned interest income is recorded at inception of the lease and amortized over the lease term using the effective interest method.

Foreign Currency Translation

The Company uses the U.S. dollar predominantly as its functional currency. Assets and liabilities of foreign subsidiaries that have a functional currency denominated in non-U.S. dollars are translated into U.S. dollars at year-end exchange rates, and revenue and expenses of these foreign subsidiaries are translated at average rates prevailing during the year. Translation adjustments are included in "Accumulated other comprehensive income," a separate component of shareholders' equity. Transaction gains and losses arising from transactions denominated in a currency other than the functional currency of the entity involved are included in "Other income (expense), net" in the accompanying Consolidated Statements of Operations. Net transaction gains were \$0.1 million and \$1.7 million for 2018 and 2017, respectively. Net transaction losses were \$1.0 million for 2016.

Research and Development

Research and development expenses include costs incurred in the development and production of hardware and software, costs incurred to enhance and support existing product features, costs incurred to support and improve development processes, and costs related to future product development. Research and development costs are expensed as incurred, and may be offset by co-funding from third parties. The Company may also enter into arrangements whereby it makes advance, non-refundable payments to a vendor to perform certain research and development services. These payments are deferred and recognized over the vendor's estimated performance period. The Company classifies amounts to be received from funded research and development projects as either revenue or a reduction of research and development expense based on the specific facts and circumstances of the contractual arrangement, considering total costs expected to be incurred compared to total expected funding and the nature of the research and development contractual arrangement. In the event that a particular arrangement is determined to represent revenue, the corresponding research and development costs are classified as cost of revenue. Amounts to be received under co-funding arrangements with the U.S. government or others are based on either contractual milestones or costs incurred. These co-funding payments are recognized as a reduction of research and development expense as performance is estimated to be completed and are measured as milestone achievements occur or as costs are incurred. These estimates are reviewed on a periodic basis and are subject to change, including in the near term. If an estimate is changed, net research and development expense could be impacted significantly. The Company does not record a receivable from the U.S. government prior to completing the requirements necessary to bill for a milestone or cost reimbursement. Funding from the U.S. government is subject to certain budget restrictions and milestones may be subject to completion risk, and as a result, there are often periods in which research and development costs are expensed as incurred for which no reimbursement is recorded, as milestones have not been completed or the U.S. government has not funded an agreement. Accordingly, there can be substantial variability in the amount of net research and development expenses from quarter to quarter and year to year.

Income Taxes

Deferred tax assets and liabilities are determined based on differences between financial reporting and tax bases of assets and liabilities and operating loss and tax credit carryforwards and are measured using the enacted tax rates and laws that will be in effect when the differences and carryforwards are expected to be recovered or settled.

A valuation allowance for deferred tax assets is provided when the Company estimates that it is more likely than not that all or a portion of the deferred tax assets will not be realized through future operations. This assessment is based

upon consideration of all available positive and negative evidence, which includes, among other things, the Company's recent results of operations, forecasted domestic and international earnings over a number of years, all known business risks and industry trends, and applicable tax planning strategies that should, if implemented, enable the Company to utilize its deferred tax assets before they expire. The

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CRAY INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS - (Continued)

Company considers its actual historical results over several years to have stronger weight than other more subjective indicators, including forecasts, when considering whether to establish or reduce a valuation allowance on deferred tax assets. The Company has significant difficulty projecting future results due to the nature of the business and the industry in which it operates.

The Tax Cuts and Jobs Act subjects a U.S. corporation to tax on its global intangible low taxed income (GILTI). Under GAAP, the Company is required to make an accounting policy election to either treat taxes due on its future GILTI inclusions as either a current period expense or to account for such taxes in the measurement of its deferred tax assets. The Company has elected to account for any tax due on its GILTI as a current period expense. As a result of changes made by the Tax Cuts and Jobs Act the Company no longer considers the earnings of its foreign subsidiaries to be permanently reinvested outside of the United States.

As of December 31, 2018, the Company continued to provide a full valuation allowance against its U.S. federal deferred tax assets and against the majority of its state and foreign deferred tax assets as the realization of such assets is not considered to be more likely than not at this time. In a future period, the Company's assessment of the realizability of its deferred tax assets and therefore the appropriateness of the valuation allowance could change based on an assessment of all available evidence, both positive and negative in that future period. If the Company's conclusion about the realizability of its deferred tax assets and therefore the appropriateness of the valuation allowance changes in a future period, the Company could record a substantial tax benefit in its Consolidated Statements of Operations when that occurs. The Company recognizes the income tax benefit from a tax position only if it is more likely than not that the tax position will be sustained on examination by the applicable taxing authorities, based on the technical merits of the Company's position. The tax benefit recognized in the financial statements from such a position is measured based on the largest benefit that has a greater than fifty percent likelihood of being realized upon ultimate settlement.

Estimated interest and penalties are recorded as a component of interest expense and other expense, respectively.

Share-Based Compensation

The Company measures compensation cost for share-based payment awards at fair value and recognizes it as compensation expense over the service period for awards expected to vest. Share-based compensation expense is recognized for all share-based payment awards, net of an estimated forfeiture rate. Compensation cost is only recognized for those shares expected to vest on a straight-line basis over the requisite service period of the award. Determining the appropriate fair value model and calculating the fair value of share-based payment awards requires subjective assumptions, including the expected life of the share-based payment awards and stock price volatility. The Company utilizes the Black-Scholes options pricing model to value the stock options granted under its options plans. In this model, the assumptions utilized relate to stock price volatility, stock option term and forfeiture rates that are based upon both historical factors as well as management's judgment.

The fair value of restricted stock and restricted stock units is determined based on the number of shares or units granted and the quoted price of the Company's common stock at the date of grant.

The Company has granted performance vesting restricted stock and performance vesting restricted stock units to executives as one of the ways to align compensation with shareholder interests. Vesting of these awards is contingent upon achievement of certain performance conditions. Compensation expense for these awards is only recorded when vesting is deemed to be "probable."

Awards are evaluated for probability of vesting each reporting period. The Company does not currently believe that any of its performance vesting restricted stock units are "probable" of vesting.

Shipping and Handling Costs

Costs related to shipping and handling are included in "Cost of product revenue" and "Cost of service revenue" in the accompanying Consolidated Statements of Operations.

Advertising Costs

Sales and marketing expenses in the accompanying Consolidated Statements of Operations included advertising expenses of \$3.8 million, \$3.4 million, and \$3.2 million in 2018, 2017, and 2016, respectively. The Company incurs

advertising costs for representation at certain trade shows, promotional events and sales lead generation, as well as design and printing costs for promotional materials. The Company expenses all advertising costs as incurred.

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CRAY INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS - (Continued)

Earnings Per Share (EPS)

Basic EPS is computed by dividing net income (loss) available to common shareholders by the weighted average number of common shares, excluding unvested restricted stock, outstanding during the period. Diluted EPS is computed by dividing net income (loss) available to common shareholders by the weighted average number of common and potential common shares outstanding during the period, which includes the additional dilution related to conversion of stock options, unvested restricted stock and unvested restricted stock units as computed under the treasury stock method.

For the years ended December 31, 2018 and 2017, outstanding stock options, unvested restricted stock and unvested restricted stock units were antidilutive because of the net losses and, as such, their effect has not been included in the calculation of basic or diluted net loss per share. For the year ended December 31, 2016, the added shares from these items included in the calculation of diluted shares and EPS totaled approximately 1.2 million. Potentially dilutive shares of 3.1 million, 3.1 million, and 1.2 million, respectively, have been excluded from the denominator in the computation of diluted EPS for the years ended December 31, 2018, 2017, and 2016, respectively, because they were antidilutive. An additional 0.5 million, 0.5 million and 1.2 million performance vesting restricted stock and performance vesting restricted stock units were excluded from the computation of diluted EPS for the years ended December 31, 2018, 2017, and 2016, respectively, because the conditions for vesting had not been met as of the balance sheet date.

Accumulated Other Comprehensive Income

Accumulated other comprehensive income, a component of shareholders' equity, consisted of the following at December 31 (in thousands):

	2018	2017
Accumulated unrealized net loss on available-for-sale investments	\$—	\$(7)
Accumulated currency translation adjustments	606	1,611
Accumulated unrealized net gain (loss) on cash flow hedges	2,602	(689)
Accumulated other comprehensive income	\$3,208	\$915

Recent Accounting Pronouncements

In May 2014, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update No. 2014-09, Revenue from Contracts with Customers: Topic 606 (ASU 2014-09) to supersede nearly all existing revenue recognition guidance under GAAP. The core principle of ASU 2014-09 is to recognize revenues when promised goods or services are transferred to customers in an amount that reflects the consideration that is expected to be received for those goods or services. ASU 2014-09 defines a five step process to achieve this core principle and, in doing so, it is possible more judgment and estimates may be required within the revenue recognition process than required under prior GAAP, including identifying performance obligations in the contract, estimating the amount of variable consideration to include in the transaction price and allocating the transaction price to each separate performance obligation. The new guidance also requires additional disclosures and several terminology changes, such as amounts previously referred to as deferred revenue now being referred to as customer contract liabilities. The Company adopted ASU 2014-09 at the beginning of the first quarter of 2018 using the modified retrospective method. No cumulative effect adjustment was required to be recorded for this change in accounting as the Company determined the impact of the change to not be material. The comparative information for the years ended December 31, 2017 and 2016, and as of December 31, 2017 and 2016 has not been restated and continues to be reported under the accounting standards in effect for those periods. The effect of initially applying the new revenue standard had an immaterial effect on the Company's financial statements. Adoption of the new standard did not have a material impact on the Company's net loss during the year ended December 31, 2018. The Company expects the impact of the adoption of the new standard to be immaterial to its net income on an ongoing basis.

