ASPEN TECHNOLOGY INC /DE/
Form 10-K
August 08, 2018

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K
(Mark One)
ý ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the fiscal year ended June 30, 2018
or
o TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the transition period from to
Commission file number: 001-34630

Aspen Technology, Inc.
(Exact name of registrant as specified in its charter)

Delaware	04-2739697
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)
20 Crosby Drive Bedford, MA (Address of principal executive offices)	01730 (Zip Code)

Registrant's telephone number, including area code: 781-221-6400

Securities registered pursuant to Section 12(b) of the Act:
None
Securities registered pursuant to Section 12(g) of the Act:
Common stock, $0.10 par value per share
Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ý No o
Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes o No ý
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 ý No o
Indicate by checkmark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes ý No o
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 the 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. ý
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 ý	Accelerated filer	o
Non-accelerated filer o (Do not check if a smaller reporting company)	Smaller reporting company	o
	Emerging growth company	o

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. o

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

As of December 31, 2017, the aggregate market value of common stock (the only outstanding class of common equity of the registrant) held by non-affiliates of the registrant was $4,245,574,876 based on a total of 64,132,551 shares of common stock held by non-affiliates and on a closing price of $66.20 on December 31, 2017 for the common stock as reported on The NASDAQ Global Select Market.

There were 71,009,111 shares of common stock outstanding as of August 1, 2018.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's Proxy Statement related to its 2018 Annual Meeting of Stockholders to be filed with the Securities and Exchange Commission pursuant to Regulation 14A not later than 120 days after the end of the fiscal year covered by this Form 10-K are incorporated by reference in Part III, Items 10-14 of this Form 10-K.

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Our registered trademarks include aspenONE and Aspen Plus. All other trademarks, trade names and service marks appearing in this Form 10-K are the property of their respective owners.
Our fiscal year ends on June 30, and references to a specific fiscal year are the twelve months ended June 30 of such year (for example, "fiscal 2018" refers to the year ended June 30, 2018).

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SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS AND INDUSTRY DATA

This Form 10-K contains "forward-looking statements" within the meaning of Section 27A of the Securities Act of 1933 and Section 21E of the Securities Exchange Act of 1934. Forward-looking statements relate to future events or our future financial performance. We generally identify forward-looking statements by terminology such as "anticipate," "believe," "could," "estimate," "expect," "intend," "may," "potential," "should," "target," or the negative of these terms or other similar words. These statements are only predictions. The outcome of the events described in these forward-looking statements is subject to known and unknown risks, uncertainties and other factors that may cause our, our customers' or our industry's actual results, levels of activity, performance or achievements expressed or implied by these forward-looking statements, to differ. "Item 1. Business," "Item 1A. Risk Factors" and "Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations" as well as other sections in this Form 10-K, discuss some of the factors that could contribute to these differences. The forward-looking statements made in this Form 10-K relate only to events as of the date on which the statements are made. We undertake no obligation to update any forward-looking statement to reflect events or circumstances after the date on which the statement is made or to reflect the occurrence of unanticipated events. Our forward-looking statements do not reflect the potential impact of any future acquisitions, mergers, dispositions, joint ventures or investments we may make. The industry in which we operate is subject to a high degree of uncertainty and risk due to variety of factors, including those described in "Item 1A. Risk Factors." Unless the context indicates otherwise, references in this report to "we", "us", "our" and other similar references mean Aspen Technology, Inc. and its subsidiaries.

PART I

Item 1. Business.

Overview

We are a leading global supplier of asset optimization solutions that improve asset design, operations and maintenance in complex, industrial environments. We combine decades of process modeling and operations expertise with big data machine-learning and analytics. Our purpose-built software solutions improve the competitiveness and profitability of our customers by increasing throughput, energy efficiency, and production, reducing unplanned downtime, enhancing capital efficiency, and decreasing working capital requirements over the entire asset lifecycle to support operational excellence.

Our software incorporates our proprietary mathematical and empirical models of manufacturing and planning processes and reflects the deep domain expertise we have amassed from focusing on solutions for the process and other capital-intensive industries for over 35 years. We have developed our applications to design and optimize processes across three principal business areas: engineering, manufacturing and supply chain, and asset performance management. We are a recognized market and technology leader in providing process optimization and asset performance management software solutions for each of these business areas.

We have established sustainable competitive advantages based on the following strengths:

- Innovative products that can enhance our customers' profitability and productivity;
- Long-term customer relationships;
- Large installed base of users of our software; and
- Long-term license contracts.

We have approximately 2,200 customers globally. Our customers consist of companies in the process and other capital-intensive industries such as energy, chemicals, engineering and construction, as well as pharmaceuticals, transportation, power, metals and mining, pulp and paper, and consumer packaged goods.

Industry Background

The process manufacturing industries consist of companies that typically manufacture finished products by applying a controlled chemical process either to a raw material that is fed continuously through the plant or to a specific batch of raw material.

Process industry characteristics and dynamics are complex; therefore, any small improvement in the high-volume feedstocks used, or to the chemical process applied, can have a significant impact on the efficiency and cost-effectiveness of manufacturing operations. As a result, process manufacturers, as well as the engineering and construction firms that partner with these manufacturers, have extensive technical requirements and need sophisticated, integrated software to help design,

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operate and maintain complex manufacturing assets. The unique characteristics associated with process manufacturing create special demands for business applications that frequently exceed the capabilities of generic or non-process manufacturing software packages.

Industry Specific Challenges Facing the Process Industries

Companies in different segments of the process industries face specific challenges that drive the need for software solutions that design, operate and maintain manufacturing environments more effectively:

Energy. Our energy markets are comprised of three primary sectors: Exploration and Production, also called "upstream," Oil and Gas Production and Processing, also called "midstream," and Refining and Marketing, also called "downstream":

- Companies engaged in Exploration and Production explore for and produce hydrocarbons. They target reserves in increasingly diverse geographies involving geological, logistical and political challenges. They need to design and develop ever larger, more complex and more remote production, gathering and processing facilities as quickly as possible with the objective of optimizing production and ensuring regulatory compliance.
- Companies engaged in Oil and Gas Production and Processing produce and gather oil and natural gas from well heads, clean it, process it, and separate it into oil, dry natural gas, and natural gas liquids in preparation for transport to downstream markets. The number of oil and gas processing plants in North America has increased significantly in recent years to process the oil and gas extracted from shale deposits.
- Companies engaged in Refining and Marketing convert crude oil through a thermal and chemical manufacturing process into end products such as gasoline, jet and diesel fuels and into intermediate products for downstream chemical manufacturing companies. These companies are characterized by high volumes and low operating margins. In order to deliver better margins, they focus on optimizing feedstock selection and product mix, reducing energy and capital costs, maximizing throughput, and minimizing inventory, all while operating safely and in accordance with regulations.

Chemicals. The chemicals industry includes both bulk and specialty chemical companies:

- Bulk chemical producers manufacture commodity chemicals and compete primarily on price; they seek to achieve economies of scale and manage operating margin pressure by building larger, more complex plants located near feedstock sources.
- Specialty chemical manufacturers, which primarily manufacture highly differentiated customer-specific products, face challenges in managing diverse product lines, multiple plants, complex supply chains and product quality.

Engineering and construction. Engineering and construction firms that work with process manufacturers compete on a global basis by bidding on and executing on complex, large-scale projects. They need a digital environment in which optimal plant designs can be produced quickly and efficiently, incorporating highly accurate modeling, analysis and cost estimation technology. In addition, these projects require software that enables significant collaboration internally, with the manufacturer, and in many cases, with other engineering and construction firms.

Companies in the consumer packaged goods, power, metals and mining, pulp and paper, pharmaceuticals and biofuels industries are also seeking asset optimization solutions that help them deliver improved financial and operating results in the face of varied process manufacturing challenges.

Complexity of the Process Industries

Companies in the process industries constantly face pressure on margins causing them to continually seek ways to operate more efficiently. At the same time, these manufacturers face complexity as a result of the following:

Globalization of markets. Process manufacturers are continuously expanding their operations to take advantage of growing demand and more economically viable sources of feedstocks. Process manufacturers must be able to design, build and operate plants efficiently and economically while managing and optimizing ever broadening supply chains.

Market volatility. Process manufacturers must react quickly to frequent changes in feedstock prices, temporary or longer-term feedstock shortages, and rapid changes in finished product prices. Unpredictable commodity markets strain the manufacturing and supply chain operations of process manufacturers, which must evaluate and implement changes in inventory levels, feedstock inputs, equipment usage and operational processes to remain competitive.

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Environmental and safety regulations. Process companies must comply with an expanding array of data maintenance and reporting requirements under governmental and regulatory mandates, and the global nature of their operations can subject them to numerous regulatory regimes. These companies are increasingly relying upon software applications to model potential outcomes, store operating data and develop reporting capabilities in response to heightened scrutiny and oversight because of environmental, safety and other implications of their products and manufacturing processes.

Market Opportunity

Technology solutions play a major role in helping companies in the process industries improve their manufacturing productivity. In the 1980s, process manufacturers implemented distributed control systems, or DCS, to automate the management of plant hardware. DCS use computer hardware, communication networks and industrial instruments to measure, record and automatically control process variables. In the 1990s, these manufacturers adopted enterprise resource planning, or ERP, systems to streamline back office functions and interact with DCS. These systems allowed process manufacturers to track, monitor and report the performance of each plant, rather than rely on traditional paper and generic desktop spreadsheets.

Many process manufacturers have implemented both DCS and ERP systems but have realized that their investments in hardware and back-office systems are inadequate. DCS are only able to control and monitor processes based on fixed sets of parameters and cannot dynamically react to changes in the manufacturing process unless instructed by end users. ERP systems can only record what is produced in operations. Although DCS and ERP systems help manage manufacturing performance, neither of these systems can optimize what is produced, how it is produced or where it is produced. Moreover, neither can help a process manufacturer understand how to improve its processes or how to identify opportunities to decrease operating expenses.

Asset optimization software focuses on the optimum design, operation, and maintenance of the manufacturing process; how the design is optimized for operations and reliability, how the process is operated for optimal economic performance, and how the design and operations impact the longevity and reliability of the equipment. By connecting DCS and ERP systems with intelligent, dynamic applications, asset optimization software allows a manufacturer to make better, faster economic decisions. Examples of how asset optimization software can optimize a manufacturing environment include incorporating process manufacturing domain knowledge, supporting real-time decision making, predicting equipment failure, and providing the ability to respond and adapt to operational changes. Furthermore, these solutions can optimize the supply chain by helping a manufacturer to understand the operating conditions in each plant, enabling more efficient and optimized production decisions.

Process manufacturers employ highly skilled technical personnel specializing in areas such as process design, equipment design, control engineering, manufacturing operations, analytics, planning, scheduling, and supply chain management. To drive efficiency and improve operating margins, these personnel need to collaborate across functional areas and increasingly rely on software to enable this collaboration as well as automate complex tasks associated with their jobs. Process companies must adapt to the changing nature of the technical workforce. A generation of highly experienced plant operators and engineers is nearing retirement. As a result, we believe there is increasing demand for intelligent software applications that capture and automate expert knowledge and are intuitive and easy-to-learn.

aspenONE Solutions

We provide integrated asset optimization software solutions designed and developed specifically for the process and other capital-intensive industries. Customers use our solutions to improve their competitiveness and profitability by increasing throughput and productivity, reducing operating and maintenance costs, increasing reliability, enhancing capital efficiency, enabling collaboration among different functions and decreasing working capital requirements. Our aspenONE solutions are organized into three suites: 1) engineering; 2) manufacturing and supply chain; and 3) asset performance management, or APM:

Engineering. Our engineering software is used to develop process designs of new plants, re-vamp existing plants, and simulate and optimize existing processes.

Manufacturing and Supply Chain. Our manufacturing software is used to optimize day-to-day processing activities, enabling process manufacturers to make better, more profitable decisions and to improve plant performance. Our supply chain management software is designed to enable process manufacturers to reduce inventory levels, increase asset efficiency, respond rapidly to market demands and optimize supply chain operations.

Asset Performance Management. Our asset performance management software is used to understand and predict the reliability of a system; be it multiple assets, a single asset, or equipment in a plant. The factors that impact reliability include how operating conditions degrade equipment performance over time, or how process conditions lead to equipment failure, and the ability to predict when the equipment will fail and prescribe actions to avoid such occurrences. The APM suite is a comprehensive suite of machine learning and analytics technologies when used on a standalone or integrated manner with historical and real time asset and equipment data which can help our customers improve their return on capital employed.

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Our aspenONE licensing model is a subscription offering under which customers receive access to all the products within the aspenONE suite(s) they license, including the right to any new unspecified future software products and updates that may be introduced into the licensed aspenONE software suite. This affords customers the ability to use our software whenever required and to experiment with different applications to best solve whatever critical business challenges they face.

We offer customer support, professional services and training services to our customers. Under our aspenONE licensing model, software maintenance and support is included for the term of the arrangement. Professional services are offered to customers as a means to further implement and extend our technology across their corporations.

The key benefits of our aspenONE solutions include:

Broad and comprehensive software suites. We believe we are the only software provider that has developed comprehensive suites of software applications addressing the engineering, manufacturing and supply chain and maintenance requirements of process manufacturers. While some competitors offer solutions in one or two principal business areas, no other vendor can match the breadth of our aspenONE offerings. In addition, we have developed an extensive array of software applications that address extremely specific and complex industry and end user challenges, such as feedstock selection and production scheduling for petroleum companies.

Integrated software solutions. aspenONE provides a standards-based framework that integrates applications, data and models within each of our software suites. Process manufacturers seeking to improve their business operations can use the integrated software applications in the aspenONE Manufacturing and Supply Chain suite to support real-time decision making both for individual production facilities and across multiple sites.

Flexible commercial model. Our aspenONE licensing model provides a customer with access to all of the applications within and across the aspenONE suite(s) the customer licenses, including the right to any new unspecified future software products and updates that may be introduced into the licensed aspenONE software suite. The customer can change or alternate the use of multiple applications in a licensed suite through the use of exchangeable units of measurement, or tokens, licensed in quantities determined by the customer. This enables the customer to use those applications whenever required and to experiment with different applications to best solve whatever critical business challenges the customer faces. The customer can easily increase its usage of our software as their business requirements evolve.

Our Competitive Strengths

In addition to the breadth and depth of our integrated aspenONE software and the flexibility of our aspenONE licensing model, we believe our key competitive advantages include the following:

Industry-leading innovation based on substantial process expertise. Over the past 35 years, our significant investment in research and development has led to a number of major process engineering advances considered to be industry-standard applications. Our development organization is comprised of software engineers, chemical engineers and data scientists. This combination of expertise has been essential to the development of leading products embedded with chemical engineering principles, optimization and machine learning algorithms, analytics, and the process industries’ workflows and best practices.

Rapid, high return on investment. Many customers purchase our software because they believe it will provide rapid, demonstrable and significant returns on their investment and increase their profitability. For some customers, economic benefits in the first year following installation have exceeded the total cost of our software. For many customers, even a relatively small improvement in performance can generate substantial recurring benefits due to the large production volumes and limited profit margins typical in process industries. In addition, our solutions can generate organizational efficiencies and operational improvements that can further increase a process company's profitability.

Growth Strategy

We seek to maintain and extend our position as a leading global provider of process optimization software and related services to the process industries. We have introduced a new strategy to evolve our scope of optimization from the process units in a plant to the process and the equipment in the plant or entire asset. We plan to expand our reach in optimization from conceptualization and design, operations, and supply chain to the maintenance aspects of the plant. We plan to build on our expertise in process optimization, our installed base, and long term customer relationships to expand our reach in the maintenance area of the plant. By focusing on asset optimization, we would be able to optimize the design and operations of a plant considering the performance and constraints of process equipment so as to optimize the full asset lifecycle. Our primary growth strategy is to expand organically within our core verticals by leveraging our market leadership position and driving increased usage and product adoption of the broad capabilities in our aspenONE offerings. Additionally, we seek acquisitions to

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accelerate our overall growth in the design and operations of the process, and acquisitions that will expand our maintenance solution to deliver asset optimization. To accomplish these goals, we will pursue the following activities:

Continue to provide innovative, market-leading solutions. Our recent innovations include adaptive process control, modeling of solids and batch processes, rundown blending optimization, crude assay characterization using molecular science, electrolyte and biofuel characterizations, process safety, sulfur recovery, methodologies for carbon management, multivariate analysis, process reliability, and equipment and process analytics. Most recently we introduced integrated steady state and batch process modeling capabilities for specialty chemical and pharmaceutical processes and a solution for operator training, as well as solutions for Industrial IoT Edge and enterprise data collection. We intend to continue to invest in research and development in order to develop and offer new and enhanced solutions for our aspenONE suites. We have pioneered a number of industry standard and award-winning software applications. For example, Aspen Plus, our process modeling tool for the chemicals industry, has won the Chemical Processing magazine Readers' Choice Award for "Process Simulation Software" multiple times. We have also been recognized by R&D Magazine for innovation in out of the box modeling capabilities that we developed with the National Institute of Standards and Technology.