In January 2016, FASB issued Accounting Standards Update No. 2016-01, Recognition and Measurement of Financial Assets and Financial Liabilities: Topic 825 (ASU 2016-01). The updated guidance enhances the reporting model for financial instruments, which includes amendments to address aspects of recognition, measurement,

presentation and disclosure. The Company adopted ASU 2016-01 at the beginning of the first quarter of 2018. Adoption of ASU 2016-01 did not have a material impact on the Company's consolidated financial statements. In February 2016, FASB issued Accounting Standards Update No. 2016-02, Leases: Topic 842 (ASU 2016-02), that replaces existing lease guidance. The new standard is intended to provide enhanced transparency and comparability by requiring lessees to record right-of-use (ROU) assets and corresponding lease liabilities on the balance sheet. Under the new guidance, leases will continue to be classified as either finance or operating, with classification affecting the pattern of expense recognition in the

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CRAY INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS - (Continued)

Consolidated Statements of Operations. Lessor accounting is largely unchanged under ASU 2016-02. Adoption of ASU 2016-02 is required for fiscal reporting periods beginning after December 15, 2018, including interim reporting periods within those fiscal years with early adoption being permitted. The new standard initially required application with a modified retrospective approach to each prior reporting period presented with various optional practical expedients. In July 2018, this requirement was amended with the issuance of Accounting Standards Update No. 2018-11, Leases: Topic 842: Targeted Improvements (ASU 2018-11), which permits an additional (and optional) transition method to adopt the new leases standard. Under this new transition method, an entity initially applies the new leases standard at the adoption date and recognizes a cumulative-effect adjustment to the opening balance of retained earnings in the period of adoption. Consequently, an entity's reporting for the comparative periods presented in the financial statements in which it adopts the new leases standard will continue to be in accordance with current GAAP (Topic 840, Leases). An entity that elects this additional (and optional) transition method must provide the required Topic 840 disclosures for all periods that continue to be in accordance with Topic 840. The amendments do not change the existing disclosure requirements in Topic 840. The Company expects to adopt the standard using this additional transition method on January 1, 2019 using the effective date as its date of initial application.

The Company expects that this standard will have a material impact on its consolidated financial statements. While the Company continues to assess all of the impacts of adoption, it currently believes the most significant impact relates to the recognition of new ROU assets and lease liabilities on its consolidated balance sheet for its real estate and its computer equipment operating leases. On adoption, the Company currently expects to recognize lease liabilities of approximately \$45 million, with corresponding ROU assets of approximately \$35 million. The approximately \$45 million of lease liabilities includes approximately \$10 million that is currently included in other liabilities on the Company's consolidated balance sheet as of December 31, 2018, primarily related to lease incentives, that will be reclassified at the time of adoption.

In August 2016, FASB issued Accounting Standards Update No. 2016-15, Statement of Cash Flows (Topic 230): Classification of Certain Cash Receipts and Cash Payments (ASU 2016-15). The updated guidance clarifies how companies present and classify certain cash receipts and cash payments in the statement of cash flows. The Company adopted ASU 2016-15 at the beginning of the first quarter of 2018. Adoption of ASU 2016-15 did not have a material impact on the Company's consolidated financial statements.

In November 2016, FASB issued Accounting Standards Update No. 2016-18, Statement of Cash Flows (Topic 230): Restricted Cash (ASU 2016-18), which amends ASC 230 to add or clarify guidance on the classification and presentation of restricted cash in the statement of cash flows. The amended guidance requires that amounts that are deemed to be restricted cash and restricted cash equivalents be included in the cash and cash-equivalent balances in the statement of cash flows. A reconciliation between the consolidated balance sheet and the statement of cash flows must be disclosed when the consolidated balance sheet includes more than one line item for cash, cash equivalents, restricted cash, and restricted cash equivalents. The guidance also requires that changes in restricted cash and restricted cash equivalents that result from transfers between cash, cash equivalents, and restricted cash and restricted cash equivalents should not be presented as cash flow activities in the statement of cash flows. An entity with a material balance of amounts generally described as restricted cash and restricted cash equivalents must disclose information about the nature of the restrictions. The Company adopted ASU 2016-18 at the beginning of the first quarter of 2018. Restricted cash amounts have been combined with the cash and cash equivalent balances in the Consolidated Statement of Cash Flows for each period presented. Adoption of ASU 2016-18 did not have a material impact on the Company's consolidated financial statements.

In August 2017, FASB issued Accounting Standards Update No. 2017-12, Derivatives and Hedging (Topic 815): Targeted Improvements to Accounting for Hedging Activities (ASU 2017-12). The new standard simplifies and expands the eligible hedging strategies for financial and nonfinancial risks. It also enhances the transparency of how hedging results are presented and disclosed. Further, the new standard provides partial relief on the timing of certain aspects of hedge documentation and eliminates the requirement to recognize hedge ineffectiveness separately in earnings. Adoption of ASU 2017-12 is required for fiscal reporting periods beginning after December 15, 2018,

including interim reporting periods within those fiscal years with early adoption being permitted. The Company does not expect the adoption of ASU 2017-12 to have a material impact on its consolidated financial statements. In February 2018, FASB issued Accounting Standards Update No. 2018-02, Income Statement - Reporting Comprehensive Income (Topic 220): Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income (ASU 2018-02). The new standard amends ASC 220 to allow a reclassification from accumulated other comprehensive income to retained earnings for stranded tax effects resulting from the Tax Cuts and Jobs Act and requires entities to provide certain disclosures regarding stranded tax effects. Adoption of ASU 2018-02 is required for fiscal reporting periods beginning after December 15, 2018, including interim reporting periods within those fiscal years with early adoption being permitted. The Company will adopt ASU 2018-02 on January 1, 2019 and currently expects to elect to reclassify stranded tax effects resulting from the Tax Cuts and Jobs Act from accumulated other comprehensive income to accumulated deficit. The Company will be required to make additional disclosures but does not expect the adoption of ASU 2018-02 to have a material impact on its consolidated financial statements.

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CRAY INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS - (Continued)

In August 2018, FASB issued Accounting Standards Update No. 2018-13, Fair Value Measurement (Topic 820): Disclosure Framework—Changes to the Disclosure Requirements for Fair Value Measurement (ASU 2018-13). The new standard makes various modifications to the disclosure requirements on fair value measurement in Topic 820. Adoption of ASU 2018-13 is required for fiscal reporting periods beginning after December 15, 2019, including interim reporting periods within those fiscal years with early adoption being permitted. The Company does not expect the adoption of ASU 2018-13 to have a material impact on its consolidated financial statements.

NOTE 3 STRATEGIC TRANSACTION

On September 25, 2017, the Company completed a strategic transaction with Seagate Cloud Systems Inc. (Seagate) centered around the transfer of Seagate's ClusterStor high-performance storage business (ClusterStor) to Cray. The ClusterStor business consists of the ClusterStor L300, ClusterStor L300N and the ClusterStor SL220 storage solutions. The Company sells, supports, develops, manufactures, and tests the ClusterStor storage solutions. The addition of ClusterStor allows the Company to have more control over its storage products and to increase the value added in its solutions. It also enhances the opportunity for the Company to sell its storage products through other resellers and to consolidate its service capability.

The transaction was accounted for under the acquisition method of accounting. The assets acquired and liabilities assumed by the Company were primarily recognized at their fair value at the acquisition date using significant inputs that are not observable in the market (i.e., Level 3 inputs). The Company utilized a third-party appraisal in its determination of the fair value of the various intangible assets acquired and customer contract liabilities.

The Company received assets valued at \$20.2 million and assumed liabilities valued at \$15.7 million. The excess of assets received over liabilities assumed of \$4.5 million was accounted for as a bargain purchase and recognized as a gain in the line item gain on strategic transaction in the Consolidated Statements of Operations for the year ended December 31, 2017. The bargain purchase gain was primarily the result of the seller's planned exit from the business. Assets received at closing included cash of \$8.0 million.

The Company assumed customer support obligations associated with the ClusterStor business and added more than 125 employees and contractors. Because the fair value of the assets acquired exceeded the amount of liabilities assumed, resulting in a \$4.5 million gain on the transaction, the Company reassessed and reaffirmed that the recognition and measurement of identifiable assets acquired and liabilities assumed were appropriate as required by the accounting standards applicable to bargain purchase transactions.

The Company incurred approximately \$0.5 million of legal and other transaction costs directly related to the transaction, all of which were expensed and included in general and administrative expenses in the Consolidated Statements of Operations for the year ended December 31, 2017.

The Company estimated the fair value of the assets acquired and liabilities assumed as of the acquisition date based on information that was available at the time. The Company did not record any additional purchase price adjustments during the measurement period.

Pro forma financial results are not presented as it is impractical to obtain the necessary information. The seller did not operate the acquired assets as a standalone business and, therefore, historical financial information is not available. It is impractical to determine the revenue or net income (loss) included in the Consolidated Statements of Operations related to ClusterStor since the date of acquisition because ClusterStor has been fully integrated into the Company's storage and data management segment. The Company was also previously purchasing the same ClusterStor products from Seagate for resale that it acquired as part of the transaction. For these reasons, the operating results of ClusterStor cannot be separately identified.

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CRAY INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS - (Continued)

The following are the December 31, 2017 estimated values of the assets acquired and the liabilities assumed (in thousands):

Cash	\$8,000
Receivable from Seagate	1,782
Inventory	4,120
Property and equipment	2,915
Customer contract liabilities	(12,168)
Deferred tax liabilities	(3,019)
Other liabilities	(500)
Net tangible assets	1,130
Trademarks	90
Developed technology	1,400
Customer relationships	260
Supply agreement	1,600
Total net assets acquired	\$4,480

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CRAY INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS - (Continued)

The fair values of the major components of the intangible assets acquired and their estimated useful lives are as follows (in thousands):

Intangible Asset Class	Fair Value	Useful Life (in Years)
Trademarks	\$90	5
Developed technology	\$1,400	3
Customer relationships	\$260	10
Supply agreement	\$1,600	4

The carrying amount of the major components of intangible assets acquired are as follows as of December 31, 2018 (in thousands):

	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount
Trademarks	\$ 90	\$ 23	\$ 67
Developed technology	1,400	583	817
Customer relationships	260	33	227
Supply agreement	1,600	500	1,100
Total	\$ 3,350	\$ 1,139	\$ 2,211

The carrying amount of the major components of intangible assets acquired are as follows as of December 31, 2017 (in thousands):

	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount
Trademarks	\$ 90	\$ 5	\$ 85
Developed technology	1,400	117	1,283
Customer relationships	260	7	253
Supply agreement	1,600	100	1,500
Total	\$ 3,350	\$ 229	\$ 3,121

Aggregate amortization expense of these intangible assets expected for the years ending December 31 are as follows (in thousands):

2019	\$911
2020	794
2021	344
2022	40
2023	26
Thereafter	96
Total	\$2,211

NOTE 4 FAIR VALUE MEASUREMENTS

Under FASB Accounting Standards Codification Topic 820, Fair Value Measurements and Disclosures, based on the observability of the inputs used in the valuation techniques used to determine the fair value of certain financial assets and liabilities,

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CRAY INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS - (Continued)

the Company is required to provide the following information according to the fair value hierarchy. The fair value hierarchy ranks the quality and reliability of the information used to determine fair values.

In general, fair values determined by Level 1 inputs utilize quoted prices (unadjusted) in active markets for identical assets or liabilities. Fair values determined by Level 2 inputs utilize observable inputs other than Level 1 prices, such as quoted prices for similar assets or liabilities, quoted prices in markets that are not active or other inputs that are observable or can be corroborated by observable market data for substantially the full term of the related assets or liabilities. Fair values determined by Level 3 inputs are unobservable data points for the asset or liability, and include situations where there is little, if any, market activity for the asset or liability. The following table presents information about the Company's financial assets and liabilities that have been measured at fair value on a recurring basis as of December 31, 2018 and 2017, and indicates the fair value hierarchy of the valuation inputs utilized to determine such fair value (in thousands):

Description	Fair Value as of December 31, 2018	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)
Assets:			
Cash, cash equivalents and restricted cash	\$ 245,764	\$ 245,764	\$ —
Foreign currency exchange contracts (1)	4,569	—	4,569
Assets measured at fair value at December 31, 2018	\$ 250,333	\$ 245,764	\$ 4,569
Liabilities:			
Foreign currency exchange contracts (2)	63	—	63
Liabilities measured at fair value at December 31, 2018	\$ 63	\$ —	\$ 63
Description	Fair Value as of December 31, 2017	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)
Assets:			
Cash, cash equivalents and restricted cash	\$ 140,320	\$ 140,320	\$ —
Available-for-sale investments (3)	6,997	6,997	—
Foreign currency exchange contracts (1)	3,251	—	3,251
Assets measured at fair value at December 31, 2017	\$ 150,568	\$ 147,317	\$ 3,251
Liabilities:			
Foreign currency exchange contracts (2)	2,431	—	2,431
Liabilities measured at fair value at December 31, 2017	\$ 2,431	\$ —	\$ 2,431

(1) Included in "Prepaid expenses and other current assets" and "Other non-current assets" on the Company's Consolidated Balance Sheets.

(2) Included in "Other accrued liabilities" and "Other non-current liabilities" on the Company's Consolidated Balance Sheets.

(3) Included in "Short-term investments" on the Company's Consolidated Balance Sheets.

Foreign Currency Derivatives

The Company may enter into foreign currency derivatives to hedge future cash receipts on certain sales transactions that are payable in foreign currencies.

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CRAY INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS - (Continued)

As of December 31, 2018 and 2017, the Company had outstanding foreign currency exchange contracts that were designated and accounted for as cash flow hedges of anticipated future cash receipts on sales contracts payable in foreign currencies. The outstanding notional amounts were approximately (in millions):

	December 31,	
	2018	2017
Canadian Dollars (CAD)	54.4	56.0
Euros (EUR)	—	2.1
Japanese Yen (JPY)	—	4,345.6
New Zealand Dollars (NZD)	—	16.2

The Company had hedged foreign currency exposure related to these designated cash flow hedges of approximately \$41.6 million and \$96.3 million as of December 31, 2018 and 2017, respectively.

As of December 31, 2018 and 2017, the Company had outstanding foreign currency exchange contracts that had been dedesignated for the purposes of hedge accounting treatment. The Company dedesignates cash flow hedges when the receivable related to the hedged cash flow is recorded. The outstanding notional amounts were approximately (in millions):

	December 31,	
	2018	2017
British Pounds (GBP)	24.8	26.1
Singapore Dollars (SGD)	2.0	—
Korean Won (KRW)	4,446.5	—
Euros (EUR)	—	4.7
Canadian Dollars (CAD)	—	0.3
Swiss Francs (CHF)	—	2.6

The foreign currency exposure related to these contracts was approximately \$40.6 million and \$46.9 million as of December 31, 2018 and 2017, respectively. Unrealized gains or losses related to these dedesignated contracts are recorded in other income (expense) in the Consolidated Statements of Operations and are generally offset by foreign currency adjustments on related receivables. These foreign currency exchange contracts are considered to be economic hedges.

Cash receipts associated with the hedged contracts are expected to be received from 2019 through 2022, during which time the revenue on the associated sales contracts is expected to be recognized, or in the case of receivables denominated in a foreign currency, the receivables balances will be collected. Any gain or loss on hedged foreign currency will be recognized in operations at the time of customer acceptance, or in the case of receivables denominated in a foreign currency, each period during which hedged receivables denominated in a foreign currency are outstanding.

As of December 31, 2018 and 2017, the fair value of outstanding foreign currency exchange contracts totaled a net gain of \$4.5 million and \$0.8 million, respectively.

Fair values of derivative instruments, consisting of foreign currency exchange contracts, designated as cash flow hedges (in thousands):

	December 31,	
	2018	2017
Balance Sheet Location		
Prepaid expenses and other current assets	\$1,296	\$546
Other non-current assets	137	—
Other accrued liabilities	—	(129)
Other non-current liabilities	—	(1,907)
Total fair value of derivative instruments designated as cash flow hedges	\$1,433	\$(1,490)

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CRAY INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS - (Continued)

As of December 31, 2018, unrecognized gains, net of tax, of \$2.6 million were included in “Accumulated other comprehensive income” on the Company’s Consolidated Balance Sheets. As of December 31, 2017, unrecognized losses, net of tax, of \$0.7 million, were included in “Accumulated other comprehensive income” on the Company’s Consolidated Balance Sheets.