Further penetrate existing customer base. We have an installed base of approximately 2,200 customers. Many of our customers only use a fraction of our products. We work with our customers to identify ways in which they can improve their business performance by using the entire licensed suite of aspenONE solutions, both at an individual user level and across all of their plant locations. Our customers are segmented based on their size and complexity. Our large complex customers are serviced by our Field Sales organization, while our other customers are serviced by our inside sales group. Additionally, we regularly enhance our products to make them easier to use and seek to increase productivity of users by offering more integrated workflows.

Adoption and usage in customer base. We strive for our customers to adopt and sustain the use of our products by maximizing the consumption of their token entitlement. We do so by focusing our go-to-market resources through specific customer success management activities that generate and sustain the value from our products by ensuring that customers are using the latest version of our products, that our software is deployed in the most optimum manner in their IT networks, and that our customers are familiar with the latest value enhancing functionality in our products.

Asset Performance Management (APM) expansion. In fiscal year 2017, we introduced a new suite of products focused on improving the reliability of our customers' assets and equipment using a combination of machine learning, data science and process modeling together with historical and real time asset and equipment data. We have increased our investment in the research and development, sales and marketing, and channel sales functions to build out the capabilities that will enable us to grow this new business area and deliver value for our customers. In addition, we target additional capital-intensive industries with the APM functionality that we refer to as the global economy industries. These include transportation, power, pulp and paper, wastewater treatment, and consumer products goods.

Scale through digital channels. We have a broad user base spanning our vertical industries and geographies, and they possess a variety of skills, experience and business needs. To reach our user base in an effective, productive and leveraged manner, we utilize digital customer engagement solutions including webinars, digital communities, social media, videos, email and other digital means that target each of the specific users that use our different products. We intend to capitalize increasingly on segmentation to ensure we deliver targeted messages intended to address the specific needs of each market, customer and user.

Build an ecosystem. The relevance of our solutions in the markets we serve means that we have the opportunity to leverage third parties interested in building or expanding their businesses to increase our market penetration. The breadth of relationships that we establish will depend on the profile of the third-party company and the objectives specified to be achieved from the promotion and implementation of our products and solutions.

Pursue acquisitions. As part of our make-vs-buy analyses, we regularly explore and evaluate acquisitions. We have made several acquisitions in recent years and believe the opportunity exists to do more, especially as we seek to evolve our strategy to asset optimization and the maintenance area of the plant.

Expand our total addressable market. Our focus on innovation also means introducing product capabilities or new product categories that create value for our customers and therefore expand our total addressable market.

Products

Our integrated asset optimization software solutions are designed and developed specifically for the process industries. Customers use our solutions to improve their competitiveness and profitability by increasing throughput and productivity, reducing operating costs, enhancing capital efficiency, and decreasing working capital requirements. We have designed and developed our software applications across four principal business areas:

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Engineering. Our engineering software applications are used during both the design and the ongoing operation of plant facilities to model and improve the way engineers develop and deploy manufacturing assets. Process manufacturers must address a variety of challenges including design, operational improvement, collaborative engineering and economic evaluation. They must, for example, determine where they should locate facilities, how they can lower capital and manufacturing costs, what they should produce and how they can maximize plant efficiency.

Manufacturing. Our manufacturing software products focus on optimizing day-to-day processing activities, enabling customers to make better, faster decisions that lead to improved plant performance and operating results. These solutions include desktop and server applications that help customers make real-time decisions, which can reduce fixed and variable costs and improve product yields. Process manufacturers must address a wide range of manufacturing challenges such as optimizing execution efficiency, reducing costs, selecting the right raw materials, scheduling and coordinating production processes, and identifying an appropriate balance between turnaround times, delivery schedules, product quality, cost and inventory.

Supply Chain Management. Our supply chain management solutions include desktop and server applications that help customers optimize critical supply chain decisions in order to reduce inventory, increase asset efficiency, and respond more quickly to changing market conditions. Process manufacturers must address numerous challenges as they strive to effectively and efficiently manage raw materials inventory, production schedules and feedstock purchasing decisions. Supply chain managers face these challenges in an environment of ever-changing market prices, supply constraints and customer demands.

Asset Performance Management. Our asset performance management products are used to understand and predict the reliability of a system; be it multiple assets, a single asset, or equipment in a plant. Factors that impact reliability include how operating conditions degrade equipment performance over time, or how process conditions can lead to equipment failure. The APM suite is a comprehensive suite of machine learning and analytics technologies which can be used in a standalone or integrated manner with historical and real time asset and equipment data to help our customers predict when the equipment will fail and prescribe actions to avoid such occurrences, thereby improving return on capital employed.

Our software applications are currently offered in three suites: aspenONE Engineering, aspenONE Manufacturing and Supply Chain, and aspenONE Asset Performance Management. These suites are integrated applications that allow end users to design process manufacturing environments, monitor operational performance, respond and adapt to operational changes, predict asset reliability and equipment failure, and manage planning and scheduling activities as well as collaborate across these functions and activities. The three suites are designed around core modules and applications that allow customers to design, operate and maintain their process manufacturing environments, as shown below:

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aspenONE Engineering

Business Area	aspenONE Module	Major Products	Product Description
Engineering	Process Simulation for Energy	Aspen HYSYS	Process modeling software for the design and optimization of hydrocarbon processes, including flow assurance, refinery reactors, acid gas clean-up, and sulfur recovery
		Aspen Operator Training	Solution for developing and deploying dynamic plant simulations for the purpose of training plant operators to respond to operational and safety scenarios in a virtual training environment
	Process Simulation for Chemicals	Aspen Plus	Process modeling software for the design and optimization of chemical processes, including solids and batch processes
	Economic Evaluation	Aspen Economic Evaluation	Economic evaluation software for estimating project capital costs and lifecycle asset economics - from conceptual definition through detailed cost estimation
	Equipment Design & Rating	Aspen Exchanger Design and Rating	Software for the design, simulation and rating of various types of heat exchangers
	Basic Engineering	Aspen Basic Engineering	Collaborative platform for managing process engineering data and producing front-end design deliverables such as multi-disciplinary datasheets, process flow diagrams, piping and instrument diagrams, and equipment lists
	Operation Support	Aspen Online	Solution that connects process models to real-time plant data for expedited decisions, operational guidance, and optimization

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aspenONE Manufacturing and Supply Chain

Business Area	aspenONE Module	Major Products	Product Description
Manufacturing	Advanced Process Control	Aspen DMC3	Multi-variable controller software for maintaining processes at their optimal operating point under changing process conditions
		Aspen Watch Performance Monitor	Real-time monitoring and diagnostic information software to help engineers and operators focus on the problems that erode margins
	Manufacturing Execution Systems	Aspen Info Plus.21	Data historian software for storing, visualizing and analyzing large volumes of data to improve production execution and enhance performance management
		AspenONE Process Explorer	Software for combining process measurements, product characteristics, alarms, events and unstructured data for a complete view of production
		Aspen Production Record Manager	Easy and fast segmentation of production data into batches, campaigns or other logical groupings for easier analysis and production reporting
		Aspen Production Execution Manager	Workflow, order and recipe management software per cGMP guidelines that ensures operational consistency for improved yields, higher quality and lower production costs
Supply Chain	Refinery Planning & Scheduling	Aspen PIMS Advanced Optimization	Refinery planning software for optimizing feedstock selection, product slate and operational execution
		Aspen Petroleum Scheduler	Refinery scheduling software for scheduling and optimization of refinery operations with integration to refinery planning, blending and dock operations
	Supply & Distribution	Aspen Petroleum Supply Chain Planner	Economic planning software for optimizing the profitability of the petroleum distribution network, including transportation, raw materials, sales demands, and processing facilities
		Aspen Fleet Optimizer	Software for inventory management and truck transportation optimization in secondary petroleum distribution
	Supply Chain Management	Aspen Collaborative Demand Manager	Software for forecasting market demand and managing forecast through changes in the business environment by combining historical and real time data
		Aspen Plant Scheduler	Software for generating optimal production schedules to meet total demand
		Aspen Supply Planner	Software for determining the optimal production plan taking into account labor and equipment, feedstock, inbound /outbound transportation, storage capacity, and other variables

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aspenONE Asset Performance Management

Business Area	aspenONE Module	Major Products	Product Description
Asset Performance Management	Risk Analysis	Aspen Fidelis Reliability	Software for predicting the future performance of any system and quantifying the change in performance due to changes in design, capacity, operations, maintenance, logistics, market dynamics, and weather
	Process Analytics	Aspen ProMV	Multivariate analysis software for analyzing interrelated process data for continuous and batch processes, to identify the minimum critical set of variables driving product quality and process performance, and identifying optimal set points
	Equipment Analytics	Aspen Asset Analytics	Software for analyzing plant operations in real time to identify causal precursors that can lead to an unplanned downtime event
		Aspen Mtell	Software for recognizing unique data patterns as predictions of future equipment behavior
	Connect	Aspen Edge Connect Aspen Cloud Connect	Software to collect data from assets, enterprise data sources, and MES systems using Industrial IoT technology, and integrating the data into enterprise systems on-premise or in the cloud

Our product development activities are currently focused on strengthening the integration of our applications and adding new capabilities that address specific operational business processes in each industry. As of June 30, 2018, we had a total of 505 employees in our research and development group, which is comprised of product management, software development and quality assurance. Research and development expenses were $82.1 million in fiscal 2018, $79.5 million in fiscal 2017 and $67.2 million in fiscal 2016.

Sales and Marketing

We employ a value-based sales approach, offering our customers a comprehensive suite of software and services that enhance the efficiency and productivity of their engineering, manufacturing and supply chain and maintenance operations. We have increasingly focused on positioning our products as a strategic investment and therefore devote an increasing portion of our sales efforts to our customers' senior management, including senior decision makers in manufacturing, operations, maintenance and technology. Our aspenONE solution strategy supports this value-based approach by broadening the scope of optimization across the entire enterprise over its lifecycle, expanding the use of process models in the operations environment, and enabling the use of analytics and data science to enhance equipment and process reliability. We offer a variety of training programs focused on illustrating the capabilities of our applications as well as online training built into our applications. We have implemented incentive compensation programs for our sales force to reward efforts that increase customer usage of our products. Furthermore, we believe our aspenONE licensing model enables our sales force to develop consultative sales relationships with our customers.

Historically, most of our license sales have been generated through our direct Field Sales organization. In order to market the specific functionality and other technical features of our software, our account managers work with specialized teams of technical sales personnel and product specialists organized for each sales and marketing effort. Our technical sales personnel typically have degrees in chemical engineering or related disciplines and actively consult with a customer's plant engineers. Product specialists share their detailed knowledge of the specific features of our software solutions as they apply to the unique business processes of different vertical industries. In addition to our direct Field Sales organization, we employ an inside sales team that targets customers in certain market segments.

We have established channel relationships with select companies that we believe can help us pursue opportunities in non-core target markets. We also license our software products to universities that agree to use our products in teaching and research. We believe that students' familiarity with our products will stimulate future demand once the students enter the workplace.

We supplement our sales efforts with a variety of marketing initiatives, including industry analyst and public relations activities, campaigns to promote product usage and adoption, user group meetings and customer relationship programs. Our broad user base spans multiple verticals and geographies and these users possess a variety of skills, experience and business needs. In order to reach each of them in an effective, productive and leveraged manner we will increasingly capitalize on digital customer engagement solutions. Using webinars, digital communities, social media, videos, email and other digital means, we

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seek to engage our extensive user base with targeted messages intended to address the specific needs of each market, customer and user.

Our overall sales force, which consists of sales account managers, technical sales personnel, indirect-channel personnel, inside sales personnel, and marketing personnel, consisted of 453 employees as of June 30, 2018.

Software Maintenance and Support, Professional Services and Training

Software maintenance and support ("SMS") consists primarily of providing customer technical support and access to software fixes and upgrades. Customer technical support services are provided throughout the world by our three global call centers as well as via email and through our support website. For license term arrangements entered into subsequent to our transition to a subscription-based licensing model, SMS is included with the license arrangement. For license arrangements that don't include SMS, customers can purchase standalone SMS.

We offer professional services focused on implementation of our solution. Our professional services team primarily consists of project engineers with degrees in chemical engineering or a similar discipline, or who have significant relevant industry experience. Our employees include experts in fields such as thermophysical properties, distillation, adsorption processes, polymer processes, industrial reactor modeling, the identification of empirical models for process control or analysis, large-scale optimization, supply distribution systems modeling and scheduling methods. Our primary focus is the successful implementation and usage of our software, and in many instances, this work can be professionally performed by qualified third parties. As a result, we often compete with third-party consulting firms when bidding for professional services contracts, particularly in developed markets. We offer our services on either a time-and-material or fixed-price basis.

We offer a variety of training solutions ranging from standardized training, which can be delivered in a public forum, on-site at a customer's location or over the Internet, to customized training sessions, which can be tailored to fit customer needs. We have also introduced a wide range of online computer-based training courses offering customers on-demand training in basic and advanced features of our products directly from within the products. As of June 30, 2018, we had a total of 283 employees in our customer support, professional services and training groups.

Business Segments

We have two operating and reportable segments: i) subscription and software and ii) services. The subscription and software segment is engaged in the licensing of asset optimization software solutions and associated support services. The services segment includes professional services and training.

Competition

Our markets in general are competitive, and we expect the intensity of competition in our markets to increase as existing competitors enhance and expand their product and service offerings and as new participants enter the market. Increased competition may result in price reductions, reduced profitability and loss of market share. We cannot ensure that we will be able to compete successfully against existing or future competitors. Some of our customers and companies with which we have strategic relationships also are, or may become, competitors.

Many of our current and potential competitors have greater financial, technical, marketing, service and other resources than we have. As a result, these companies may be able to offer lower prices, additional products or services, or other incentives that we cannot match or offer. These competitors may be in a stronger position to respond more quickly to new technologies and may be able to undertake more extensive marketing campaigns. We believe they also have adopted and may continue to pursue more aggressive pricing policies and make more attractive offers to potential customers, employees and strategic partners. For example, some competitors may be able to initiate relationships through sales and installations of hardware and then seek to expand their customer relationships by offering asset optimization software at a discount. In addition, competitors with greater financial resources may make strategic acquisitions to increase their ability to gain market share or improve the quality or marketability of their products. Furthermore, we face challenges in selling our solutions to large companies in the process industries that have internally developed their own proprietary software solutions.

We seek to develop and offer integrated suites of targeted, high-value vertical industry solutions that can be implemented with relatively limited service requirements. We believe this approach provides us with an advantage over many of our competitors that offer software products that are point solutions or are more service-based. Our key competitive differentiators include:

- breadth, depth and integration of our aspenONE software offering;
- rapid return on investment and increase in profitability;

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- domain expertise of chemical engineering personnel;
- focus on software for the process industries;
- flexibility of our usage-based aspenONE licensing model; and
- consistent global support.

Proprietary Rights

Our software is proprietary and fundamental to our business. We rely on a combination of copyright, patent, trademark and trade secret laws in the United States and other jurisdictions, and on license and confidentiality agreements and technology measures to protect our proprietary technology and brand, and prevent unauthorized use of our software. We generally seek to protect our trade secrets by entering into non-disclosure agreements with our employees and customers, and historically have restricted access to our software and source code, which we regard as proprietary information. We have obtained or applied for patent protection with respect to some of our intellectual property and have registered or applied to register some of our trademarks in the United States and in selected other countries. We actively monitor use of our intellectual property and have enforced, and will continue to enforce, our intellectual property rights. In the United States, we are generally able to maintain our patents for up to 20 years from the earliest effective filing date, and to maintain our trademark registrations for as long as the trademarks are in use. The laws of many countries in which our products are licensed may not protect our intellectual property rights to the same extent as the laws of the United States. While we consider our intellectual property rights to be valuable, we do not believe that our competitive position in the industry can depend solely on obtaining legal protection for our software products and technology. Instead, we believe that the success of our business also depends on our ability to maintain a leadership position by continuing to develop innovative software products and technology.

Our proprietary rights are subject to risks and uncertainties described under Item 1A. “Risk Factors” below. You should read that discussion, which is incorporated into this section by reference.