Fair values of derivative instruments, consisting of foreign currency exchange contracts, not designated as cash flow hedges (in thousands):

Balance Sheet Location	December 31,	
	2018	2017
Prepaid expenses and other current assets	\$1,894	\$1,252
Other non-current assets	1,242	1,453
Other accrued liabilities	(63)	(395)
Total fair value of derivative instruments not designated as cash flow hedges	\$3,073	\$2,310

NOTE 5 ACCUMULATED OTHER COMPREHENSIVE INCOME

The following table shows the impact on product revenue of reclassification adjustments from accumulated other comprehensive income resulting from hedged foreign currency transactions recorded by the Company for the years ended December 31, 2018, 2017, and 2016 (in thousands). The gross reclassification adjustments decreased product revenue for the years ended December 31, 2018 and 2017 and increased product revenue for the year ended December 31, 2016.

	Year Ended December 31,		
	2018	2017	2016
Gross of Tax Reclassifications	\$(517)	\$(146)	\$22,207
Net of Tax Reclassifications	\$(517)	\$(87)	\$13,324

The following tables show the changes in Accumulated Other Comprehensive Income by component for the years ended December 31, 2018 and 2017 (in thousands):

Year Ended December 31, 2018

	Unrealized Loss on Investments	Foreign Currency Translation Adjustments	Unrealized Gain (Loss) on Cash Flow Hedges	Accumulated Other Comprehensive Income
Beginning balance	\$ (7)	\$ 1,611	\$ (689)	\$ 915
Current-period change, net of tax	7	(1,005)	3,291	2,293
Ending balance	\$ —	\$ 606	\$ 2,602	\$ 3,208

Income tax expense (benefit) associated with current-period change

Year Ended December 31, 2017

	Unrealized Loss on Investments	Foreign Currency Translation Adjustments	Unrealized Gain (Loss) on Cash Flow Hedges	Accumulated Other Comprehensive Income
Beginning balance	\$ —	\$ 2,101	\$ 681	\$ 2,782
Current-period change, net of tax	(7)	(490)	(1,370)	(1,867)

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Ending balance	\$ (7)	\$ 1,611	\$ (689)	\$ 915
Income tax expense (benefit) associated with current-period change	\$ (3)	\$ 1,110	\$ (1,399)	\$ (292)

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CRAY INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS - (Continued)

NOTE 6 INVESTMENTS

The Company's investments in debt securities with maturities at purchase greater than three months are classified as "available-for-sale." Changes in fair value are reflected in other comprehensive income (loss). The carrying amount of the Company's investments in available-for-sale securities are shown in the table below (in thousands):

	December 31, 2017
Short-term available-for-sale securities cost	\$ 7,007
Short-term available-for-sale securities unrealized loss	(10)
Short-term available-for-sale securities fair value	\$ 6,997

The Company's investments in debt securities were investment grade and carried a long-term rating of A2/A or higher.

NOTE 7 ACCOUNTS AND OTHER RECEIVABLES, NET

A summary of net accounts and other receivables follows (in thousands):

	December 31,	
	2018	2017
Trade accounts receivable	\$63,414	\$131,151
Current contract assets	4,391	9,321
Advance billings	1,832	3,569
Short-term investment in sales-type lease	12,462	10,684
Other receivables	6,708	7,337
	88,807	162,062
Allowance for doubtful accounts	(988)	(28)
Accounts and other receivables, net	\$87,819	\$162,034

Contract assets represent amounts where the Company has recognized revenue in advance of the contractual billing terms. Advance billings represent billings made based on contractual terms for which revenue has not been recognized.

As of December 31, 2018 and 2017, accounts and other receivables included \$25.6 million and \$45.3 million, respectively, due from the U.S. Government. Of these amounts, \$1.5 million and \$2.1 million were unbilled and included in contract assets as of December 31, 2018 and 2017, respectively, based upon contractual billing arrangements with these customers. As of December 31, 2018, two non-U.S. Government customers accounted for 28% of total accounts and other receivables. As of December 31, 2017, two non-U.S. Government customers accounted for 38% of total accounts and other receivables.

NOTE 8 SALES-TYPE LEASE

The Company has a sales-type lease with one non-U.S. Government customer, under which it will receive quarterly payments over the term of the lease, which expires in September 2020. The lease is denominated in British Pounds and the Company has entered into certain foreign currency exchange contracts that act as an economic hedge for the foreign currency exposure associated with this arrangement.

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CRAY INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS - (Continued)

The following table shows the components of the net investment in the sales-type lease as of December 31, 2018 and 2017 (in thousands):

	December 31	
	2018	2017
Total minimum lease payments to be received	\$25,543	\$42,268
Less: executory costs	(2,985)	(6,831)
Net minimum lease payments receivable	22,558	35,437
Less: unearned income	(510)	(1,386)
Net investment in sales-type lease	22,048	34,051
Less: long-term investment in sales-type lease	(9,586)	(23,367)
Investment in sales-type lease included in accounts and other receivables	\$12,462	\$10,684

As of December 31, 2018, minimum lease payments for each of the succeeding two fiscal years were as follows (in thousands):

2019	\$14,605
2020	10,938
Total minimum lease payments to be received	\$25,543

NOTE 9 INVENTORY

A summary of inventory follows (in thousands):

	December 31	
	2018	2017
Components and subassemblies	\$42,390	\$37,219
Work in process	17,429	59,456
Finished goods	20,541	89,632
	\$80,360	\$186,307

As of December 31, 2018 and 2017, \$16.0 million and \$48.1 million, respectively, of finished goods inventory was located at customer sites pending acceptance. At December 31, 2018, the U.S. Government accounted for \$13.9 million of finished goods inventory and at December 31, 2017, two non-U.S. Government customers accounted for \$67.7 million of finished goods inventory.

The Company wrote-off \$2.2 million and \$4.8 million of excess and obsolete inventory during the years ended December 31, 2018 and 2016, respectively. The company did not write-off any inventory during the year ended December 31, 2017.

NOTE 10 PROPERTY AND EQUIPMENT, NET

A summary of property and equipment follows (in thousands):

	December 31,	
	2018	2017
Land	\$203	\$203
Buildings	20,542	20,480
Furniture and equipment	11,622	13,219
Computer equipment	67,948	58,358
Leasehold improvements	11,669	9,961
	111,984	102,221
Accumulated depreciation and amortization	(76,247)	(65,598)
Property and equipment, net	\$35,737	\$36,623

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CRAY INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS - (Continued)

Depreciation expense on property and equipment for 2018, 2017, and 2016 was \$13.5 million, \$14.4 million and \$12.5 million, respectively.

NOTE 11 CUSTOMER CONTRACT LIABILITIES

Liabilities from contracts with customers consisted of the following (in thousands):

	December 31	
	2018	2017
Contract liability - product	\$5,667	\$22,245
Contract liability - service	88,337	96,496
Total contract liabilities	94,004	118,741
Less: long-term contract liabilities	(32,021)	(38,622)
Current contract liabilities	\$61,983	\$80,119

As of December 31, 2018 and 2017, the U.S. Government accounted for \$29.8 million and \$32.5 million, respectively, of total customer contract liabilities. As of December 31, 2018 and 2017, no non-U.S. Government customers accounted for more than 10% of total customer contract liabilities.

NOTE 12 COMMITMENTS AND CONTINGENCIES

The Company has recorded rent expense under leases for buildings or office space, which were accounted for as operating leases, in 2018, 2017, and 2016 of \$7.7 million, \$8.7 million, and \$8.4 million, respectively. The 2016 rent expense includes a \$2.3 million lease termination fee for the Company's St. Paul facility.

Minimum contractual commitments as of December 31, 2018, were as follows (in thousands):

	Operating Development	
	Leases	Agreements
2019	\$ 7,285	\$ 17,642
2020	6,654	2,234
2021	6,682	74
2022	6,641	76
2023	5,740	—
Thereafter	28,854	—
Minimum contractual commitments	\$ 61,856	\$ 20,026

In its normal course of operations, the Company engages in development arrangements under which it hires outside engineering resources to augment its existing internal staff in order to complete research and development projects, or parts thereof. For the years ended December 31, 2018, 2017, and 2016, the Company incurred \$24.7 million, \$17.5 million and \$15.6 million, respectively, for such arrangements.