Licenses

In connection with our acquisition of Hyprotech Ltd. and related subsidiaries of AEA Technology plc in May 2002 and the consent decree we entered into with the Federal Trade Commission in December 2004 to resolve allegations that the acquisition was improperly anticompetitive, we and certain of our subsidiaries entered into a purchase and sale agreement with Honeywell International Inc. and certain of its subsidiaries, pursuant to which we sold intellectual property and other assets to Honeywell relating to our operator training business and our Hyprotech engineering software products. Under the terms of the transactions, we retained a perpetual, irrevocable, worldwide, royalty-free non-exclusive license to the Hyprotech engineering software and have the right to continue to develop, license and sell the Hyprotech engineering products.

In March 1982, we entered into a System License Agreement with the Massachusetts Institute of Technology, or MIT, granting us a worldwide, perpetual non-exclusive license (with the right to sublicense) to use, reproduce, distribute and create derivative works of the computer program known as "ASPEN" which provides a framework for simulating the steady-state behavior of chemical processes that we utilize in the simulation engine for our Aspen Plus product. MIT agreed that we would own any derivative works and enhancements. MIT has the right to terminate the agreement if: we breach it and do not cure the breach within 90 days after receiving a written notice from MIT; we cease to carry on our business; or certain bankruptcy or insolvency proceedings are commenced and not dismissed. In the event of such termination, sublicenses granted to our customers prior to termination will remain in effect.

Employees

As of June 30, 2018, we had a total of 1,466 full-time employees, of whom 789 were located in the United States. None of our employees is represented by a labor union, except for one employee of our subsidiary Hyprotech UK Limited who belongs to the Prospect union for professionals. We have experienced no work stoppages and believe that our employee relations are satisfactory.

Corporate Information

Aspen Technology, Inc. was formed in Massachusetts in 1981 and reincorporated in Delaware in 1998. Our principal executive offices are at 20 Crosby Drive, Bedford, MA 01730, and our telephone number at that address is (781) 221-6400. Our website address is http://www.aspentech.com. The information on our website is not part of this Form 10-K, unless expressly noted.

Available Information

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We file reports with the Securities and Exchange Commission, or the SEC, which we make available on our website free of charge. These reports include annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and amendments to such reports, each of which is provided on our website as soon as reasonably practicable after we electronically file such materials with or furnish them to the SEC. You can also read and copy any materials we file with the SEC at the SEC's Public Reference Room at 100 F Street, N.E., Washington, DC 20549. You can obtain additional information about the operation of the Public Reference Room by calling the SEC at 1-800-SEC-0330. In addition, the SEC maintains a website (http://www.sec.gov) that contains reports, proxy and information statements, and other information regarding issuers that file electronically with the SEC, including us.

Item 1A. Risk Factors.

Investing in our common stock involves a high degree of risk. You should carefully consider the risks and uncertainties described below before purchasing our common stock. The risks and uncertainties described below are not the only ones facing our company. Additional risks and uncertainties may also impair our business operations. If any of the following risks actually occurs, our business, financial condition, results of operations or cash flows would likely suffer. In that case, the trading price of our common stock could fall, and you may lose all or part of your investment in our common stock.

Risks Related to Our Business

If we fail to increase usage and product adoption of our aspenONE engineering and manufacturing and supply chain offerings and grow our aspenONE APM business, or fail to continue to provide innovative, market-leading solutions, we may be unable to implement our growth strategy successfully, and our business could be seriously harmed.

The maintenance and extension of our market leadership and our future growth is largely dependent upon our ability to increase usage and product adoption of our aspenONE engineering and manufacturing and supply chain offerings and grow our aspenONE APM business, and to develop new software products that achieve market acceptance with acceptable operating margins. Enterprises are requiring their application software vendors to provide greater levels of functionality and broader product offerings. We must continue to enhance our current product line and develop and introduce new products and services that keep pace with increasingly sophisticated customer requirements and the technological developments of our competitors. Our business and operating results could suffer if we cannot successfully execute our strategy and drive usage and product adoption.

We have implemented a product strategy that unifies our software solutions under the aspenONE brand with differentiated aspenONE vertical solutions targeted at specific capital-intensive industries. We cannot ensure that our product strategy will result in products that will continue to meet market needs and achieve significant usage and product adoption. If we fail to increase usage and product adoption or fail to develop or acquire new software products that meet the demands of our customers or our target markets, our operating results and cash flows from operations will grow at a slower rate than we anticipate and our financial condition could suffer.

Our business could suffer if we do not grow our aspenONE APM business or if the demand for, or usage of, our other aspenONE software declines for any reason, including declines due to adverse changes in the process and other capital-intensive industries.

We have introduced the aspenONE APM suite, and our aspenONE engineering and manufacturing and supply chain suites account for a significant majority of our revenue and will continue to do so for the foreseeable future. If we do not grow our aspenONE APM business or if demand for, or usage of, our other suites declines for any reason, our operating results, cash flows from operations and financial position would suffer. Our business could be adversely affected by:

- insufficient growth in our aspenONE APM business;
- any decline in demand for or usage of our aspenONE suites;
- the introduction of products and technologies that serve as a replacement or substitute for, or represent an improvement over, our aspenONE suites;
- technological innovations that our aspenONE suites do not address;
- our inability to release enhanced versions of our aspenONE suites on a timely basis; and
- adverse changes in capital intensive industries or otherwise that lead to reductions, postponements or cancellations of customer purchases of our products and services, or delays in the execution of license agreement renewals in the same

quarter in which the original agreements expire.

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Because of the nature of their products and manufacturing processes and their global operations, companies in the process and other capital-intensive industries are subject to risk of adverse or even catastrophic environmental, safety and health accidents or incidents and are often subject to changing standards and regulations worldwide.

In addition, worldwide economic downturns and pricing pressures experienced by energy, chemical, engineering and construction, and other capital-intensive industries have led to consolidations and reorganizations. In particular, we believe that the volatility in oil prices has impacted and may continue to impact the operating levels and capital spending by certain of our customers in the engineering and construction market, which has resulted and could continue to result in less predictable and lower demand for our products and services.

Any such adverse environmental, safety or health incident, change in regulatory standards, or economic downturn that affects the capital-intensive industries, including continued challenges and uncertainty among customers whose business is adversely affected by volatility in oil prices, as well as general domestic and foreign economic conditions and other factors that reduce spending by companies in these industries, could harm our operating results in the future.

Unfavorable economic and market conditions or a lessening demand in the market for asset optimization software could adversely affect our operating results.

Our business is influenced by a range of factors that are beyond our control and difficult or impossible to predict. If the market for asset optimization software grows more slowly than we anticipate, demand for our products and services could decline and our operating results could be impaired. Further, the state of the global economy may deteriorate in the future. Our operating results may be adversely affected by unfavorable global economic and market conditions, including significant volatility in oil prices, as well as a lessening demand for asset optimization software generally.

Customer demand for our products is linked to the strength of the global economy. If weakness in the global economy persists, many customers, including those whose businesses are negatively impacted by lower oil prices, may delay or reduce technology purchases. This could result in reductions in sales of our products, longer sales cycles, slower adoption of new technologies, increased price competition or reduced use of our products by our customers. We will lose revenue if demand for our products is reduced because potential customers experience weak or deteriorating economic conditions, catastrophic environmental or other events, and our business, results of operations, financial condition and cash flow from operations would likely be adversely affected.

The majority of our revenue is attributable to operations outside the United States, and our operating results therefore may be materially affected by the economic, political, military, regulatory and other risks of foreign operations or of transacting business with customers outside the United States.

As of June 30, 2018, we operated in 32 countries. We sell our products primarily through a direct sales force located throughout the world. In the event that we are unable to adequately staff and maintain our foreign operations, we could face difficulties managing our international operations.

Customers outside the United States accounted for the majority of our total revenue during the fiscal years ended June 30, 2018, 2017 and 2016. We anticipate that revenue from customers outside the United States will continue to account for a significant portion of our total revenue for the foreseeable future. Our operating results attributable to operations outside the United States are subject to additional risks, including:

- unexpected changes in regulatory or environmental requirements, tariffs and other barriers, including, for example, changes in climate regulations, sanctions or other regulatory restrictions imposed by the United States or foreign governments; and the effects of the United Kingdom European Union membership referendum in June 2016 and the subsequent withdrawal process initiated in March 2017;
- less effective protection of intellectual property;
- requirements of foreign laws and other governmental controls;
- delays in the execution of license agreement renewals in the same quarter in which the original agreements expire;
- difficulties in collecting trade accounts receivable in other countries;
- adverse tax consequences; and
- the challenges of managing legal disputes in foreign jurisdictions.

Fluctuations in foreign currency exchange rates could result in declines in our reported revenue and operating results.

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During fiscal 2018, 2017 and 2016, 9.7%, 9.8% and 11.5% of our total revenue was denominated in a currency other than the U.S. dollar, respectively. In addition, certain of our operating expenses incurred outside the United States are denominated in currencies other than the U.S. dollar. Our reported revenue and operating results are subject to fluctuations in foreign exchange rates. Foreign currency risk arises primarily from the net difference between non-U.S. dollar receipts from customers outside the United States and non-U.S. dollar operating expenses for subsidiaries in foreign countries. Currently, our largest exposures to foreign exchange rates exist primarily with the Euro, Pound Sterling, Canadian Dollar and Japanese Yen against the U.S. dollar. During fiscal 2018, 2017 and 2016, we did not enter into, and were not a party to any, derivative financial instruments, such as forward currency exchange contracts, intended to manage the volatility of these market risks. We cannot predict the impact of foreign currency fluctuations, and foreign currency fluctuations in the future may adversely affect our revenue and operating results. Any hedging policies we may implement in the future may not be successful, and the cost of those hedging techniques may have a significant negative impact on our operating results.

Competition from software offered by current competitors and new market entrants, as well as from internally developed solutions by our customers, could adversely affect our ability to sell our software products and related services and could result in pressure to price our products in a manner that reduces our margins.

Our markets in general are competitive and differ among our principal product areas: engineering, manufacturing, supply chain management and asset performance management. We face challenges in selling our solutions to large companies that have internally developed their own proprietary software solutions, and we face competition from well-established vendors as well as new entrants in our markets. Many of our current and potential competitors have greater financial, technical, marketing, service and other resources than we have. As a result, these companies may be able to offer lower prices, additional products or services, or other incentives that we cannot match or offer. These competitors may be in a stronger position to respond more quickly to new technologies and may be able to undertake more extensive marketing campaigns. We believe they also have adopted and may continue to pursue more aggressive pricing policies and make more attractive offers to potential customers, employees and strategic partners. For example, some competitors may be able to initiate relationships through sales and installations of hardware and then seek to expand their customer relationships by offering asset optimization software at a discount. In addition, many of our competitors have established, and may in the future continue to establish, cooperative relationships with third parties to improve their product offerings and to increase the availability of their products in the marketplace. Competitors with greater financial resources may make strategic acquisitions to increase their ability to gain market share or improve the quality or marketability of their products.

Competition could seriously impede our ability to sell additional software products and related services on terms favorable to us. Businesses may continue to enhance their internally developed solutions, rather than investing in commercial software such as ours. Our current and potential commercial competitors may develop and market new technologies that render our existing or future products obsolete, unmarketable or less competitive. In addition, if these competitors develop products with similar or superior functionality to our products, we may need to decrease the prices for our products in order to remain competitive. If we are unable to maintain our current pricing due to competitive pressures, our margins will be reduced and our operating results will be negatively affected. We cannot ensure that we will be able to compete successfully against current or future competitors or that competitive pressures will not materially adversely affect our business, financial condition and operating results.

Defects or errors in our software products could harm our reputation, impair our ability to sell our products and result in significant costs to us.

Our software products are complex and may contain undetected defects or errors. We have not suffered significant harm from any defects or errors to date, but we have from time to time found defects in our products and we may discover additional defects in the future. We may not be able to detect and correct defects or errors before releasing products. Consequently, we or our customers may discover defects or errors after our products have been implemented. We have in the past issued, and may in the future need to issue, corrective releases of our products to remedy defects or errors. The occurrence of any defects or errors could result in:

- lost or delayed market acceptance and sales of our products;
- delays in payment to us by customers;

- product returns;
- injury to our reputation;
- diversion of our resources;
- increased service and warranty expenses or financial concessions;

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- increased insurance costs; and
- legal claims, including product liability claims.

Defects and errors in our software products could result in claims for substantial damages against us.

Potential acquisitions could be difficult to consummate and integrate into our operations, and they and investment transactions could disrupt our business, dilute stockholder value or impair our financial results.

As part of our business strategy, we may continue from time to time to seek to grow our business through acquisitions of or investments in new or complementary businesses, technologies or products that we believe can improve our ability to compete in our existing customer markets or allow us to enter new markets. The potential risks associated with acquisitions and investment transactions include, but are not limited to:

- failure to realize anticipated returns on investment, cost savings and synergies;
- difficulty in assimilating the operations, policies and personnel of the acquired company;
- unanticipated costs associated with acquisitions;
- challenges in combining product offerings and entering into new markets in which we may not have experience;
- distraction of management's attention from normal business operations;
- potential loss of key employees of the acquired company;
- difficulty implementing effective internal controls over financial reporting and disclosure controls and procedures;
- impairment of relationships with customers or suppliers;
- possibility of incurring impairment losses related to goodwill and intangible assets; and
- other issues not discovered in due diligence, which may include product quality issues or legal or other contingencies

Acquisitions and/or investments may also result in potentially dilutive issuances of equity securities, the incurrence of debt and contingent liabilities, the expenditure of available cash, and amortization expenses or write-downs related to intangible assets such as goodwill, any of which could have a material adverse effect on our operating results or financial condition. Investments in immature businesses with unproven track records and technologies have an especially high degree of risk, with the possibility that we may lose our entire investment or incur unexpected liabilities. We may experience risks relating to the challenges and costs of closing a business combination or investment transaction and the risk that an announced business combination or investment transaction may not close. There can be no assurance that we will be successful in making additional acquisitions in the future or in integrating or executing on our business plan for existing or future acquisitions.

We may be subject to significant expenses and damages because of product-related claims.

In the ordinary course of business, we are, from time to time, involved in lawsuits, claims, investigations, proceedings and threats of litigation. These matters include an April 2004 claim by a customer that certain of our software products and implementation services failed to meet the customer's expectations. In March 2014, a judgment was issued by the trial court against us in the amount of approximately 1.9 million Euro ("€") plus interest and a portion of legal fees. We subsequently filed an appeal of that judgment. In March 2016, the appellate court determined that we are liable for damages in the amount of approximately €1.7 million plus interest, with the possibility of additional damages to be determined in further proceedings by the appellate court. In December 2017, the appellate court issued a final judgment against us in the amount of approximately €3.5 million, including interest, plus approximately €0.2 million in costs and legal fees. As of June 30, 2018, all payments associated with this judgment have been paid.

The amount of damages cannot be predicted with certainty, and could materially adversely affect our results of operations, cash flows or financial position.

Claims that we infringe the intellectual property rights of others may be costly to defend or settle and could damage our business.

We cannot be certain that our software and services do not infringe patents, copyrights, trademarks or other intellectual property rights, so infringement claims might be asserted against us. In addition, we have agreed, and may agree in the future, to indemnify certain of our customers against infringement claims that third parties may assert against our customers based on use of our software or services. Such claims may have a material adverse effect on our business, may be time-consuming and may result in substantial costs and diversion of resources, including our management's attention to our business. Furthermore, a party making an infringement claim could secure a judgment that requires us to pay substantial damages and could also include an injunction or other court order that could prevent us from selling our software or require that we re-engineer some or all of our products. Claims of intellectual property infringement also might require us to enter costly royalty or license agreements. We may be unable to obtain royalty or license agreements on terms acceptable to us or at all. Our business, operating results and financial condition could be harmed significantly if any of these events were to occur, and the price of our common stock could be adversely affected.

We may not be able to protect our intellectual property rights, which could make us less competitive and cause us to lose market share.

Our software is proprietary. Our strategy is to rely on a combination of copyright, patent, trademark and trade secret laws in the United States and other jurisdictions, and to rely on license and confidentiality agreements and software security measures to further protect our proprietary technology and brand. We have obtained or applied for patent protection with respect to some of our intellectual property, but generally do not rely on patents as a principal means of protecting our intellectual property. We have registered or applied to register some of our trademarks in the United States and in selected other countries. We generally enter into non-disclosure agreements with our employees and customers, and historically have restricted third-party access to our software and source code, which we regard as proprietary information. In certain cases, we have provided copies of source code to customers for the purpose of special product customization or have deposited copies of the source code with a third-party escrow agent as security for ongoing service and license obligations. In these cases, we rely on non-disclosure and other contractual provisions to protect our proprietary rights.