Litigation

From time to time, the Company is subject to various legal proceedings that arise in the ordinary course of business. Other than as outlined below, none of these legal proceedings are deemed to be material to the Company's business. The Company is subject to patent lawsuits brought by Raytheon Company, or Raytheon. The first suit was brought by Raytheon on September 25, 2015 in the Eastern District of Texas (Civil Action No. 2:15-cv-1554) asserting infringement of four patents owned by Raytheon. Two of the originally asserted patents relate to computer hardware alleged to be encompassed by Cray's current and past products (the "Hardware Patents"), and the two remaining asserted patents relate to features alleged to be performed by certain third-party software that Cray optionally includes as part of its product offerings (the "Software Patents"). A second suit was brought by Raytheon on April 22, 2016 in the Eastern District of Texas (Civil Action No. 2:16-cv-423) asserting infringement of five patents owned by Raytheon. In this second suit, all five asserted patents relate to features alleged to be performed by certain third-party software that Cray optionally includes as part of its product offerings. On September 21, 2017, the United States Court of Appeals for the Federal Circuit granted Cray's petition for writ of mandamus and overturned the trial court's determination that venue in the first action was proper in the Eastern District of Texas, and accordingly on April 5, 2018,

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CRAY INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS - (Continued)

the trial court ordered that the first action should be transferred to the Western District of Wisconsin as had been requested by Cray, which was effective on April 30, 2018 (Civil Action No. 3:18-cv-00318-wmc). After transfer, Raytheon indicated its desire to withdraw its claims for infringement of the Hardware Patents. Accordingly, the Wisconsin court, upon joint motion of the parties, has dismissed with prejudice the counts related to the Hardware Patents, and Raytheon has served on the Company and filed with the court covenants not to sue for infringement of the Hardware Patents. Trial has been set for June 3, 2019, on the remaining two counts relating to the Software Patents, and the Wisconsin court held a summary judgment hearing on January 10, 2019. The Texas court, upon joint motion of the parties, has also transferred the second action to the Northern District of California (Civil Action No. 3:18-cv-03388-RS). Per joint motion of the parties, the California court has stayed the second action pending resolution of the first action. The Company is vigorously defending these actions. The probable outcome of either litigation cannot be determined, nor can the Company estimate a range of potential loss. Based on its review of the matters to date, the Company believes that it has valid defenses and claims in each of the two lawsuits. As a result, the Company considers the likelihood of a material loss related to these matters to be remote.

NOTE 13 INCOME TAXES

Income taxes are recognized for the amount of taxes payable for the current year and for the impact of deferred tax assets and liabilities, which represent consequences of events that have been recognized differently in the financial statements under GAAP than for tax purposes.

On December 22, 2017, the President of the United States signed into law H.R. 1, “An Act to Provide for Reconciliation Pursuant to Titles II and V of the Concurrent Resolution on the Budget for Fiscal Year 2018” (the “Tax Cuts and Jobs Act”). ASC Topic 740, Accounting for Income Taxes, requires companies to recognize the effect of tax law changes in the period of enactment. The Tax Cuts and Jobs Act made significant changes to existing U.S. tax law, including, but not limited to, a permanent reduction to the U.S. federal corporate income tax rate from 35% to 21%, imposition of a one-time tax on deferred foreign income (“Repatriation Transition Tax”), adoption of a participation exemption system with respect to the taxation of future dividends received from foreign corporations, and repeal of the corporate alternative minimum tax system. Other significant changes in the Tax Cuts and Jobs Act include taxing payments made to foreign related parties that are deemed to be excessive, imposing a minimum tax on certain foreign earnings, requiring (beginning after December 31, 2021) the capitalization and subsequent amortization of certain research and development related expenses, and placing additional limits on the use of net operating losses and the deductibility of certain executive compensation.

During the year ended December 31, 2017, the Company recorded a reduction, in the amount of \$28.9 million, in the carrying value of its U.S. deferred tax assets as a result of a reduction in the U.S. federal corporate income tax rate to 21% and provisional tax expense, in the amount of \$0.3 million, attributable to the Repatriation Transition Tax and provisional tax expense, in the amount of \$0.3 million, as a result of its decision to no longer consider the undistributed earnings of its foreign subsidiaries to be permanently reinvested outside of the U.S. Given the significance of the Tax Cuts and Jobs Act, the FASB issued Accounting Standards Update No. 2018-05, Income Taxes (Topic 740): Amendments to SEC Paragraphs Pursuant to SEC Staff Accounting Bulletin No. 118 that recognized that a company’s review of the income tax effects attributable to the enactment of the Tax Cuts and Jobs Act may have been incomplete at the time financial statements were issued for the reporting period that included the date of enactment and allowed a company to record provisional amounts during a one year measurement period.

During the measurement period, income tax effects attributable to the enactment of the Tax Cuts and Jobs Act could be adjusted and recognized, as a discrete item in the applicable reporting period, as information became available, prepared or analyzed. The measurement period was deemed to have ended when the company had obtained, prepared and analyzed the information necessary to finalize its accounting. During the third quarter of 2018, the Company finalized its accounting with respect to the items for which provisional tax expense was recorded. No significant adjustments were made to the provisional amounts that were recorded.

The Tax Cuts and Jobs Act also subjects a U.S. corporation to tax on its global intangible low taxed income (GILTI). Under GAAP, the Company is required to make an accounting policy election to either treat taxes due on its future

GILTI inclusions as either a current period expense or to account for such taxes in the measurement of its deferred tax assets. The Company has elected to account for any tax due on its GILTI as a current period expense.

A majority of the Company's deferred tax assets result from net operating loss carryforwards and research and development tax credits. As of December 31, 2018, the Company had U.S. federal net operating loss carryforwards of approximately \$103.3 million and U.S. federal research and development tax credit carryforwards of approximately \$39.9 million. Upon the adoption of ASU 2016-09, Compensation-Stock Compensation (Topic 718): Improvements to Employee Share-Based Payment Accounting in March of 2016, the Company recognized \$16.6 million in deferred tax benefits from approximately \$47.4 million of federal net operating losses attributable to share-based income tax deductions that exceeded amounts that had been recognized for financial reporting purposes. These deferred tax benefits were recorded as a cumulative-effect adjustment to accumulated deficit. Approximately \$70.5 million of the Company's federal net operating losses will expire between 2019 and 2037; the remainder can

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CRAY INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS - (Continued)

be carried forward indefinitely. The federal research and development tax credits will expire from 2021 through 2038 if not utilized. Utilization of \$21.2 million of the Company's federal net operating loss carryforwards generated prior to May 10, 2001 is limited under Section 382 of the Internal Revenue Code to \$4.3 million per year. As of December 31, 2018, the Company had approximately \$5.0 million of foreign net operating loss carryforwards that can be carried forward indefinitely, with certain amounts expiring from 2019 to 2027.

Income (loss) before income taxes consisted of the following (in thousands):

	Year Ended December 31,		
	2018	2017	2016
United States	\$(76,980)	\$(53,201)	\$2,648
International	6,670	311	7,273
Total	\$(70,310)	\$(52,890)	\$9,921

The tax provision (benefit) for income taxes related to operations consisted of the following (in thousands):

	Year Ended December 31,		
	2018	2017	2016
Current provision (benefit):			
Federal	\$—	\$445	\$3
State	141	310	(279)
Foreign	1,777	1,735	1,443
Total current provision	1,918	2,490	1,167
Deferred provision (benefit):			
Federal	—	77,152	(2,127)
State	(448)	1,185	416
Foreign	(99)	112	(150)
Total deferred provision (benefit)	(547)	78,449	(1,861)
Total provision (benefit) for income taxes	\$1,371	\$80,939	\$(694)

The tax provision (benefit) differs from the amount computed by applying the federal statutory income tax rate as follows (in thousands):

	Year Ended December 31,		
	2018	2017	2016
Income tax provision (benefit) at statutory rate	\$(14,765)	\$(18,511)	\$3,472
State taxes, net of federal benefit	221	(1,066)	89
Foreign income taxes	717	135	(407)
Additional increases (deductions) from share-based compensation	(767)	1,036	(1,815)
Deemed dividends for U.S. income tax purposes	639	—	329
Nondeductible expenses	147	222	231
Disallowed compensation	331	60	331
Audit accrual (settlement)	—	1,156	(297)
Research and development tax credit	(3,272)	(3,827)	(2,470)
Tax effect of repatriation transition tax on unremitted earnings	—	605	—
Gain on strategic transaction	—	(1,568)	—
Deferred tax impact from tax rate change	—	28,907	—
Effect of change in valuation allowance on deferred tax assets	18,120	73,790	(157)
Effective income tax provision (benefit)	\$1,371	\$80,939	\$(694)

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CRAY INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS - (Continued)

Significant components of the Company's deferred income tax assets and liabilities follow (in thousands):

	December 31,	
	2018	2017
Deferred Income Tax Assets		
Inventory	\$2,981	\$6,495
Accrued compensation	1,076	262
Deferred revenue	9,733	8,285
Research and development credit carryforwards	35,520	32,218
Net operating loss carryforwards	28,877	22,775
Property and equipment	7,439	4,136
Goodwill	451	289
Research and development expenses	19,849	9,944
Share-based compensation	4,635	4,124
Other	1,992	2,592
Gross deferred tax assets	112,553	91,120
Valuation allowance	(101,589)	(82,875)
Deferred tax assets	10,964	8,245
Deferred Income Tax Liabilities		
Investment in sales-type lease, net	(5,359)	(3,084)
Intangible assets	(163)	(205)
Other	(4,138)	(3,850)
Deferred tax liabilities	(9,660)	(7,139)
Net deferred tax asset	\$1,304	\$1,106

The Company's net deferred tax asset is included in other non-current assets in the Company's Consolidated Balance Sheets.