The steps we have taken to protect our proprietary rights may not be adequate to deter misappropriation of our technology or independent development by others of technologies that are substantially equivalent or superior to our technology. Our intellectual property rights may expire or be challenged, invalidated or infringed upon by third parties or we may be unable to maintain, renew or enter into new licenses on commercially reasonable terms. Any misappropriation of our technology or development of competitive technologies could harm our business and could diminish or cause us to lose the competitive advantages associated with our proprietary technology, and could subject us to substantial costs in protecting and enforcing our intellectual property rights, and/or temporarily or permanently disrupt our sales and marketing of the affected products or services. The laws of some countries in which our products are licensed do not protect our intellectual property rights to the same extent as the laws of the United States. Moreover, in some non-U.S. countries, laws affecting intellectual property rights are uncertain in their application, which can affect the scope of enforceability of our intellectual property rights.

Our software research and development initiatives and our customer relationships could be compromised if the security of our information technology is breached as a result of a cyber-attack. This could have a material adverse effect on our business, operating results and financial condition, and could harm our competitive position.

We devote significant resources to continually updating our software and developing new products, and our financial performance is dependent in part upon our ability to bring new products and services to market. Our customers use our software to optimize their manufacturing processes and manage asset performance, and they rely on us to provide updates and releases as part of our software maintenance and support services, and to provide remote on-line troubleshooting support. The security of our information technology environment is therefore important to our research and development initiatives, and an important consideration in our customers' purchasing decisions. We maintain cybersecurity policies and procedures, including employee training, to manage risk to our information systems, and we continually evaluate and adapt our systems and processes to mitigate evolving cybersecurity threats. We may incur additional costs to maintain appropriate cybersecurity protections in response to evolving cybersecurity threats, and we may not be able to safeguard against all data security breaches or misuses of data. If the security of our systems is impaired, our development initiatives might be disrupted, and we might be unable to provide service. Our customer relationships might deteriorate, our reputation in the industry could be harmed, and we could be subject to liability claims. This could reduce our revenues, and expose us to significant costs to detect, correct and avoid recurrences of any breach of security and to defend any claims against us. In addition, our insurance coverage may not be adequate to cover all costs related to cybersecurity incidents and the disruptions resulting from such events.

Risks Related to Our Common Stock

Our common stock may experience substantial price and volume fluctuations.

The equity markets have from time to time experienced extreme price and volume fluctuations, particularly in the high technology sector, and those fluctuations often have been unrelated to the operating performance of particular companies. In addition, the market price of our common stock may be affected by other factors, such as: (i) our financial performance; (ii)

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announcements of technological innovations or new products by us or our competitors; and (iii) market conditions in the computer software or hardware industries.

In the past, following periods of volatility in the market price of a public company's securities, securities class action litigation has often been instituted against that company. This type of litigation against us could result in substantial liability and costs and divert management's attention and resources.

Our corporate documents and provisions of Delaware law may prevent a change in control or management that stockholders may consider desirable.

Section 203 of the Delaware General Corporation Law, our charter and our by-laws contain provisions that might enable our management to resist a takeover of our company. These provisions include:

- limitations on the removal of directors;
- a classified board of directors, so that not all members of the board are elected at one time;
- advance notice requirements for stockholder proposals and nominations;
- the inability of stockholders to act by written consent or to call special meetings;
- the ability of the board to make, alter or repeal our by-laws; and
- the ability of the board to designate the terms of and issue new series of preferred stock without stockholder approval.

These provisions could:

- have the effect of delaying, deferring or preventing a change in control of our company or a change in our management that stockholders may consider favorable or beneficial;
- discourage proxy contests and make it more difficult for stockholders to elect directors and take other corporate actions; and
- limit the price that investors might be willing to pay in the future for shares of our common stock.

Item 1B. Unresolved Staff Comments.

None.

Item 2. Properties.

Our principal executive offices are located in leased facilities in Bedford, Massachusetts, consisting of approximately 143,000 square feet of office space to accommodate our product development, sales, marketing, operations, finance and administrative functions. The lease for our Bedford executive offices commenced in November 2014 and is scheduled to expire March 2025. Subject to the terms and conditions of the lease, we may extend the term of the lease for two successive terms of five years each.

We also lease approximately 63,000 square feet in Houston, Texas to accommodate sales, services and product development functions. In addition to our Bedford and Houston locations, we lease office space in Shanghai, Reading (UK), Singapore, Bahrain and Tokyo, to accommodate sales, services and product development functions.

In the remainder of our other locations, the majority of our leases have lease terms of one year or less that are generally based on the number of workstations required. We believe this facilities strategy provides us with significant flexibility to adjust to changes in our business environment. We do not own any real property. We believe that our leased facilities are adequate for our anticipated future needs.

Item 3. Legal Proceedings.

Refer to Note 15, "Commitments and Contingencies," to our Consolidated Financial Statements for information regarding certain legal proceedings, the contents of which are herein incorporated by reference.

Item 4. Mine Safety Disclosures

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None.

PART II

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

Market Information

Our common stock currently trades on The NASDAQ Global Select Market under the symbol "AZPN." The closing price of our common stock on June 30, 2018 was $92.74. The following table sets forth, for the periods indicated, the high and low sales prices per share of our common stock as reported by The NASDAQ Global Select Market:

	2018		2017	
Period	Low	High	Low	High
Quarter ended June 30	$77.29	$99.79	$54.42	$63.05
Quarter ended March 31	66.17	82.88	52.79	59.46
Quarter ended December 31	63.61	69.18	46.07	55.09
Quarter ended September 30	55.05	64.57	39.67	47.02

Holders

On August 1, 2018, there were 358 holders of record of our common stock. The number of record holders does not include persons who held our common stock in nominee or "street name" accounts through brokers.

Dividends

We have never declared or paid cash dividends on our common stock. We do not anticipate paying cash dividends on our common stock in the foreseeable future. On February 26, 2016, we entered into a $250.0 million Credit Agreement (the “Credit Agreement”) with JPMorgan Chase Bank, N.A., as administrative agent, Silicon Valley Bank, as syndication agent, and the lenders and other parties named therein (the “Lenders”). On August 9, 2017, we entered into an Amendment to increase the Credit Agreement to $350.0 million. The Credit Agreement restricts us from declaring or paying dividends in cash on our capital stock if our Leverage Ratio is in excess of 2.75 to 1.00 (refer to “Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations” and Note 10, "Credit Agreement," to our Consolidated Financial Statements for further discussion of the Credit Agreement). Our Leverage Ratio is below 2.75 to 1.00 as of June 30, 2018. Any future determination relating to our dividend policy will be made at the discretion of the Board of Directors and will depend on a number of factors, including our future earnings, capital requirements, financial condition and future prospects and such other factors as the Board of Directors may deem relevant.

Purchases of Equity Securities by the Issuer

As of June 30, 2018, the total number of shares of common stock repurchased since November 1, 2010 under all programs approved by the Board of Directors was 31,943,599 shares.

On January 22, 2015, our Board of Directors approved a share repurchase program (the "Share Repurchase Program") for up to $450 million worth of our common stock. On April 26, 2016, June 8, 2017, and April 18, 2018, the Board of Directors approved a $400 million, $200 million, and $200 million increase in our current share repurchase plan, respectively. Under the share repurchase program, purchases can be made from time to time using a variety of methods, which may include open market purchases, accelerated buyback programs, and others. The specific timing, price and size of purchases will depend on prevailing stock prices, general market and economic conditions, and other considerations, including the amount of cash generated in the United States and other potential uses of cash, such as acquisitions. Purchases may be made through a Rule 10b5-1 plan pursuant to predetermined metrics set forth in such plan. The Board of Directors' authorization of the share repurchase program does not obligate us to acquire any particular amount of common stock, and the program may be suspended or discontinued at any time.

During fiscal 2018, we repurchased 2,797,623 shares of our common stock in the open market for $200.0 million. During fiscal 2017, we repurchased 5,185,257 shares of our common stock in the open market for $275.0 million and 2,106,709 shares of our common stock for $100.0 million as part of an accelerated share repurchase program. During fiscal 2016, we repurchased 4,750,692 shares of our common stock in the open market for $180.1 million.

As of June 30, 2018, the total remaining value under the Share Repurchase Program was approximately $346.3 million.

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The following table sets forth, for the month indicated, our purchases of common stock during the fourth quarter of fiscal 2018:

Issuer Purchases of Equity Securities

Period	Total Number of Shares Purchased (2)	Average Price Paid per Share (3)	Total Number of Shares Purchased as Part of Publicly Announced Program (1)	Approximate Dollar Value of Shares that May Yet Be Purchased Under the Program (4)
April 1 to 30, 2018	176,900	$ 83.11	176,900	
May 1 to 31, 2018	195,289	92.36	195,289	
June 1 to 30, 2018	180,447	95.66	180,447	
	552,636	$ 90.48	552,636	$ 346,292,952

(1) On January 22, 2015, our Board of Directors approved a share repurchase program (the "Share Repurchase Program") for up to $450 million worth of our common stock. On April 26, 2016, June 8, 2017, and April 18, 2018, the Board of Directors approved a $400 million, $200 million, and $200 million increase in our current share repurchase plan, respectively.

(2) As of June 30, 2018, the total number of shares of common stock repurchased under all programs approved by the Board of Directors was 31,943,599, including purchases under an accelerated share repurchase program.

(3) The total average price paid per share is calculated as the total amount paid for the repurchase of our common stock during the period divided by the total number of shares repurchased.

(4) As of June 30, 2018, the total remaining value under the Share Repurchase Program approved on January 22, 2015 and amended on April 26, 2016, June 8, 2017, and April 18, 2018 was approximately $346.3 million.

Securities Authorized for Issuance Under Equity Compensation Plans

The following table provides information about the securities authorized for issuance under our equity compensation plans as of June 30, 2018:

Plan Category	Number of securities to be issued upon exercise of outstanding options, warrants and rights (a)	Weighted-average exercise price of outstanding options, warrants and rights (b)	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column (a)) (c)
Equity compensation plans approved by security holders	1,991,142	$ 48.34	8,170,674

Equity compensation plans approved by security holders consist of our 2010 and 2016 equity incentive plans. Options issuable under the equity incentive plan have a maximum term of ten years.

Stockholder Return Comparison

The information included in this section is not deemed to be "soliciting material" or to be "filed" with the SEC or subject to Regulation 14A or 14C under the Securities Exchange Act or to the liabilities of Section 18 of the Securities Exchange Act, and will not be deemed to be incorporated by reference into any filing under the Securities Act or the Securities Exchange Act, except to the extent we specifically incorporate it by reference into such a filing.

The graph below matches the cumulative 5-year total return of holders of our common stock with the cumulative total returns of the NASDAQ Composite index and the NASDAQ Computer & Data Processing index. The graph assumes that the value of the investment in our common stock and in each of the indexes (including reinvestment of dividends) was $100 on June 30, 2013 and tracks it through June 30, 2018.

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*$100 invested on 6/30/13 in stock or index, including reinvestment of dividends.
Fiscal year ending June 30.
The stock price performance included in this graph is not necessarily indicative of future stock price performance.

	Year Ended June 30,					
	2013	2014	2015	2016	2017	2018
Aspen Technology, Inc.	$100.00	$161.17	$158.21	$139.77	$191.94	$322.13
NASDAQ Composite	$100.00	$132.45	$151.00	$148.88	$189.66	$233.12
NASDAQ Computer & Data Processing	$100.00	$136.90	$148.29	$172.95	$226.96	$300.54

Item 6. Selected Financial Data.

The following tables present selected consolidated financial data for Aspen Technology, Inc. The consolidated statements of operations data set forth below for fiscal 2018, 2017 and 2016 and the consolidated balance sheets data as of June 30, 2018, and 2017, are derived from our consolidated financial statements included beginning on page F-1 of this Form 10-K. The consolidated statements of operations data for fiscal 2015 and 2014 and the consolidated balance sheet data as of June 30, 2016, 2015, and 2014 are derived from our consolidated financial statements that are not included in this Form 10-K. The data presented below should be read in conjunction with our consolidated financial statements and accompanying notes beginning on page F-1 and "Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations."
Our historical results should not be viewed as indicative of results expected for any future period.

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	Year Ended June 30,				
	2018	2017	2016	2015	2014
	(in Thousands, except per share data)				
Consolidated Statements of Operations Data:					
Revenue(1)	$499,514	$482,942	$472,344	$440,401	$391,453
Gross profit	448,870	435,476	423,733	390,825	338,765
Income from operations	209,641	212,016	211,381	179,792	129,724
Net income	$148,688	$162,196	$139,951	$118,407	$85,783
Basic income per share	$2.06	$2.12	$1.69	$1.34	$0.93
Diluted income per share	$2.04	$2.11	$1.68	$1.33	$0.92
Weighted average shares outstanding—Basic	72,140	76,491	82,892	88,398	92,648
Weighted average shares outstanding—Diluted	72,956	76,978	83,309	89,016	93,665

(1) In July 2009, we introduced our aspenONE licensing model under which license revenue is recognized over the term of a license contract. We previously recognized a substantial majority of our license revenue upfront, upon shipment of software. We substantially completed our transition to the aspenONE licensing model in fiscal 2015.

	Year Ended June 30,				
	2018	2017	2016	2015	2014
	(in Thousands)				
Consolidated Balance Sheet Data:					
Cash and cash equivalents	$96,165	$101,954	$318,336	$156,249	$199,526
Marketable securities	—	—	3,006	62,244	98,889
Accounts receivable, net	21,910	27,670	20,476	30,721	38,532
Installments receivable, net	—	—	267	1,842	1,451
Total assets	264,924	247,942	419,738	315,361	407,972
Borrowings (1)	170,000	140,000	140,000	—	—
Deferred revenue	315,104	300,359	282,078	288,887	274,882
Working (deficit) capital	(371,103)	(321,057)	(71,300)	(32,836)	63,178
Total stockholders' (deficit) equity	(284,115)	(260,784)	(75,034)	(48,546)	83,676

(1) In February 2016, we entered into a Credit Agreement. Refer to “Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations” and Note 10, "Credit Agreement," to our Consolidated Financial Statements for further discussion of the Credit Agreement.

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

You should read the following discussion in conjunction with our consolidated financial statements and related notes beginning on page F-1. In addition to historical information, this discussion contains forward-looking statements that involve risks and uncertainties. You should read “Item 1A. Risk Factors” for a discussion of important factors that could cause our actual results to differ materially from our expectations.

Our fiscal year ends on June 30, and references to a specific fiscal year are the twelve months ended June 30 of such year (for example, "fiscal 2018" refers to the year ended June 30, 2018).

Business Overview

We are a leading global supplier of asset optimization solutions that optimize asset design, operations and maintenance in complex, industrial environments. We combine decades of process modeling and operations expertise with big data machine-learning and analytics. Our purpose-built software solutions improve the competitiveness and profitability of our customers by increasing throughput, energy efficiency, and production, reducing unplanned downtime, enhancing capital efficiency, and decreasing working capital requirements over the entire asset lifecycle to support operational excellence.

Our software incorporates our proprietary mathematical and empirical models of manufacturing and planning processes and reflects the deep domain expertise we have amassed from focusing on solutions for the process and other capital-intensive industries for over 35 years. We have developed our applications to design and optimize processes across three principal business areas: engineering, manufacturing and supply chain, and asset performance management. We are a recognized market and technology leader in providing process optimization and asset performance management software solutions for each of these business areas.

We have established sustainable competitive advantages based on the following strengths:

•Innovative products that can enhance our customers' profitability and productivity;

•Long-term customer relationships;

•Large installed base of users of our software; and

•Long-term license contracts.

We have approximately 2,200 customers globally. Our customers consist of companies engaged in the process and other capital-intensive industries such as energy, chemicals, engineering and construction, as well as pharmaceuticals, transportation, power, metals and mining, pulp and paper, and consumer packaged goods.

Business Segments

We have two operating and reportable segments: i) subscription and software and ii) services. The subscription and software segment is engaged in the licensing of asset optimization software solutions and associated support services. The services segment includes professional services and training.

Key Components of Operations

Revenue

We generate revenue primarily from the following sources:

Subscription and Software Revenue. We sell our software products to end users primarily under fixed-term licenses. We license our software products primarily through a subscription offering which we refer to as our aspenONE licensing model, which includes software maintenance and support, known as our Premier Plus SMS offering, for the entire term. Our aspenONE products are organized into three suites: 1) engineering; 2) manufacturing and supply chain; and 3) asset performance management. The aspenONE licensing model provides customers with access to all of the products within the aspenONE suite(s) they license. Customers can change or alternate the use of multiple products in a licensed suite through the use of exchangeable units of measurement, called tokens, licensed in quantities determined by the customer. This licensing system enables customers to use products as needed and to experiment with different products to best solve whatever critical business challenges they face. Customers can increase their usage of our software by purchasing additional tokens as business needs evolve.