The Company recorded income tax expense of \$1.4 million and \$80.9 million during the years ended December 31, 2018 and 2017, respectively, and an income tax benefit of \$0.7 million during the year ended December 31, 2016. The difference between the income tax benefit at the statutory rate and the Company's effective income tax expense for the year ended December 31, 2018 was the result of its decision to continue to provide a full valuation allowance against the Company's U.S. federal deferred tax assets offset, in part, by foreign taxes. The difference between the income tax benefit at the statutory rate and the Company's effective income tax expense for the year ended December 31, 2017 was primarily attributable to the reduction in the U.S. federal corporate income tax rate as a result of the Tax Cuts and Jobs Act and its impact on the carrying value of the Company's U.S. deferred tax assets and the Company's decision after the Tax Cuts and Jobs Act was enacted to increase the valuation allowance held against its U.S. deferred tax assets, offset, in part, by research and development tax credits. The difference between the income tax provision at the statutory rate and the Company's effective income tax benefit for the year ended December 31, 2016 was the result of research and development tax credits and additional tax deductions from share-based compensation, sometimes referred to as excess tax benefits, partially offset by state taxes, non-deductible expenses and other permanent items. Excess tax benefits arise when tax deductions recognized by the Company with respect to share-based compensation exceed the compensation cost attributable to share-based compensation that was recognized in the Company's consolidated financial statements.

The valuation allowance on deferred tax assets increased by \$18.7 million and \$74.1 million in 2018 and 2017, respectively, and decreased by \$0.8 million in 2016. Substantially all of the increase in the valuation allowance during 2018 was attributable to the Company's decision to continue to provide a full valuation allowance against its U.S. federal deferred tax assets and against a majority of its state and foreign deferred tax assets.

The Company's assessment of its ability to utilize its U.S. deferred tax assets is based upon all available positive and negative evidence, which includes, among other things, the Company's recent results of operations, forecasted

domestic and international earnings over a number of years, all known business risks and industry trends, and applicable tax planning strategies. The Company considers its actual historical results over several years to have stronger weight than other more subjective indicators, including forecasts, when considering whether to establish or reduce a valuation allowance on deferred tax assets. The Company has significant difficulty projecting future results due to the nature of its business and the industry in which it operates. As of December 31, 2018, the Company has experienced a significant decline in revenue, gross profit, and operating income since 2015, has reported a cumulative pre-tax loss in recent years and is forecasting to report a pre-tax loss for the year ending December 31, 2019.

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS - (Continued)

The Company's conclusion about the realizability of its deferred tax assets, and therefore the appropriateness of the valuation allowance, is reviewed quarterly and could change in future periods depending on the Company's future assessment of all available evidence in support of the likelihood of realization of its deferred tax assets. If the Company's conclusion about the realizability of its deferred tax assets and therefore the appropriateness of its valuation allowance changes in a future period, it could record a substantial tax benefit in the Consolidated Statements of Operations when that occurs.

The following table summarizes changes in the amount of the Company's unrecognized tax benefits for uncertain tax positions for the three years ended December 31, 2018, 2017, and 2016 (in thousands):

Balance at December 31, 2015	\$6,214
Increase related to prior year income tax positions	53
Decrease related to prior year income tax positions	(365)
Increase related to current year income tax positions	565
Balance at December 31, 2016	\$6,467
Increase related to prior year income tax positions	1,440
Increase related to current year income tax positions	673
Balance at December 31, 2017	\$8,580
Increase related to prior year income tax positions	47
Increase related to current year income tax positions	830
Balance at December 31, 2018	\$9,457

Included in the balance of unrecognized tax benefits as of December 31, 2018 was \$1.3 million of tax benefits that, if recognized, would affect the effective tax rate. It is not anticipated that the balance of unrecognized tax benefits will significantly change over the next twelve months.

The Company or its subsidiaries file income tax returns in the U.S. federal jurisdiction and various state and foreign jurisdictions. The Company defines its major tax jurisdictions to include United Kingdom and the United States. The Company is no longer subject to income tax examinations with respect to periods before 2017 in the United Kingdom and before 2015 in the United States, although in the United States net operating loss and tax credit carryforwards generated in a year are subject to examination and adjustment for at least three years following the year in which such losses or credits are actually used to offset taxable income.

Estimated interest and penalties are recorded as a component of interest expense and other expense, respectively. Such amounts were not material for 2018, 2017, and 2016.

NOTE 14 CREDIT FACILITIES

On April 20, 2018 the Company amended its Credit Facility with Wells Fargo. Pursuant to the amendment, the Credit Facility was reduced from \$50.0 million to \$15.0 million. The Credit Facility is for general corporate purposes, including working capital requirements and to support the issuance of letters of credit. The Credit Facility is secured by a first priority lien on up to \$15.0 million of the Company's investments account held with Wells Fargo Bank. The Company had \$15.0 million in long-term restricted cash associated with the Credit Facility as of December 31, 2018. The amended Credit Facility expires on March 1, 2020.

The Company made no draws and had no outstanding cash borrowings on the credit facility as of December 31, 2018. As of December 31, 2018, the Company had \$17.3 million in total restricted cash. The company had \$13.9 million in USD equivalent value in outstanding letters of credit, the majority of which was supported by the Wells Fargo Credit Facility, as of December 31, 2018.

NOTE 15 SHAREHOLDERS' EQUITY

Preferred Stock: The Company has 5,000,000 shares of undesignated preferred stock authorized, and no shares of preferred stock outstanding.

Common Stock: The Company has 75,000,000 authorized shares of common stock with a par value of \$0.01 per share.

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CRAY INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS - (Continued)

Stock Plans: As of December 31, 2018, the Company had one active equity incentive plan that provides shares available for option, restricted stock and restricted stock unit grants to employees, directors, executives and others.

Stock Options: In determining the fair value of stock options, the Company uses the Black-Scholes option pricing model. The following key weighted average assumptions were employed in the calculation for the indicated years ended December 31:

	2018	2017	2016
Risk-free interest rate	2.84 %	1.64 %	1.12 %
Expected dividend yield	— %	— %	— %
Volatility	48.92 %	54.14 %	50.92 %
Expected life (in years)	4.0	4.0	4.0
Weighted average Black-Scholes value of options granted	\$11.12	\$7.91	\$13.16

The risk-free interest rate is based on the U.S. Treasury yield curve in effect at the time of grant. The Company does not anticipate declaring dividends in the foreseeable future. Volatility is based on historical data. The expected life of an option is based on the assumption that options will be exercised, on average, about two years after vesting occurs. The Company recognizes compensation expense for only the portion of options that are expected to vest. Therefore, management applies an estimated forfeiture rate that is derived from historical employee termination data and adjusted for expected future employee turnover rates. The estimated forfeiture rates applied to the Company's stock option grants for the years ended December 31, 2018, 2017, and 2016 was 8.0%. If the actual number of forfeitures differs from those estimated by management, additional adjustments to compensation expense may be required in future periods. The Company's stock price volatility, option lives and expected forfeiture rates involve management's best estimates at the time of such determination, which impact the fair value of the option calculated under the Black-Scholes methodology and, ultimately, the expense that will be recognized over the vesting period or requisite service period of the option. The Company typically issues stock options with a four-year vesting period (the requisite service period) and amortizes the fair value of stock options (share-based compensation cost) ratably over the requisite service period. Options to purchase shares expire no later than ten years after the date of grant.

A summary of the Company's stock option activity and related information follows:

	Options	Weighted Average Exercise Price	Weighted Average Remaining Contractual Term (Years)
Outstanding at January 1, 2016	1,948,475	\$ 14.83	
Granted	240,075	32.65	
Exercised	(168,825)	12.57	
Canceled and forfeited	(30,588)	26.60	
Outstanding at December 31, 2016	1,989,137	16.99	
Granted	324,500	18.36	
Exercised	(157,257)	8.51	
Canceled and forfeited	(121,906)	27.02	
Outstanding at December 31, 2017	2,034,474	17.26	
Granted	170,053	27.09	
Exercised	(251,121)	9.49	
Canceled and forfeited	(75,804)	26.70	
Outstanding at December 31, 2018	1,877,602	18.81	5.3
Exercisable at December 31, 2018	1,446,949	17.23	4.3
Available for grant at December 31, 2018 (1)	2,325,135		

- (1) Using the plan's fungible ratio of 1.55:1 for full-value awards, 1,500,087 shares were available for restricted stock awards, stock bonus awards, restricted stock units, performance shares or performance units.