We provide customers technical support, access to software fixes and updates and the right to any new unspecified future software products and updates that may be introduced into the licensed aspenONE software suite. Our technical support services are provided from our customer support centers throughout the world, as well as via email and through our support website.

We also license our software through point product arrangements with our Premier Plus SMS offering included for the contract term, as well as perpetual license arrangements.

Services and Other Revenue. We provide training and professional services to our customers. Our professional services are focused on implementing our technology in order to improve customers' plant performance and gain better operational data. Customers who use our professional services typically engage us to provide those services over periods of up to 24 months. We charge customers for professional services on a time-and-materials or fixed-price basis. We provide training services to our customers, including on-site, Internet-based and customized training.

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Our services and other revenue consists of revenue related to professional services and training. The amount and timing of this revenue depend on a number of factors, including:

- whether the professional services arrangement was sold as a single arrangement with, or in contemplation of, a new aspenONE licensing arrangement;
- the number, value and rate per hour of service transactions booked during the current and preceding periods;
- the number and availability of service resources actively engaged on billable projects;
- the timing of milestone acceptance for engagements contractually requiring customer sign-off;
- the timing of collection of cash payments when collectability is uncertain; and
- the size of the installed base of license contracts.

Cost of Revenue

Cost of Subscription and Software. Our cost of subscription and software revenue consists of (i) royalties, (ii) amortization of capitalized software and intangibles, (iii) distribution fees, and (iv) costs of providing Premier Plus SMS bundled with our aspenONE licensing and point product arrangements.

Cost of Services and Other. Our cost of services and other revenue consists primarily of personnel-related and external consultant costs associated with providing customers professional services and training.

Operating Expenses

Selling and Marketing Expenses. Selling expenses consist primarily of the personnel and travel expenses related to the effort expended to license our products and services to current and potential customers, as well as for overall management of customer relationships. Marketing expenses include expenses needed to promote our company and our products and to conduct market research to help us better understand our customers and their business needs.

Research and Development Expenses. Research and development expenses consist primarily of personnel expenses related to the creation of new software products, enhancements and engineering changes to existing products and costs of acquired technology prior to establishing technological feasibility.

General and Administrative Expenses. General and administrative expenses include the costs of corporate and support functions, such as executive leadership and administration groups, finance, legal, human resources and corporate communications, and other costs, such as outside professional and consultant fees and provision for bad debts.

Other Income and Expenses

Interest Income. Interest income is recorded for the accretion of interest on the investment in marketable securities and short-term money market instruments.

Interest Expense. Interest expense is primarily related to our Credit Agreement.

Other Income (Expense), Net. Other income (expense), net is comprised primarily of foreign currency exchange gains (losses) generated from the settlement and remeasurement of transactions denominated in currencies other than the functional currency of our operating units. During fiscal 2017, other income also included a $0.7 million litigation related recovery receipt.

Provision for Income Taxes. Provision for income taxes is comprised of domestic and foreign taxes. We record interest and penalties related to income tax matters as a component of income tax expense. Our effective income tax rate may fluctuate between fiscal years and from quarter to quarter due to items arising from discrete events, such as tax benefits from the disposition of employee equity awards, settlements of tax audits and assessments and tax law changes. Our effective income tax rate is also impacted by, and may fluctuate in any given period because of, the composition of income in foreign jurisdictions where tax rates differ.

Key Business Metrics

Background

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We utilize certain key non-GAAP and other business measures to track and assess the performance of our business and we make these measures available to investors. We have refined the set of appropriate business metrics in the context of our evolving business and use the following non-GAAP business metrics in addition to GAAP measures to track our business performance:

- Annual spend;
- Free cash flow; and
- Non-GAAP operating income.

None of these metrics should be considered as an alternative to any measure of financial performance calculated in accordance with GAAP.

Annual Spend

Annual spend is an estimate of the annualized value of our portfolio of term license arrangements, as of a specific date. Management believes that this financial measure is a useful metric to investors as it provides insight into the growth component of license bookings during a fiscal period. Annual spend is calculated by summing the most recent annual invoice value of each of our active term license contracts. Annual spend also includes the annualized value of standalone SMS agreements purchased in conjunction with term license agreements. Comparing annual spend for different dates can provide insight into the growth and retention rates of our business, and since annual spend represents the estimated annualized billings associated with our active term license agreements, it provides insight into the future value of subscription and software revenue.

Annual spend increases as a result of:

- New term license agreements with new or existing customers;
- Renewals or modifications of existing term license agreements that result in higher license fees due to price escalation or an increase in the number of tokens (units of software usage) or products licensed; and
- Escalation of annual payments in our active term license contracts.

Annual spend is adversely affected by term license and standalone SMS agreements that are renewed at a lower entitlement level or not renewed and, to a lesser extent, by customer contracts that are terminated during the contract term due to the customer’s business ceasing operations.
We estimate that annual spend grew by approximately 6.4% during fiscal 2018, from $459.6 million at June 30, 2017 to $489.3 million at June 30, 2018. We estimate that annual spend grew by approximately 4.1% during fiscal 2017, from $441.4 million at June 30, 2016 to $459.6 million at June 30, 2017. The growth was attributable primarily to an increase in the number of tokens or products sold.
Free Cash Flow
We use a non-GAAP measure of free cash flow to analyze cash flows generated from our operations. Management believes that this financial measure is useful to investors because it permits investors to view our performance using the same tools that management uses to gauge progress in achieving our goals. We believe this measure is also useful to investors because it is an indication of cash flow that may be available to fund investments in future growth initiatives or to repay borrowings under the Credit Agreement, and it is a basis for comparing our performance with that of our competitors. The presentation of free cash flow is not meant to be considered in isolation or as an alternative to cash flows from operating activities as a measure of liquidity.

Free cash flow is calculated as net cash provided by operating activities adjusted for the net impact of (a) purchases of property, equipment and leasehold improvements, (b) capitalized computer software development costs, (c) excess tax benefits from stock-based compensation, (d) non-capitalized acquired technology, and (e) other nonrecurring items, such as acquisition related payments and litigation related payments (receipts).

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The following table provides a reconciliation of GAAP cash flow from operating activities to free cash flow for the indicated periods:

	June 30,		
	2018	2017	2016
	(Dollars in Thousands)		
GAAP cash flow from operating activities	$206,936	$182,386	$153,744
Purchase of property, equipment, and leasehold improvements	(331)	(2,720)	(3,483)
Capitalized computer software development costs	(329)	(405)	(269)
Excess tax benefits from stock-based compensation	—	5,965	2,208
Non-capitalized acquired technology	75	2,246	1,250
Litigation related payments (receipts)	4,546	(721)	3,040
Acquisition related fee payments	1,148	448	8,649
Free cash flow (non-GAAP)	$212,045	$187,199	$165,139

Excess tax benefits are related to stock-based compensation tax deductions in excess of book compensation expense and reduce our income taxes payable. We have included the impact of excess tax benefits within free cash flow in fiscal 2017 and 2016 to be consistent with the treatment of other tax benefits. As a result of adopting ASU No. 2016-09, effective July 1, 2017, excess tax benefits from stock-based compensation are now reflected in the consolidated statements of operations as a component of the provision for income taxes, whereas they were previously a component of stockholders' deficit. For a more detailed description of the standard, refer to Note 2, "Significant Accounting Policies," to our Consolidated Financial Statements.

In fiscal 2018, 2017 and 2016, we have excluded payments of $0.1 million, $2.2 million, and $1.3 million, respectively, for non-capitalized acquired technology (including $0.1 million and $0.5 million in fiscal 2018 and 2017, respectively, of final payments related to non-capitalized acquired technology from prior fiscal years) from free cash flow to be consistent with the treatment of other transactions where the acquired technology assets were capitalized.

In fiscal 2018 and 2016, we have excluded litigation related payments of $4.5 million and $3.0 million, respectively. Refer to Note 15, "Commitments and Contingencies," to our Consolidated Financial Statements. In fiscal 2017, we have excluded a $(0.7) million litigation related recovery receipt.

Fiscal 2018 Compared to Fiscal 2017

Total free cash flow increased $24.8 million during fiscal 2018 as compared to the prior fiscal year primarily due to changes in working capital. For a more detailed description of these changes refer to "Liquidity and Capital Resources."

Fiscal 2017 Compared to Fiscal 2016

Total free cash flow increased $22.1 million during fiscal 2017 as compared to the prior fiscal year primarily due to higher net income of $22.2 million. For a more detailed description of these changes refer to "Liquidity and Capital Resources."

Non-GAAP Operating Income

Non-GAAP operating income excludes certain non-cash and non-recurring expenses, and is used as a supplement to operating income presented on a GAAP basis. We believe that non-GAAP operating income is a useful financial measure because removing certain non-cash and other items provides additional insight into recurring profitability and cash flow from operations.

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The following table presents our net income, as adjusted for stock-based compensation expense, non-capitalized acquired technology and amortization of purchased technology intangibles, and other items, such as litigation judgments and acquisition related expenses, for the indicated periods:

	June 30,			2018 Compared to 2017		2017 Compared to 2016	
	2018	2017	2016	$	%	$	%
GAAP income from operations	$209,641	$212,016	$211,381	$(2,375)	(1.1)%	$635	0.3 %
Plus:							
Stock-based compensation	22,688	18,800	15,727	3,888	20.7 %	3,073	19.5 %
Non-capitalized acquired technology	—	2,250	250	(2,250)	(100.0)%	2,000	800.0 %
Amortization of intangibles	2,231	950	147	1,281	134.8 %	803	546.3 %
Litigation judgment	1,689	—	—	1,689	100.0 %	—	— %
Acquisition related fees	721	1,754	5,213	(1,033)	(58.9)%	(3,459)	(66.4)%
Non-GAAP operating income	$236,970	$235,770	$232,718	$1,200	0.5 %	$3,052	1.3 %

Non-GAAP operating income increased $1.2 million, or approximately 1%, in fiscal year 2018 as compared to the prior year primarily due to a larger base of license arrangements recognized on a ratable basis amounting to $17.5 million. Non-GAAP operating income increased $3.1 million, or approximately 1%, in 2017 as compared to the prior year due to an increase in revenue primarily due to a larger base of license arrangements recognized on a ratable basis amounting to $13.1 million.

In fiscal 2017 and 2016, we acquired technology that did not meet the accounting requirements for capitalization and therefore the cost of the acquired technology was expensed as research and development. We have excluded the expense of the acquired technology from non-GAAP operating income to be consistent with transactions where the acquired assets were capitalized. In fiscal 2018, we incurred an expense associated with a litigation judgment in the amount of $1.7 million. In fiscal 2016, we incurred fees associated with an acquisition bid.

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Results of Operations

The following table sets forth the results of operations, percentage of total revenue and the year-over-year percentage change in certain financial data for fiscal 2018, 2017 and 2016:

	Year Ended June 30,						2018 Compared to 2017 %	2017 Compared to 2016 %
	2018		2017		2016			
	(Dollars in Thousands)							
Revenue:								
Subscription and software	$471,041	94.3 %	$453,512	93.9 %	$440,408	93.2 %	3.9 %	3.0 %
Services and other	28,473	5.7	29,430	6.1	31,936	6.8	(3.3)	(7.8)
Total revenue	499,514	100.0	482,942	100.0	472,344	100.0	3.4	2.2
Cost of revenue:								
Subscription and software	23,228	4.7	21,051	4.4	20,376	4.3	10.3	3.3
Services and other	27,416	5.5	26,415	5.5	28,235	6.0	3.8	(6.4)
Total cost of revenue	50,644	10.2	47,466	9.9	48,611	10.3	6.7	(2.4)
Gross profit	448,870	89.8	435,476	90.1	423,733	89.7	3.1	2.8
Operating expenses:								
Selling and marketing	101,077	20.2	92,633	19.2	91,536	19.4	9.1	1.2
Research and development	82,076	16.4	79,530	16.5	67,152	14.2	3.2	18.4
General and administrative	56,076	11.2	51,297	10.6	53,664	11.4	9.3	(4.4)
Total operating expenses	239,229	47.8	223,460	46.3	212,352	45.0	7.1	5.2
Income from operations	209,641	42.0	212,016	43.9	211,381	44.8	(1.1)	0.3
Interest income	231	—	808	0.2	441	0.1	(71.4)	83.2
Interest expense	(5,691)	(1.1)	(3,787)	(0.8)	(1,212)	(0.3)	50.3	212.5
Other (expense) income, net	(838)	(0.2)	1,309	0.3	29	—	(164.0)	4,413.8
Income before provision for income taxes	203,343	40.7	210,346	43.6	210,639	44.6	(3.3)	(0.1)
Provision for income taxes	54,655	10.9	48,150	10.0	70,688	15.0	13.5	(31.9)
Net income	$148,688	29.8 %	$162,196	33.6 %	$139,951	29.6 %	(8.3)%	15.9 %

Revenue

Fiscal 2018 Compared to Fiscal 2017

Total revenue increased by $16.6 million during fiscal 2018 as compared to the prior fiscal year. The increase was due to higher subscription and software revenue of $17.5 million, partially offset by lower services and other revenue of $1.0 million.

Fiscal 2017 Compared to Fiscal 2016

Total revenue increased by $10.6 million during fiscal 2017 as compared to the prior fiscal year. The increase was due to higher subscription and software revenue of $13.1 million, partially offset by lower services and other revenue of $2.5 million.

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Subscription and Software Revenue

	Year Ended June 30,			2018 Compared to 2017		2017 Compared to 2016	
	2018	2017	2016	$	%	$	%
	(Dollars in Thousands)						
Subscription and software revenue	$471,041	$453,512	$440,408	$17,529	3.9%	$13,104	3.0%
As a percent of total revenue	94.3 %	93.9 %	93.2 %				

Fiscal 2018 Compared to Fiscal 2017

The increase in subscription and software revenue of $17.5 million during fiscal 2018 as compared to the prior fiscal year was primarily the result of the growth of our base of license arrangements being recognized on a ratable basis.

Fiscal 2017 Compared to Fiscal 2016

The increase in subscription and software revenue of $13.1 million during fiscal 2017 as compared to the prior fiscal year was primarily the result of the growth of our base of license arrangements being recognized on a ratable basis.

Services and Other Revenue

	Year Ended June 30,			2018 Compared to 2017		2017 Compared to 2016	
	2018	2017	2016	$	%	$	%
	(Dollars in Thousands)						
Services and other revenue	$28,473	$29,430	$31,936	$(957)	(3.3)%	$(2,506)	(7.8)%
As a percent of total revenue	5.7 %	6.1 %	6.8 %				

Services and other revenue consists primarily of revenue related to professional services and training.

Fiscal 2018 Compared to Fiscal 2017

The decrease in services and other revenue of $1.0 million during fiscal 2018 as compared to the prior fiscal year was attributable to lower professional services revenue of $1.4 million, partially offset by higher training revenue of $0.5 million.

Under the aspenONE licensing model, revenue from committed professional service arrangements that are sold as a single arrangement with, or in contemplation of, a new aspenONE licensing transaction is deferred and recognized on a ratable basis over the longer of (a) the period the services are performed or (b) the term of the related software arrangement. As our typical contract term approximates five years, professional services revenue on these types of arrangements will usually be recognized over a longer period than the period over which the services are performed. Revenue from professional service arrangements bundled with and recognized over the term of aspenONE transactions was consistent year-over-year.

Fiscal 2017 Compared to Fiscal 2016

The decrease in services and other revenue of $2.5 million during fiscal 2017 as compared to the prior fiscal year was attributable to lower professional services revenue of $1.6 million and lower training revenue of $0.8 million.

Cost of Revenue

Cost of Subscription and Software Revenue

	Year Ended June 30,			2018 Compared to 2017		2017 Compared to 2016	
	2018	2017	2016	$	%	$	%
	(Dollars in Thousands)						
Cost of subscription and software revenue	$23,228	$21,051	$20,376	$2,177	10.3%	$675	3.3%
As a percent of subscription and software revenue	4.9 %	4.6 %	4.6 %				

Cost of subscription and software revenue increased by $2.2 million during fiscal 2018 as compared with the prior fiscal year and increased by $0.7 million during fiscal year 2017 as compared with the prior fiscal year. Subscription and software

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gross profit margin was 95.1% in fiscal 2018 and was consistent with 95.4% and 95.4% in fiscal years 2017 and 2016, respectively.

Cost of Services and Other Revenue

	Year Ended June 30,			2018 Compared to 2017		2017 Compared to 2016	
	2018	2017	2016	$	%	$	%
	(Dollars in Thousands)						
Cost of services and other revenue	$27,416	$26,415	$28,235	$1,001	3.8%	$(1,820)	(6.4)%
As a percent of services and other revenue	96.3 %	89.8 %	88.4 %				

Cost of services and other revenue includes the cost of providing professional services and training.

Fiscal 2018 Compared to Fiscal 2017

Cost of services and other revenue increased by $1.0 million during fiscal 2018 as compared to the prior fiscal year. The increase was due to higher cost of professional services revenue of $0.7 million and higher cost of training revenue of $0.3 million, both of which were primarily due to an increase in average headcount.

Gross profit margin on services and other revenue decreased from 10.2% during fiscal 2017 to 3.7% during fiscal 2018 primarily due to lower services and other revenue and higher associated costs.

Fiscal 2017 Compared to Fiscal 2016

Cost of services and other revenue decreased by $1.8 million during fiscal 2017 as compared to the prior fiscal year. The decrease was due to lower cost of training revenue of $1.7 million and lower cost of professional services revenue of $0.1 million.

Gross profit margin on services and other revenue decreased from 11.6% during fiscal 2016 to 10.2% during fiscal 2017 primarily due to lower services and other revenue.

Gross Profit

	Year Ended June 30,			2018 Compared to 2017		2017 Compared to 2016	
	2018	2017	2016	$	%	$	%
	(Dollars in Thousands)						
Gross profit	$448,870	$435,476	$423,733	$13,394	3.1%	$11,743	2.8%
As a percent of total revenue	89.8 %	90.1 %	89.7 %				

Fiscal 2018 Compared to Fiscal 2017

Gross profit increased by $13.4 million during fiscal 2018 as compared to the prior fiscal year and gross profit margin remained consistent at 89.8% in fiscal 2018 compared to 90.1% in fiscal 2017. The year-to-year increase in gross profit was primarily attributable to the growth of our subscription and software revenue, while gross profit margin remained consistent.

Fiscal 2017 Compared to Fiscal 2016

Gross profit increased by $11.7 million during fiscal 2017 as compared to the prior fiscal year and gross profit margin increased to 90.1% in fiscal 2017 from 89.7% in fiscal 2016. The year-to-year increase in gross profit was primarily attributable to the growth of our subscription and software revenue, while gross profit margin remained consistent.

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Operating Expenses

Selling and Marketing Expense

	Year Ended June 30,			2018 Compared to 2017		2017 Compared to 2016	
	2018	2017	2016	$	%	$	%
	(Dollars in Thousands)						
Selling and marketing expense	$101,077	$92,633	$91,536	$8,444	9.1%	$1,097	1.2%
As a percent of total revenue	20.2%	19.2%	19.4%				

Fiscal 2018 Compared to Fiscal 2017

The year-over-year increase in selling and marketing expense in fiscal 2018 as compared to the prior fiscal year was primarily the result of higher compensation costs of $3.8 million related to an increase in average headcount attributable to our continued investment in asset performance management and acquisitions, higher commissions expense of $2.1 million, and higher travel and sales training costs of $1.6 million.

Fiscal 2017 Compared to Fiscal 2016

The year-over-year increase in selling and marketing expense in fiscal 2017 as compared to the prior fiscal year was primarily the result of higher commissions expense of $1.2 million, higher marketing costs of $1.0 million due to our biennial customer conference held in fiscal 2017, and higher professional fees of $0.9 million, partially offset by lower sales conference costs of $1.6 million due to the holding of one sales conference in the current fiscal year compared to two sales conferences in the prior fiscal year, and lower stock-based compensation of $0.7 million.

Research and Development Expense

	Year Ended June 30,			2018 Compared to 2017		2017 Compared to 2016	
	2018	2017	2016	$	%	$	%
	(Dollars in Thousands)						
Research and development expense	$82,076	$79,530	$67,152	$2,546	3.2%	$12,378	18.4%
As a percent of total revenue	16.4%	16.5%	14.2%				

Fiscal 2018 Compared to Fiscal 2017

The year-over-year increase in research and development expense in fiscal 2018 as compared to the prior fiscal year was primarily the result of higher compensation costs of $3.5 million related to an increase in average headcount attributable to our continued investment in asset performance management and acquisitions, and higher stock-based compensation of $1.8 million, partially offset by lower acquisition and acquired technology costs of $2.5 million.

Fiscal 2017 Compared to Fiscal 2016

Research and development expenses increase by approximately $12.4 million during fiscal 2017 as compared to the prior fiscal year, which was primarily due to acquisitions and hiring related to our new asset performance management suite. The increase resulted primarily from higher compensation costs of $5.2 million related to an increase in headcount, higher stock-based compensation of $2.4 million, and higher overhead allocations of $1.9 million, as well as higher costs of acquired technology of $1.9 million and higher professional fees of $1.0 million.

Overhead allocations consist of information systems costs, facility costs and certain benefit costs. The overhead expenses are allocated to departments based on relative headcount, geographic location and total salary.

In fiscal 2017 and 2016, we acquired technology in two separate transactions for $2.3 million and $0.3 million, respectively. At the time we acquired the technology, the projects to develop commercially available products did not meet the accounting definition of having reached technological feasibility and therefore the cost of the acquired technology was expensed as a research and development expense.

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General and Administrative Expense

	Year Ended June 30,			2018 Compared to 2017		2017 Compared to 2016	
	2018	2017	2016	$	%	$	%
	(Dollars in Thousands)						
General and administrative expense	$56,076	$51,297	$53,664	$4,779	9.3%	$(2,367)	(4.4)%
As a percent of total revenue	11.2%	10.6%	11.4%				

Fiscal 2018 Compared to Fiscal 2017

The year-over-year increase in general and administrative expense during fiscal 2018 as compared to the prior fiscal year was primarily attributable to higher compensation costs of $2.4 million related to an increase in average headcount, higher stock-based compensation of $1.9 million, an increase in expense of $1.7 million associated with a litigation judgment, a $1.2 million increase in our allowance for doubtful accounts, and higher professional fees of $0.7 million, which were related to our assessment and implementation of ASU No. 2014-09 Revenue from Contracts with Customers, partially offset by lower acquisition costs of $1.4 million and lower amortization expense of $0.9 million.

Fiscal 2017 Compared to Fiscal 2016

The year-over-year decrease in general and administrative expense during fiscal 2017 as compared to the prior fiscal year was primarily attributable to lower acquisition costs of $3.4 million, lower overhead allocations of $2.2 million and lower compensation costs of $0.6 million, partially offset by higher professional fees of $1.9 million, which were primarily related to our assessment and implementation of ASU No. 2014-09 Revenue from Contracts with Customers, as well as higher stock-based compensation of $1.3 million and higher hardware and software maintenance costs of $0.7 million.

Interest Income

	Year Ended June 30,			2018 Compared to 2017		2017 Compared to 2016	
	2018	2017	2016	$	%	$	%
	(Dollars in Thousands)						
Interest income	$231	$808	$441	$(577)	(71.4)%	$367	83.2%
As a percent of total revenue	—%	0.2%	0.1%				

Fiscal 2018 Compared to Fiscal 2017

The year-over-year decrease in interest income during fiscal 2018 as compared to the prior fiscal year was attributable to a lower level of interest income from investments.

Fiscal 2017 Compared to Fiscal 2016

The year-over-year increase in interest income during fiscal 2017 as compared to the prior fiscal year was attributable to a higher level of interest income from investments.

Interest Expense

	Year Ended June 30,			2018 Compared to 2017		2017 Compared to 2016	
	2018	2017	2016	$	%	$	%
	(Dollars in Thousands)						
Interest expense	$(5,691)	$(3,787)	$(1,212)	$(1,904)	50.3%	$(2,575)	212.5%
As a percent of total revenue	(1.1)%	(0.8)%	(0.3)%				

Fiscal 2018 Compared to Fiscal 2017

The year-over-year increase in interest expense during fiscal 2018 as compared to the prior fiscal year was primarily attributable to interest expenses related to higher interest rates and increased borrowings under the Credit Agreement we entered into during fiscal 2016.

Fiscal 2017 Compared to Fiscal 2016

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The year-over-year increase in interest expense during fiscal 2017 as compared to the prior fiscal year was primarily attributable to interest expenses related to the Credit Agreement we entered into during fiscal 2016.

Other Income (Expense), Net

	Year Ended June 30,			2018 Compared to 2017		2017 Compared to 2016	
	2018	2017	2016	$	%	$	%
	(Dollars in Thousands)						
Other (expense) income, net	$(838)	$1,309	$29	$(2,147)	(164.0)%	$1,280	4,413.8%
As a percent of total revenue	(0.2)%	0.3%	—%				

Other income (expense), net is comprised primarily of unrealized and realized foreign currency exchange gains and losses generated from the settlement and remeasurement of transactions denominated in currencies other than the functional currency of our operating units. Other income (expense), net also includes miscellaneous non-operating gains and losses.

During fiscal 2018, other income (expense), net was comprised of $(0.8) million of net foreign currency exchange losses. During fiscal 2017, other income (expense), net was comprised of a $0.7 million litigation related recovery receipt and other net currency gains. During fiscal 2016, other income (expense), net was $0.1 million of net currency gains, which was comprised primarily of $(3.4) million of net foreign currency exchange losses related to the Acquisition Bid, offset by $3.5 million of net currency gains.

Provision for Income Taxes

	Year Ended June 30,			2018 Compared to 2017		2017 Compared to 2016	
	2018	2017	2016	$	%	$	%
	(Dollars in Thousands)						
Provision for income taxes	$54,655	$48,150	$70,688	$6,505	13.5%	$(22,538)	(31.9)
Effective tax rate	26.9%	22.9%	33.6%				

Fiscal 2018 Compared to Fiscal 2017

The effective tax rate for the periods presented is primarily the result of income earned in the U.S. taxed at U.S. federal and state statutory income tax rates, income earned in foreign tax jurisdictions taxed at the applicable rates, as well as the impact of permanent differences between book and tax income.

On December 22, 2017, the President of the United States signed into law Public Law No. 115-97, commonly referred to as the Tax Cuts and Jobs Act (the “Tax Act”), following its passage by the United States Congress. The Tax Act made significant changes to U.S. federal income tax laws, including reduction of the corporate tax rate from 35.0% to 21.0%, limitation of the tax deduction for interest expense to 30.0% of adjusted taxable income (except for certain small businesses), limitation of the deduction for net operating losses to 80.0% of current year taxable income and elimination of net operating loss carrybacks, one time taxation of offshore earnings at reduced rates regardless of whether they are repatriated, elimination of U.S. tax on foreign earnings (subject to certain important exceptions), immediate deductions for certain new investments instead of deductions for depreciation expense over time, and modifying or repealing many business deductions. As a result of the enactment of the Tax Act, the blended U.S. statutory federal income tax rate for fiscal 2018 was 28.1%.

The Tax Act has several significant changes that impact all taxpayers, including a transition tax, which is a one-time tax charge on accumulated, undistributed foreign earnings. The calculation of accumulated foreign earnings requires an analysis of each foreign entity’s financial results going back to 1986. In response to the Tax Act, the Securities and Exchange Commission (“SEC”) staff issued a Staff Accounting Bulletin No. 118 (“SAB 118”) that provides guidance on accounting for the impact of the Tax Act. SAB 118 allows companies to record provisional amounts while the accounting impact of the Tax Act is still under analysis, not to extend beyond the measurement period of one year from the enactment of the Tax Act. We are currently estimating that we will not be subject to the transition tax associated with our accumulated, undistributed foreign earnings. We will continue to evaluate this area and expect to finalize our conclusions by the second quarter of fiscal 2019.

Our effective tax rate was 26.9% and 22.9% during fiscal 2018 and 2017, respectively.
We recognized income tax expense of $54.7 million during fiscal 2018 compared to $48.2 million during fiscal 2017. Fiscal 2018 was favorably impacted by the recognition of excess tax benefits related to stock-based compensation, the domestic production activity deduction, and the lower blended U.S. statutory tax rate of 28.1%, partially offset by $5.2 million of tax

expense associated with the decrease in our net deferred income tax assets due to the reduction in the corporate income tax rate under the Tax Act. Fiscal 2017 was favorably impacted by an income tax benefit of $19.1 million, which primarily resulted from the release of tax contingency reserves following an examination of our fiscal 2015 federal tax return by the IRS.

As of June 30, 2018, we maintained a valuation allowance in the U.S. primarily for certain deferred tax assets related to capital losses that are anticipated to expire unused. We also maintain a valuation allowance on certain foreign subsidiary NOL carryforwards and state R&D credits because it is more likely than not that a benefit will not be realized. As of June 30, 2018 and 2017, our total valuation allowance was $10.4 million and $11.3 million, respectively.

We made cash tax payments totaling $50.6 million during fiscal 2018. We paid $44.0 million for U.S. federal and state income taxes and $6.6 million for foreign tax liabilities.

Fiscal 2017 Compared to Fiscal 2016

The effective tax rate for the periods presented is primarily the result of income earned in the U.S. taxed at U.S. federal and state statutory income tax rates, income earned in foreign tax jurisdictions taxed at the applicable rates, as well as the impact of permanent differences between book and tax income.

Our effective tax rate was 22.9% and 33.6% during fiscal 2017 and 2016, respectively.

We recognized income tax expense of $48.2 million during fiscal 2017 compared to $70.7 million during fiscal 2016. The $22.5 million year-over-year decrease was generally attributable to an income tax benefit of $19.1 million primarily resulting from the release of tax contingency reserves as a result of concluding an examination of our fiscal 2015 federal tax return by the IRS and additional federal and state research and development ("R&D") credits.

As of June 30, 2017, we maintained a valuation allowance in the U.S. primarily for certain deferred tax assets related to capital losses that are anticipated to expire unused. We also maintain a valuation allowance on certain foreign subsidiary NOL carryforwards and state R&D credits because it is more likely than not that a benefit will not be realized. As of June 30, 2017 and 2016, our total valuation allowance was $11.3 million and $10.1 million, respectively.

We made cash tax payments totaling $65.5 million during fiscal 2017. We paid $60.8 million for U.S. federal and state income taxes and $4.7 million for foreign tax liabilities.

Liquidity and Capital Resources

Resources

In recent years, we have financed our operations with cash generated from operating activities. As of June 30, 2018 and 2017, our principal sources of liquidity consisted of $96.2 million and $102.0 million in cash and cash equivalents, respectively.

We believe our existing cash and cash equivalents, together with our cash flows from operating activities, will be sufficient to meet our anticipated cash needs for at least the next twelve months. We may need to raise additional funds if we decide to make one or more acquisitions of businesses, technologies or products. If additional funding for such purpose is required beyond existing resources and our Credit Agreement described below, we may not be able to effect a receivable, equity or debt financing on terms acceptable to us or at all.

Credit Agreement

On February 26, 2016, we entered into a $250.0 million Credit Agreement (the "Credit Agreement") with various lenders. On August 9, 2017, we entered into an Amendment to increase the Credit Agreement to $350.0 million. The Credit Agreement matures on February 26, 2021. Prior to the maturity of the Credit Agreement, any amounts borrowed may be repaid and, subject to the terms and conditions of the Credit Agreement, borrowed again whole or in part without penalty. As of June 30, 2018 and 2017, we had $170.0 million and $140.0 million in outstanding borrowings under the Credit Agreement, respectively.

For a more detailed description of the Credit Agreement, refer to Note 10, "Credit Agreement," to our Consolidated Financial Statements.

Cash Equivalents and Cash Flows

Our cash equivalents of $5.0 million and $79.7 million as of June 30, 2018 and 2017, respectively, consisted primarily of money market funds. The fair value of our portfolio is affected by interest rate movements, credit and liquidity risks. The

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objective of our investment policy is to manage our cash and investments to preserve principal and maintain liquidity, while earning a return on our investment portfolio by investing available funds.

The following table summarizes our cash flow activities for the periods indicated:

	Year Ended June 30,		
	2018	2017	2016
	(Dollars in Thousands)		
Cash flow provided by (used in):			
Operating activities	$206,936	$182,386	$153,744
Investing activities	(34,360)	(36,698)	47,221
Financing activities	(178,479)	(362,017)	(38,659)
Effect of exchange rates on cash balances	114	(53)	(219)
(Decrease) increase in cash and cash equivalents	$(5,789)	$(216,382)	$162,087

Operating Activities

Our primary source of cash is from the annual installments associated with our software license arrangements and related software support services, and to a lesser extent from professional services and training. We believe that cash inflows from our term license business will grow as we benefit from the continued growth of our portfolio of term license contracts.