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CRAY INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS - (Continued)

Outstanding and exercisable options by price range as of December 31, 2018, were as follows:

Range of Exercise Prices per Share	Outstanding Options			Exercisable Options	
	Number	Weighted	Weighted	Number	Weighted
		Average Remaining Life (Years)	Average Exercise Price		Average Exercise Price
\$ 0.00 - \$ 10.00	484,961	1.4	\$ 5.08	484,961	\$ 5.08
\$ 10.01 - \$ 20.00	556,751	6.3	16.79	380,955	16.24
\$ 20.01 - \$ 30.00	638,777	6.8	26.55	446,038	26.32
\$ 30.01 - \$ 42.40	197,113	7.3	33.19	134,995	33.61
\$ 0.00 - \$ 42.40	1,877,602	5.3	18.81	1,446,949	17.23

As of December 31, 2018, there was \$10.7 million of aggregate intrinsic value of outstanding stock options, including \$10.1 million of aggregate intrinsic value of exercisable stock options. Intrinsic value represents the total pretax intrinsic value for all “in-the-money” options (i.e., the difference between the Company’s closing stock price on the last trading day of 2018 and the exercise price, multiplied by the number of shares of common stock underlying the stock options) that would have been received by the option holders if all option holders had exercised their options on December 31, 2018. This amount changes, based on the fair market value of the Company’s stock. Total intrinsic value of options exercised was \$3.5 million, \$1.8 million, and \$4.0 million for the years ended December 31, 2018, 2017, and 2016, respectively.

Restricted Stock: During 2018, 2017 and 2016, the Company issued an aggregate of 28,469, 44,002, and 9,893 shares of restricted stock, respectively, to certain directors, executives and other employees. The grant date fair value of these grants was approximately \$0.8 million, \$0.8 million, and \$0.3 million for 2018, 2017 and 2016, respectively. Share-based compensation expense is recorded over the vesting period, which is generally one year for non-employee directors and four years for officers and employees of the Company.

A summary of the Company’s unvested restricted stock grants and changes during the indicated years ended December 31 is as follows:

	Service Vesting Restricted Shares		Performance Vesting Restricted Shares		Total Restricted Shares	
	Shares	Weighted Average Grant Date Fair Value	Shares	Weighted Average Grant Date Fair Value	Shares	Weighted Average Grant Date Fair Value
Outstanding at January 1, 2016	516,443	\$ 24.12	585,500	\$ 15.07	1,101,943	\$ 19.31
Granted	9,893	34.86	—	—	9,893	34.86
Forfeited	(18,685)	24.73	(72,000)	15.57	(90,685)	17.46
Vested	(250,849)	22.14	—	—	(250,849)	22.14
Outstanding at December 31, 2016	256,802	26.43	513,500	15.00	770,302	18.81
Granted	44,002	17.55	—	—	44,002	17.55
Forfeited	(32,207)	28.15	(513,500)	15.00	(545,707)	15.78
Vested	(156,272)	25.25	—	—	(156,272)	25.25
Outstanding at December 31, 2017	112,325	24.09	—	—	112,325	24.09
Granted	28,469	27.10	—	—	28,469	27.10
Forfeited	(680)	26.26	—	—	(680)	26.26
Vested	(105,845)	23.61	—	—	(105,845)	23.61
Outstanding at December 31, 2018	34,269	27.64	—	—	34,269	27.64

The estimated forfeiture rates applied to the Company's service vesting restricted stock grants during the years ended December 31, 2018, 2017 and 2016 was 8.0%. The aggregate fair value of restricted shares vested during 2018, 2017 and 2016 was \$2.5 million, \$2.9 million, and \$7.7 million, respectively. There are no longer any performance vesting restricted shares outstanding.

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CRAY INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS - (Continued)

Restricted Stock Units: During 2018, 2017 and 2016, the Company issued an aggregate of 513,681, 825,000 and 244,160 restricted stock and performance vesting restricted stock units, respectively, to certain executives and other employees. The grant date fair value of these grants was approximately \$13.3 million, \$15.2 million and \$8.0 million for 2018, 2017 and 2016, respectively. Restricted stock units have similar vesting characteristics as restricted stock but are not outstanding shares and do not have any voting or dividend rights. The Company records share-based compensation expense over the vesting period. At the time of vesting, a share of common stock representing each restricted stock unit vested will be issued by the Company.

A summary of the Company's unvested restricted stock unit grants and changes during the indicated years ended December 31 is as follows:

	Service Vesting Restricted Stock Units		Performance Vesting Restricted Stock Units		Total Restricted Stock Units	
	Units	Weighted Average Grant Date Fair Value	Units	Weighted Average Grant Date Fair Value	Units	Weighted Average Grant Date Fair Value
Outstanding at January 1, 2016	273,050	\$ 29.75	632,700	\$ 30.04	905,750	\$ 29.95
Granted	220,575	31.89	23,585	42.65	244,160	32.93
Forfeited	(7,700)	29.44	—	—	(7,700)	29.44
Vested	(60,204)	29.57	—	—	(60,204)	29.57
Outstanding at December 31, 2016	425,721	30.89	656,285	30.49	1,082,006	30.65
Granted	799,000	18.40	26,000	20.25	825,000	18.46
Forfeited	(95,001)	25.75	(199,800)	30.04	(294,801)	28.66
Vested	(141,697)	30.91	—	—	(141,697)	30.91
Outstanding at December 31, 2017	988,023	21.29	482,485	30.13	1,470,508	24.19
Granted	513,681	25.94	—	—	513,681	25.94
Forfeited	(64,812)	21.41	—	—	(64,812)	21.41
Vested	(270,584)	22.41	—	—	(270,584)	22.41
Outstanding at December 31, 2018	1,166,308	23.07	482,485	30.13	1,648,793	25.14

The estimated forfeiture rates applied to the Company's service vesting restricted stock unit grants during the years ended December 31, 2018, 2017 and 2016 was 8.0%. The aggregate fair value of restricted stock units vested during 2018, 2017 and 2016 was \$6.1 million, \$2.7 million and \$1.9 million, respectively. The performance vesting restricted stock units are subject to performance measures that are currently not considered "probable" of attainment and as such, no compensation cost has been recorded for these units. The period for which the performance measures of the performance vesting restricted stock units can be satisfied ends at the end of 2019.

Share-based Compensation Expense: Including performance-based equity awards, the Company had \$34.3 million of total unrecognized compensation cost related to unvested stock options, unvested restricted stock and unvested restricted stock units as of December 31, 2018. Excluding the \$14.5 million of unrecognized compensation cost related to unvested restricted stock units that are subject to performance measures that are currently not considered "probable" of attainment, unrecognized compensation cost is \$19.8 million. No compensation expense is recognized for unvested restricted stock or unvested restricted stock units subject to performance measures that are not considered "probable" of attainment. Unrecognized compensation cost related to unvested stock options, unvested restricted stock and unvested non-performance-based restricted stock units is expected to be recognized over a weighted average period of 2.9 years.

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CRAY INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS - (Continued)

The following table sets forth the gross share-based compensation cost resulting from stock options, unvested restricted stock and unvested restricted stock units that were recorded in the Company's Consolidated Statements of Operations for the indicated years ended December 31 (in thousands):

	2018	2017	2016
Cost of product revenue	\$416	\$294	\$320
Cost of service revenue	420	290	211
Research and development	4,244	3,759	3,113
Sales and marketing	3,261	2,432	3,710
General and administrative	4,806	4,074	3,797
Total share-based compensation expense	\$13,147	\$10,849	\$11,151

NOTE 16 BENEFIT PLANS

401(k) Plan

For the three years ended December 31, 2018, the Company's retirement plan covered substantially all U.S. employees and provided for voluntary salary deferral contributions on a pre-tax basis in accordance with Section 401(k) of the Internal Revenue Code of 1986, as amended. The Company matches a portion of employee contributions. The 2018, 2017, and 2016 Company match expense was \$3.0 million, \$3.0 million and \$2.9 million, respectively.

Pension Plan

The Company's German subsidiary maintains a defined benefit pension plan. At December 31, 2018, the excess of plan assets over the projected benefit obligation of \$1.9 million was \$0.2 million. At December 31, 2017, the excess of plan assets over the projected benefit obligation of \$2.0 million was \$0.2 million. Plan assets are invested in insurance policies payable to employees. Net pension expense was not material for any period. Contributions to the plan are not expected to be significant to the financial position of the Company.

NOTE 17 SEGMENT INFORMATION

The Company has the following reportable segments: Supercomputing, Storage and Data Management, Maintenance and Support, and Engineering Services and Other. The Company's reportable segments represent components of the Company for which separate financial information is available that is utilized on a regular basis by the Chief Executive Officer, who is the Chief Operating Decision Maker, in determining how to allocate the Company's resources and evaluate performance. The segments are determined based on several factors, including the Company's internal operating structure, the manner in which the Company's operations are managed, client base, similar economic characteristics and the availability of separate financial information.

Supercomputing

Supercomputing includes a suite of highly advanced, tightly integrated and cluster supercomputer systems which are used by large research and engineering centers in universities, government laboratories, and commercial institutions. Supercomputing also includes the ongoing maintenance of these systems as well as system analysts.