Fiscal 2018

Cash from operating activities provided $206.9 million during fiscal 2018. This amount resulted from net income of $148.7 million, adjusted for non-cash items of $35.2 million, and net sources of cash of $23.0 million due to decreases in operating assets of $8.1 million and increases in operating liabilities of $14.9 million.

Non-cash items within net income consisted primarily of stock-based compensation expense of $22.7 million, depreciation and amortization expense of $6.5 million, deferred income taxes of $3.2 million, provision for bad debts of $1.4 million, and net foreign currency losses of $1.0 million.

A decrease in operating assets of $8.1 million and an increase in operating liabilities of $14.9 million increased net cash from operating activities by $23.0 million. Sources of cash consisted of net increases in deferred revenue of $13.7 million, decreases in accounts receivable of $4.3 million, decreases in prepaid expenses, prepaid income taxes and other assets totaling $3.8 million, and net increases in accounts payable, accrued expenses and other current liabilities of $1.2 million.

Fiscal 2017

Cash from operating activities provided $182.4 million during fiscal 2017. This amount resulted from net income of $162.2 million, adjusted for non-cash items of $20.7 million, and net uses of cash of $0.5 million due to increases in operating assets of $9.9 million and increases in operating liabilities of $9.4 million.

Cash flow from operations for fiscal 2017 was reduced by expensing $2.3 million related to the purchases of non-capitalized acquired technology. Other acquisitions of technology qualified for capitalization and therefore the cash outflow is shown in the investing section of the consolidated statements of cash flows. Refer to the ‘Key Business Metrics - Free Cash Flow” and “Non-GAAP Operating Income” for further discussion of the non-capitalized acquired technology transaction.

Non-cash expenses within net income consisted primarily of stock-based compensation expense of $18.8 million, depreciation and amortization expense of $6.4 million, and net foreign currency gains of $1.0 million.

An increase in operating assets of $9.9 million and an increase in operating liabilities of $9.4 million decreased net cash from operating activities by $0.5 million. Uses of cash consisted of net decreases in accounts payable, accrued expenses and other current liabilities of $9.1 million, increases in accounts receivable of $7.5 million and increases in prepaid expenses, prepaid income taxes and other assets totaling $2.4 million. Partially offsetting these uses of cash were net increases in deferred revenue of $18.5 million.

Investing Activities

Fiscal 2018

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During fiscal 2018, we used $34.4 million of cash from investing activities. The use of cash was from $33.7 million for business acquisitions and $0.7 million for capital expenditures.

Fiscal 2017

During fiscal 2017, we used $36.7 million of cash from investing activities. The use of cash was from $36.2 million for business acquisitions and $3.1 million for capital expenditures. Partially offsetting this use of cash was $2.6 million related to the net maturity of marketable securities.

Financing Activities

Fiscal 2018

During fiscal 2018, we used $178.5 million of cash for financing activities. We used $205.0 million for repurchases of our common stock, $8.6 million for deferred business acquisition payments, and $7.9 million for withholding taxes on vested and settled restricted stock units. Sources of cash in the period included proceeds of $30.0 million from the Credit Agreement and proceeds of $13.5 million from the exercise of employee stock options.

Fiscal 2017

During fiscal 2017, we used $362.0 million of cash for financing activities. We paid $371.5 million for repurchases of our common stock and paid withholding taxes of $5.8 million on vested and settled restricted stock units. Sources of cash in the period included proceeds of $9.3 million from the exercise of employee stock options and $6.0 million related to stock-based compensation tax deductions in excess of book compensation expense that reduced taxes payable and increased additional paid in capital.

Contractual Obligations and Requirements

Our contractual obligations consisted primarily of borrowings and interest under our Credit Agreement, operating lease commitments for our headquarters and other facilities, royalty and other obligations and were as follows as of June 30, 2018:

	Payments due by Period				
	Total	Less than 1 Year	1 to 3 Years	3 to 5 Years	More than 5 Years
Contractual Cash Obligations:					
Credit agreement (1)	$176,564	$176,564	$—	$—	$—
Operating leases	38,731	7,938	13,944	10,131	6,718
Royalty obligations	5,185	4,112	971	16	86
Deferred acquisition payments	5,994	1,700	4,294	—	—
Other purchase obligations	14,773	8,962	3,006	2,247	558
Total contractual cash obligations	$241,247	$199,276	$22,215	$12,394	$7,362
Other Commercial Commitments:					
Standby letters of credit	$3,474	$3,206	$—	$—	$268
Total commercial commitments	$244,721	$202,482	$22,215	$12,394	$7,630

(1) The $176.6 million contractual obligation related to our Credit Agreement includes $170.0 million in outstanding borrowings and $6.6 million of interest expense and commitment fees as of June 30, 2018.

Except for the commitments under the aforementioned lease agreement, we are not currently a party to any other material purchase contracts related to future capital expenditures, and we do not expect our future investment in capital expenditures to be materially different from recent levels.

The standby letters of credit were issued by Silicon Valley Bank in the United States and secure our performance on professional services contracts and certain facility leases.

The above table does not reflect a liability for uncertain tax positions of $3.9 million as of June 30, 2018. We estimate that none of this amount will be paid within the next year and we are currently unable to reasonably estimate the timing of payments for the remainder of the liability.

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Off-Balance Sheet Arrangements

As of June 30, 2018, we did not have any significant off-balance sheet arrangements, as defined in Item 303(a)(4)(ii) of SEC Regulation S-K.

Critical Accounting Estimates and Judgments

Our consolidated financial statements are prepared in accordance with GAAP. The preparation of our financial statements requires management to make estimates and judgments that affect the reported amounts of assets, liabilities, revenue, expenses and related disclosures. We base our estimates on historical experience and various other assumptions that we believe to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

We believe that the assumptions and estimates associated with the following critical accounting policies have the greatest potential impact on our consolidated financial statements:

- revenue recognition;
- accounting for income taxes; and
- loss contingencies.

For further information on our significant accounting policies, refer to Note 2, "Significant Accounting Policies," to our Consolidated Financial Statements.

Revenue Recognition

Four basic criteria must be satisfied before software license revenue can be recognized: persuasive evidence of an arrangement between us and an end user; delivery of our product has occurred; the fee for the product is fixed or determinable; and collection of the fee is probable.

Persuasive evidence of an arrangement—We use a signed contract as evidence of an arrangement for software licenses and SMS. For professional services we use a signed contract and a work proposal to evidence an arrangement. In cases where both a signed contract and a purchase order are required by the customer, we consider both taken together as evidence of the arrangement.

Delivery of our product—Software and the corresponding access keys are generally delivered to customers via disk media with standard shipping terms of Free Carrier, our warehouse (i.e., FCA, named place) or electronic delivery. Our software license agreements do not contain conditions for acceptance.

Fee is fixed or determinable—We assess whether a fee is fixed or determinable at the outset of the arrangement. Significant judgment is involved in making this assessment.

Under our historical upfront revenue model, we are able to demonstrate that the fees are fixed or determinable for all arrangements, including those for our term licenses that contain extended payment terms. We have an established history of collecting under the terms of these contracts without providing concessions to customers. In addition, we also assess whether a contract modification to an existing term arrangement constitutes a concession. In making this assessment, significant analysis is performed to ensure that no concessions are given. Our software license agreements do not include a right of return or exchange. For license arrangements executed under the historical upfront revenue model, we recognize license revenue upon delivery of the software product, provided all other revenue recognition requirements are met.

We cannot assert that the fees under our aspenONE licensing model and point product arrangements with Premier Plus SMS are fixed or determinable because the rights provided to customers, and the economics of the arrangements, are not comparable to our transactions with other customers under the upfront revenue model. As a result, the amount of revenue recognized for these arrangements is limited by the amount of customer payments that become due.

Collection of fee is probable—We assess the probability of collecting from each customer at the outset of the arrangement based on a number of factors, including the customer's payment history, its current creditworthiness, economic conditions in the customer's industry and geographic location, and general economic conditions. If in our judgment collection of a fee is not probable, revenue is recognized as cash is collected, provided all other conditions for revenue recognition have been met.

Vendor-Specific Objective Evidence of Fair Value

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We have established VSOE for professional services and certain training offerings, but not for our software products or our SMS offerings. We assess VSOE for SMS, professional services, and training based on an analysis of standalone sales of these offerings using the bell-shaped curve approach. We do not have a history of selling our Premier Plus SMS offering to customers on a standalone basis, and as a result are unable to establish VSOE for this deliverable. As of July 1, 2015, we were no longer able to establish VSOE for SMS offerings sold with our legacy term license arrangements. As a result, legacy term agreements that include legacy SMS entered into subsequent to June 30, 2015, are recognized ratably over the legacy SMS service period. Loss of VSOE on legacy SMS offerings sold with our legacy term arrangements did not have a material impact on our revenue in fiscal 2016 and 2017 and is not expected to have a material impact on our revenue in future periods.

Subscription and Software Revenue

Subscription and software revenue consists of product and related revenue from our (i) aspenONE licensing model; (ii) point product arrangements with our Premier Plus SMS offering included for the contract term; (iii) legacy arrangements including (a) amendments to existing legacy term arrangements, (b) renewals of legacy term arrangements and (c) legacy arrangements that are being recognized over time as a result of not previously meeting one or more of the requirements for recognition under the upfront revenue model; (iv) legacy SMS arrangements; and (v) perpetual arrangements.

When a customer elects to license our products under our aspenONE licensing model, our Premier Plus SMS offering is included for the entire term of the arrangement and the customer receives, for the term of the arrangement, the right to any new unspecified future software products and updates that may be introduced into the licensed aspenONE software suite. Due to our obligation to provide unspecified future software products and updates, we are required to recognize revenue ratably over the term of the arrangement, once the other revenue recognition criteria noted above have been met.

Our point product arrangements with Premier Plus SMS include SMS for the term of the arrangement. Since we do not have VSOE for our Premier Plus SMS offering, the SMS element of our point product arrangements is not separable. As a result, revenue associated with point product arrangements with Premier Plus SMS included for the contract term is recognized ratably over the term of the arrangement, once all other revenue recognition criteria have been met.

Legacy term license arrangements do not include the same rights as those provided to customers under the aspenONE licensing model and point product arrangements with Premier Plus SMS. Legacy SMS revenue is generated from legacy SMS offerings provided in support of legacy term license arrangements. Customers typically receive SMS for one year and then can elect to renew SMS annually. During fiscal 2015 and prior periods, we had VSOE for certain legacy SMS offerings sold with term license arrangements and could therefore separate the undelivered elements. Accordingly, license fee revenue for legacy term license arrangements was recognized upon delivery of the software products using the residual method, provided all other revenue recognition requirements were met. VSOE of fair value for the undelivered SMS component sold with our term license arrangements was deferred and subsequently amortized into revenue ratably over the contractual term of the SMS arrangement. As of July 1, 2015, we were no longer able to establish VSOE for SMS offerings sold with our legacy term license arrangements. As a result, legacy term agreements that include legacy SMS entered into subsequent to June 30, 2015, are recognized ratably over the legacy SMS service period. Loss of VSOE on legacy SMS offerings sold with our legacy term arrangements did not have a material impact on our revenue in fiscal 2016 and 2017 and is not expected to have a material impact on our revenue in future periods.

Services and Other Revenue

Professional Services Revenue

Professional services are provided to customers on a time-and-materials (T&M) or fixed-price basis. We recognize professional services fees for our T&M contracts based upon hours worked and contractually agreed-upon hourly rates. Revenue from fixed-price engagements is recognized using the proportional performance method based on the ratio of costs incurred to the total estimated project costs. Project costs are typically expensed as incurred. The use of the proportional performance method is dependent upon our ability to reliably estimate the costs to complete a project. We use historical experience as a basis for future estimates to complete current projects. Additionally, we believe that costs are the best available measure of performance. Out-of-pocket expenses which are reimbursed by customers are recorded as revenue.

In certain circumstances, professional services revenue may be recognized over a longer time period than the period over which the services are performed. If the costs to complete a project are not estimable or the completion is uncertain, the revenue is recognized upon completion of the services. In circumstances in which professional services are sold as a single arrangement with, or in contemplation of, a new aspenONE license or point product arrangement with Premier Plus SMS, revenue is deferred and recognized on a ratable basis over the longer of (i) the period the services are performed, or (ii) the license term. When we provide professional services considered essential to the functionality of the software, we recognize the combined revenue from the sale of the software and related services using the completed contract or percentage-of-completion method.

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We have occasionally been required to commit unanticipated additional resources to complete projects, which resulted in losses on those contracts. Provisions for estimated losses on contracts are made during the period in which such losses become probable and can be reasonably estimated.

Training Revenue

We provide training services to our customers, including on-site, Internet-based, public and customized training. Revenue is recognized in the period in which the services are performed. In circumstances in which training services are sold as a single arrangement with, or in contemplation of, a new aspenONE license or point product arrangement with Premier Plus SMS, revenue is deferred and recognized on a ratable basis over the longer of (i) the period the services are performed or (ii) the license term.

Accounting for Income Taxes

We utilize the asset and liability method of accounting for income taxes in accordance with ASC 740. Under this method, deferred tax assets and liabilities are determined based on temporary differences between the financial reporting and tax bases of assets and liabilities. Deferred tax assets and liabilities are measured using the enacted tax rates and statutes that will be in effect when the differences are expected to reverse. Deferred tax assets can result from unused operating losses, R&D and foreign tax credit carryforwards and deductions recorded for financial statement purposes prior to them being deductible on a tax return.

The realization of deferred tax assets is dependent upon the generation of future taxable income and the reversal of taxable temporary differences. Valuation allowances are provided against net deferred tax assets if, based upon the available evidence, it is more likely than not that some or all of the deferred tax assets will not be realized. Significant management judgment is required in determining any valuation allowance recorded against deferred tax assets. We consider, among other available information, projected future taxable income, limitations on the availability of net operating loss ("NOLs") and tax credit carryforwards, scheduled reversals of deferred tax liabilities and other evidence assessing the potential realization of deferred tax assets. Adjustments to the valuation allowance are included in the provision for (benefit from) income taxes in our consolidated statements of operations in the period they become known.

Our provision for (benefit from) income taxes includes amounts determined under the provisions of ASC 740, and is intended to satisfy additional income tax assessments, including interest and penalties, that could result from any tax return positions for which the likelihood of sustaining the position on an audit does not meet a threshold of "more likely than not." Penalties and interest are recorded as a component of our provision for (benefit from) income taxes. Tax liabilities under the provisions of ASC 740 were recorded as a component of our income taxes payable and other non-current liabilities. The ultimate amount of taxes due will not be known until examinations are completed and settled or the audit periods are closed by statutes.

Our U.S. and foreign tax returns are subject to periodic compliance examinations by various local and national tax authorities through periods defined by the tax code in applicable jurisdictions. The years prior to 2016 are closed in the United States, although the utilization of tax credits generated in earlier periods will keep these periods open for examination to the extent of the credits claimed in fiscal 2016. Similarly, the years prior to 2015 are closed in the United Kingdom, although the utilization of net operating loss carryforwards generated in earlier periods will keep the periods open for examination. Our foreign subsidiaries are subject to audit from 2007 forward. In connection with examinations of tax filings, tax contingencies can arise from differing interpretations of applicable tax laws and regulations relative to the amount, timing or proper inclusion or exclusion of revenue and expenses in taxable income or loss. For periods that remain subject to audit, we have asserted and unasserted potential assessments that are subject to final tax settlements.

Loss Contingencies

The outcomes of legal proceedings and claims brought against us are subject to significant uncertainty. We accrue estimated liabilities for loss contingencies arising from claims, assessments, litigation and other sources when it is probable that a liability has been incurred and the amount of the claim, assessment or damages can be reasonably estimated. Disclosure of a contingency is required if there is at least a reasonable possibility that a loss has been incurred. In determining whether a loss should be accrued we evaluate, among other factors, the degree of probability of an unfavorable outcome and the ability to make a reasonable estimate of the loss amount. Change in these factors could materially impact our consolidated financial statements.

Under the terms of substantially all of our license agreements, we have agreed to indemnify customers for costs and damages arising from claims against such customers based on, among other things, allegations that our software products infringe the intellectual property rights of a third party. In most cases, in the event of an infringement claim, we retain the right to procure for the customer the right to continue using the software product or to replace or modify the software product to

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eliminate the infringement while providing substantially equivalent functionality. These indemnification provisions are accounted for in accordance with ASC Topic 460, Guarantees. In most cases, and where legally enforceable, the indemnification refund is limited to the amount of the license fees paid by the customer.