Storage and Data Management

Storage and Data Management offers Cray DataWarp and ClusterStor (formerly branded Sonexion), as well as other third-party storage products and their ongoing maintenance as well as system analysts.

Maintenance and Support

Maintenance and Support provides ongoing maintenance of Cray supercomputers, big data storage and analytics systems, as well as system analysts.

Engineering Services and Other

Included within Engineering Services and Other are the Company's analytics and artificial intelligence businesses and Custom Engineering.

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CRAY INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS - (Continued)

The following table presents revenues and gross margins for the Company's operating segments for the indicated years ended December 31 (in thousands):

	2018	2017	2016
Revenue:			
Supercomputing	\$363,524	\$282,217	\$510,403
Storage and Data Management	70,914	63,620	89,438
Maintenance and Support	135,509	124,840	107,795
Engineering Services and Other	21,510	46,672	29,968
Elimination of inter-segment revenue	(135,509)	(124,840)	(107,795)
Total revenue	\$455,948	\$392,509	\$629,809

Gross Profit:			
Supercomputing	\$95,746	\$93,272	\$173,245
Storage and Data Management	26,209	20,288	34,125
Maintenance and Support	64,386	61,305	43,147
Engineering Services and Other	8,023	17,144	12,845
Elimination of inter-segment gross profit	(64,386)	(61,305)	(43,147)
Total gross profit	\$129,978	\$130,704	\$220,215

Revenue and cost of revenue is the only discrete financial information the Company prepares for its segments. Other financial results or assets are not separated by segment.

The Company's geographic operations outside the United States include sales and service offices in Europe and the Middle East, South America, Asia Pacific and Canada. Service revenue includes engineering services which can vary significantly from period to period. The following data represents the Company's revenue and long-lived assets for the United States and all other countries (in thousands):

	United States	All Other Countries	Total
For the year ended December 31, 2018:			
Product revenue	\$134,760	\$178,113	\$312,873
Service revenue	\$85,989	\$57,086	\$143,075
Long-lived assets	\$47,334	\$13,342	\$60,676
For the year ended December 31, 2017:			
Product revenue	\$159,279	\$90,916	\$250,195
Service revenue	\$96,406	\$45,908	\$142,314
Long-lived assets	\$48,989	\$28,009	\$76,998
For the year ended December 31, 2016:			
Product revenue	\$251,317	\$248,115	\$499,432
Service revenue	\$88,208	\$42,169	\$130,377
Long-lived assets	\$39,933	\$36,555	\$76,488

Long-lived assets as of December 31, 2018, 2017, and 2016, included \$9.6 million, \$23.4 million and \$31.1 million, respectively, of long-term investment in sales-type lease which was held by the Company's United Kingdom subsidiary.

Revenue derived from the U.S. Government totaled approximately \$126.5 million, \$206.1 million and \$296.9 million in 2018, 2017, and 2016, respectively. In each of 2018 and 2017, one non-U.S. Government customer accounted for 11% of total revenue. In 2016, one non-U.S. Government customer accounted for 10% of total revenue. Revenue attributed to foreign countries is derived from sales to customers located outside the United States. In general, concentrations of revenue by customer encompass all segments. In 2018, revenue in Japan and South Korea accounted

for 27% of total revenue. In 2017, revenue in India accounted for 11% of total revenue. In 2016, revenue in the United Kingdom accounted for 17% of total revenue.

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CRAY INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS - (Continued)

NOTE 18 RESEARCH AND DEVELOPMENT

Details for the Company's net research and development expenses for the indicated years ended December 31 follows (in thousands):

	2018	2017	2016
Gross research and development expenses	\$158,077	\$141,289	\$130,006
Less: Amounts included in cost of revenue	(2,618)	(9,473)	(12,621)
Less: Reimbursed research and development (excludes amounts in revenue)	(40,285)	(33,039)	(5,255)
Net research and development expenses	\$115,174	\$98,777	\$112,130

NOTE 19 INTEREST INCOME (EXPENSE)

The detail of interest income (expense) for the indicated years ended December 31 follows (in thousands):

	2018	2017	2016
Interest income	\$3,454	\$3,386	\$2,120
Interest expense	(111)	(110)	27
Net interest income	\$3,343	\$3,276	\$2,147

Interest income is earned by the Company on cash and cash equivalents, investment balances and the investment in sales-type lease.

NOTE 20 RESTRUCTURING

In the third quarter of 2017, the Company implemented a restructuring plan intended to reduce the Company's operating costs and better align its workforce with long-term business strategies. The restructuring plan involved reducing the Company's workforce by approximately 190 employees, with the vast majority of such terminations effective in July 2017. For the years ended December 31, 2018 and 2017, the Company recorded \$0.5 million and \$8.6 million, respectively, in expense in connection with the restructuring plan, primarily related to employee severance. The majority of the cash payments related to the restructuring charges were paid in 2017. The actions associated with the restructuring plan were completed in the first quarter of 2018. Restructuring charges associated with the restructuring plan were included in restructuring on the company's Consolidated Statements of Operations.

NOTE 21 QUARTERLY DATA (UNAUDITED)

The following table presents unaudited quarterly financial information for the two years ended December 31, 2018. In the opinion of management, this information contains all adjustments, consisting only of normal recurring adjustments, necessary for a fair presentation thereof.

The operating results are not necessarily indicative of results for any future periods. Quarter-to-quarter comparisons should not be relied upon as indicators of future performance. The Company's business is driven by a few significant contracts and, as a result, the Company's operating results are subject to very large quarterly fluctuations. The Company's earnings per share for the full year may not equal the sum of the four quarterly earnings per share amounts because of common share activity during the year.

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CRAY INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS - (Continued)

(In thousands, except per share data)

	2018				2017			
For the Quarter Ended	3/31	6/30	9/30	12/31	3/31	6/30	9/30	12/31
Revenue	\$79,594	\$120,203	\$92,796	\$163,355	\$59,031	\$87,135	\$79,700	\$166,643
Cost of revenue	52,642	82,396	67,985	122,947	35,222	58,792	51,208	116,583
Gross profit	26,952	37,807	24,811	40,408	23,809	28,343	28,492	50,060
Research and development, net	29,892	29,382	26,162	29,738	32,640	17,325	26,626	22,186
Sales and marketing	15,665	15,218	15,282	16,994	14,653	15,247	13,392	16,602
General and administrative	5,779	5,624	6,580	7,434	8,797	7,205	7,022	6,089
Restructuring	476	—	—	—	—	—	7,653	915
Net loss	(25,008)	(10,950)	(22,393)	(13,330)	(19,215)	(6,840)	(10,232)	(97,542)
Net loss per common share, basic	\$(0.62)	\$(0.27)	\$(0.55)	\$(0.33)	\$(0.48)	\$(0.17)	\$(0.25)	\$(2.42)
Net loss per common share, diluted	\$(0.62)	\$(0.27)	\$(0.55)	\$(0.33)	\$(0.48)	\$(0.17)	\$(0.25)	\$(2.42)

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Shareholders and Board of Directors
Cray Inc.

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated balance sheets of Cray Inc. and Subsidiaries ("the Company") as of December 31, 2018 and 2017, the related consolidated statements of operations, comprehensive income (loss), shareholders' equity, and cash flows for each of the years in the three-year period ended December 31, 2018, and the related notes and financial statement schedule listed in the index at item 15(a)(2) (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the consolidated financial position of the Company as of December 31, 2018 and 2017, and the consolidated results of their operations and their cash flows for each of the years in the three-year period ended December 31, 2018, in conformity with accounting principles generally accepted in the United States.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) ("PCAOB"), the Company's internal control over financial reporting as of December 31, 2018, based on criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission, and our report dated February 12, 2019, expressed an unqualified opinion on the effectiveness of the Company's internal control over financial reporting.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's consolidated financial statements based on our audits. We are a public accounting firm registered with the 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 audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud. Our audits 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. We believe that our audits provide a reasonable basis for our opinion.

/S/ PETERSON SULLIVAN LLP

We have served as the Company's auditor since 2005.

Seattle, Washington

February 12, 2019

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Schedule II — Valuation and Qualifying Accounts(1)

December 31, 2018

(In thousands)

Description	Balance at Beginning of Period	Charge to Expense	Deductions (2)	Balance at End of Period
Year ended December 31, 2016:				
Allowance for doubtful accounts	\$ 19	\$ 2	\$	—\$ 21
Year ended December 31, 2017:				
Allowance for doubtful accounts	\$ 21	\$ 7	\$	—\$ 28
Year ended December 31, 2018:				
Allowance for doubtful accounts	\$ 28	\$ 960	\$	—\$ 988

(1)The Company does not have any warranty liabilities.

(2)Deductions represent uncollectible accounts written off, net of recoveries.

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