Recent Accounting Pronouncements

Refer to Note 2 (o) "Recent Accounting Pronouncements," to our Consolidated Financial Statements for information about recent accounting pronouncements.

Item 7A. Quantitative and Qualitative Disclosures about Market Risk.

In the ordinary course of conducting business, we are exposed to certain risks associated with potential changes in market conditions. These market risks include changes in currency exchange rates and interest rates which could affect operating results, financial position and cash flows. We manage our exposure to these market risks through our regular operating and financing activities and, if considered appropriate, we may enter into derivative financial instruments such as forward currency exchange contracts.

Foreign Currency Risk

During fiscal 2018 and 2017, 9.7% and 9.8% of our total revenue was denominated in a currency other than the U.S. dollar. In addition, certain of our operating costs incurred outside the United States are denominated in currencies other than the U.S. dollar. We conduct business on a worldwide basis and as a result, a portion of our revenue, earnings, net assets, and net investments in foreign affiliates is exposed to changes in foreign currency exchange rates. We measure our net exposure for cash balance positions and for cash inflows and outflows in order to evaluate the need to mitigate our foreign exchange risk. We may enter into foreign currency forward contracts to minimize the impact related to unfavorable exchange rate movements, although we have not done so during fiscal 2018 and fiscal 2017. Our largest exposures to foreign currency exchange rates exist primarily with the Euro, Pound Sterling, Canadian Dollar, and Japanese Yen.

During fiscal 2018 and fiscal 2017, we recorded net foreign currency losses of $0.8 million and gains of $0.6 million, respectively, related to the settlement and remeasurement of transactions denominated in currencies other than the functional currency of our operating units. Our analysis of operating results transacted in various foreign currencies indicated that a hypothetical 10% change in the foreign currency exchange rates could have increased or decreased the consolidated results of operations by approximately $4.8 million and $4.7 million for fiscal 2018 and 2017, respectively.

Interest Rate Risk

We place our investments in money market instruments. Our analysis of our investments and interest rates at June 30, 2018 and 2017 indicated that a hypothetical 100 basis point increase or decrease in interest rates would not have a material impact on the fair value of our investments determined in accordance with an income-based approach utilizing portfolio future cash flows discounted at the appropriate rates.

We had $170.0 million in outstanding borrowings under our Credit Agreement as of June 30, 2018. A hypothetical 10% increase or decrease in interest rates paid on outstanding borrowings under the Credit Agreement would not have a material impact on our financial position, results of operations or cash flows.

Item 8. Financial Statements and Supplementary Data.

The following consolidated financial statements specified by this Item, together with the reports thereon of KPMG LLP, are presented following Item 15 of this Form 10-K:

Financial Statements:

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

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None.

Item 9A. Controls and Procedures

a) Disclosure Controls and Procedures

Our management, with the participation of our chief executive officer and chief financial officer, evaluated the effectiveness of our disclosure controls and procedures as of June 30, 2018. The term "disclosure controls and procedures," as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act, means controls and other procedures of a company that are designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Securities Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the SEC's rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Securities Exchange Act is accumulated and communicated to the Company's management, including its principal executive and principal financial officers, as appropriate to allow timely decisions regarding required disclosure. Management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives, and management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures. Based on the evaluation of our disclosure controls and procedures as of June 30, 2018, our chief executive officer and chief financial officer concluded that, as of such date, our disclosure controls and procedures were effective.

b) Management's Report on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting for our company. Internal control over financial reporting is defined in Rule 13a-15(f) and 15d-15(f) promulgated under the Exchange Act, as a process designed by, or under the supervision of, a company's principal executive and principal financial officers and effected by the Company's board of directors, management and other personnel, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles, and includes those policies and procedures that:

- pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company;
- provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made in accordance with authorizations of management and directors of the company; and
- 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. 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, assessed the effectiveness of our internal control over financial reporting as of June 30, 2018 based on criteria established in "Internal Control—Integrated Frameworks (2013) issued by the Committee of Sponsors Organizations of the Treadway Commission ("COSO"), and concluded that, as of June 30, 2018, our internal control over financial reporting was effective.

KPMG LLP, our independent registered public accounting firm, has audited our consolidated financial statements and the effectiveness of our internal control over financial reporting as of June 30, 2018. This report appears below.

c) Changes in Internal Control over Financial Reporting

During the three months ended June 30, 2018, no changes were identified to our internal controls over financial reporting that materially affected, or were reasonably likely to materially affect, our internal controls over financial reporting.

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Report of Independent Registered Public Accounting Firm
To the Stockholders and Board of Directors
Aspen Technology, Inc.:

Opinion on Internal Control Over Financial Reporting

We have audited Aspen Technology, Inc. and subsidiaries' (the Company) internal control over financial reporting as of June 30, 2018, based on criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission. In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of June 30, 2018, based on criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission.

We also have 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 June 30, 2018 and 2017, the related consolidated statements of operations, comprehensive income, stockholders' deficit, and cash flows for each of the years in the three-year period ended June 30, 2018, and the related notes (collectively, the consolidated financial statements), and our report dated August 8, 2018 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 generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

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

/s/ KPMG LLP
Boston, Massachusetts
August 8, 2018

Item 9B. Other Information.

None.

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PART III

Item 10. Directors, Executive Officers and Corporate Governance.

Certain information required under this Item 10 will appear under the sections entitled "Executive Officers of the Registrant," "Election of Directors," "Information Regarding our Board of Directors and Corporate Governance," "Code of Business Conduct and Ethics," and "Section 16(a) Beneficial Ownership Reporting Compliance" in our definitive proxy statement for our 2018 annual meeting of stockholders, and is incorporated herein by reference.

Item 11. Executive Compensation.

Certain information required under this Item 11 will appear under the sections entitled "Director Compensation," "Compensation Discussion and Analysis," "Executive Compensation" and "Employment and Change in Control Agreements" in our definitive proxy statement for our 2018 annual meeting of stockholders, and is incorporated herein by reference.

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

Certain information required under this Item 12 will appear under the sections entitled "Stock Owned by Directors, Executive Officers and Greater-than 5% Stockholders" and "Securities Authorized for Issuance Under Equity Compensation Plans" in our definitive proxy statement for our 2018 annual meeting of stockholders, and is incorporated herein by reference.

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

Certain information required under this Item 13 will appear under the sections entitled "Information Regarding the Board of Directors and Corporate Governance" and "Related Party Transactions" in our definitive proxy statement for our 2018 annual meeting of stockholders, and is incorporated herein by reference.

Item 14. Principal Accounting Fees and Services.

Certain information required under this Item 14 will appear under the section entitled "Independent Registered Public Accountants" in our definitive proxy statement for our 2018 annual meeting of stockholders, and is incorporated herein by reference.

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PART IV

Item 15. Exhibits and Financial Statement Schedules.

(a)(1) Financial Statements

The consolidated financial statements appear immediately following page 48 ("Signatures").

(a)(2) Financial Statement Schedules

All schedules are omitted because they are not required or the required information is shown in the consolidated financial statements or notes thereto.

(a)(3) Exhibits

The exhibits listed in the accompanying exhibit index are filed or incorporated by reference as part of this Form 10-K.

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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.

ASPEN TECHNOLOGY, INC.

Date: August 8, 2018 By: /s/ ANTONIO J. PIETRI
Antonio J. Pietri
President and Chief Executive Officer

Date: August 8, 2018 By: /s/ KARL E. JOHNSEN
Karl E. Johnsen
Senior Vice President and
Chief Financial Officer

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

Signature	Title	Date
/s/ ANTONIO J. PIETRI Antonio J. Pietri	President and Chief Executive Officer and Director (Principal Executive Officer)	August 8, 2018
/s/ KARL E. JOHNSEN Karl E. Johnsen	Senior Vice President and Chief Financial Officer (Principal Financial and Accounting Officer)	August 8, 2018
/s/ ROBERT M. WHELAN, JR. Robert M. Whelan, Jr.	Chairman of the Board of Directors	August 8, 2018
/s/ DONALD P. CASEY Donald P. Casey	Director	August 8, 2018
/s/ GARY E. HAROIAN Gary E. Haroian	Director	August 8, 2018
/s/ JOAN C. MCARDLE Joan C. McArdle	Director	August 8, 2018
/s/ SIMON OREBI GANN Simon Orebi Gann	Director	August 8, 2018
/s/ R. HALSEY WISE R. Halsey Wise	Director	August 8, 2018

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INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

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Report of Independent Registered Public Accounting Firm
To the Stockholders and Board of Directors
Aspen Technology, Inc.:

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated balance sheets of Aspen Technology, Inc. and subsidiaries (the Company) as of June 30, 2018 and 2017, the related consolidated statements of operations, comprehensive income, stockholders' deficit, and cash flows for each of the years in the three year period ended June 30, 2018, and the related notes (collectively, the consolidated financial statements). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of June 30, 2018 and 2017, and the results of its operations and its cash flows for each of the years in the three year period ended June 30, 2018, in conformity with U.S. generally accepted accounting principles.

We also have 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 June 30, 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 August 8, 2018 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 these 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/ KPMG LLP

We have served as the Company's auditor since 2008.

Boston, Massachusetts
August 8, 2018

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ASPEN TECHNOLOGY, INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF OPERATIONS

	Year Ended June 30,		
	2018	2017	2016
	(Dollars in Thousands, Except per Share Data)		
Revenue:			
Subscription and software	$471,041	$453,512	$440,408
Services and other	28,473	29,430	31,936
Total revenue	499,514	482,942	472,344
Cost of revenue:			
Subscription and software	23,228	21,051	20,376
Services and other	27,416	26,415	28,235
Total cost of revenue	50,644	47,466	48,611
Gross profit	448,870	435,476	423,733
Operating expenses:			
Selling and marketing	101,077	92,633	91,536
Research and development	82,076	79,530	67,152
General and administrative	56,076	51,297	53,664
Total operating expenses	239,229	223,460	212,352
Income from operations	209,641	212,016	211,381
Interest income	231	808	441
Interest (expense)	(5,691)	(3,787)	(1,212)
Other (expense) income, net	(838)	1,309	29
Income before provision for income taxes	203,343	210,346	210,639
Provision for income taxes	54,655	48,150	70,688
Net income	$148,688	$162,196	$139,951
Net income per common share:			
Basic	$2.06	$2.12	$1.69
Diluted	$2.04	$2.11	$1.68
Weighted average shares outstanding:			
Basic	72,140	76,491	82,892
Diluted	72,956	76,978	83,309

See accompanying notes to these consolidated financial statements.

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ASPEN TECHNOLOGY, INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME

	Year Ended June 30,		
	2018	2017	2016
	(Dollars in Thousands)		
Net income	$148,688	$162,196	$139,951
Other comprehensive loss:			
Net unrealized gains on available for sale securities, net of tax effects of $12 for fiscal year 2016	—	—	22
Foreign currency translation adjustments	(71)	(1,192)	(3,841)
Total other comprehensive loss	(71)	(1,192)	(3,819)
Comprehensive income	$148,617	$161,004	$136,132

See accompanying notes to these consolidated financial statements.

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ASPEN TECHNOLOGY, INC. AND SUBSIDIARIES
CONSOLIDATED BALANCE SHEETS

	June 30, 2018	2017
	(Dollars in Thousands, Except Share and Per Share Data)	
ASSETS		
Current assets:		
Cash and cash equivalents	$96,165	$101,954
Accounts receivable, net	21,910	27,670
Prepaid expenses and other current assets	10,509	12,061
Prepaid income taxes	2,601	4,501
Total current assets	131,185	146,186
Property, equipment and leasehold improvements, net	9,806	13,400
Computer software development costs, net	646	667
Goodwill	75,590	51,248
Intangible assets, net	35,310	20,789
Non-current deferred tax assets	11,090	14,352
Other non-current assets	1,297	1,300
Total assets	$264,924	$247,942
LIABILITIES AND STOCKHOLDERS' DEFICIT		
Current liabilities:		
Accounts payable	$4,230	$5,467
Accrued expenses and other current liabilities	39,515	48,149
Income taxes payable	1,698	1,603
Borrowings under credit agreement	170,000	140,000
Current deferred revenue	286,845	272,024
Total current liabilities	502,288	467,243
Non-current deferred revenue	28,259	28,335
Other non-current liabilities	18,492	13,148
Commitments and contingencies (Note 15)		
Series D redeemable convertible preferred stock, $0.10 par value—Authorized—3,636 shares as of June 30, 2018 and 2017	—	—
Issued and outstanding—none as of June 30, 2018 and 2017		
Stockholders' deficit:		
Common stock, $0.10 par value—Authorized—210,000,000 shares		
Issued—103,130,300 shares at June 30, 2018 and 102,567,129 shares at June 30, 2017	10,313	10,257
Outstanding—71,186,701 shares at June 30, 2018 and 73,421,153 shares at June 30, 2017		
Additional paid-in capital	715,475	687,479
Retained earnings	305,208	156,520
Accumulated other comprehensive income	1,388	1,459
Treasury stock, at cost— 31,943,599 shares of common stock at June 30, 2018 and 29,145,976 shares at June 30, 2017	(1,316,499)	(1,116,499)
Total stockholders' deficit	(284,115)	(260,784)
Total liabilities and stockholders' deficit	$264,924	$247,942

See accompanying notes to these consolidated financial statements.

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ASPEN TECHNOLOGY, INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF STOCKHOLDERS' DEFICIT

	Common Stock		Additional Paid-in Capital	Retained (Deficit) Earnings	Accumulated Other Comprehensive Income	Treasury Stock		Total Stockholders' Deficit
	Number of Shares	$0.10 Par Value				Number of Shares	Cost	
	(Dollars in Thousands, Except Share Data)							
Balance June 30, 2015	101,607,520	$10,161	$641,883	$(145,627)	$ 6,470	17,103,318	$(561,433)	$(48,546)
Comprehensive income (loss):								
Net income	—	—	—	139,951	—	—	—	139,951
Other comprehensive loss	—	—	—	—	(3,819)			(3,819)
Exercise of stock options	201,706	20	3,900	—	—	—		3,920
Issuance of restricted stock units and net share settlement related to withholding taxes	222,734	22	(4,431)	—	—	—	—	(4,409)
Repurchase of common stock	—	—	—	—	—	4,750,692	(180,066)	(180,066)
Stock-based compensation	—	—	15,727	—	—	—	—	15,727
Excess tax benefits from stock-based compensation	—	—	2,208					2,208
Balance June 30, 2016	102,031,960	$10,203	$659,287	$(5,676)	$ 2,651	21,854,010	$(741,499)	$(75,034)
Comprehensive income (loss):								
Net income	—	—	—	162,196	—	—	—	162,196
Other comprehensive loss	—	—	—	—	(1,192)			(1,192)
Exercise of stock options	332,937	34	9,239	—	—	—		9,273
Issuance of restricted stock units and net share settlement related to withholding taxes	202,232	20	(5,812)	—	—	—	—	(5,792)
Repurchase of common stock	—	—	—	—	—	7,291,966	(375,000)	(375,000)

Stock-based compensation	—	—	18,800	—	—	—	—	18,800
Excess tax benefits from stock-based compensation	—	—	5,965					5,965
Balance June 30, 2017	102,567,129	$10,257	$687,479	$156,520	$ 1,459	29,145,976	$(1,116,499)	$(260,784)
Comprehensive income (loss):								
Net income	—	—	—	148,688	—	—	—	148,688
Other comprehensive loss	—	—	—	—	(71)			(71)
Exercise of stock options	362,515	36	13,395	—	—	—		13,431
Issuance of restricted stock units and net share settlement related to withholding taxes	200,656	20	(8,087)	—	—	—	—	(8,067)
Repurchase of common stock	—	—	—	—	—	2,797,623	(200,000)	(200,000)
Stock-based compensation	—	—	22,688	—	—	—	—	22,688
Balance June 30, 2018	103,130,300	$10,313	$715,475	$305,208	$ 1,388	31,943,599	$(1,316,499)	$(284,115)

See accompanying notes to these consolidated financial statements.

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ASPEN TECHNOLOGY, INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF CASH FLOWS

	Year Ended June 30,		
	2018	2017	2016
	(Dollars in Thousands)		
Operating activities:			
Net income	$148,688	$162,196	$139,951
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation and amortization	6,544	6,405	6,061
Net foreign currency losses (gains)	980	(1,036)	(3,666)
Stock-based compensation expense	22,688	18,800	15,727
Deferred income taxes	3,193	(4,286)	2,499
Provision for bad debts	1,418	199	260
Tax benefits from stock-based compensation	—	5,965	2,208
Excess tax benefits from stock-based compensation	—	(5,965)	(2,208)
Other non-cash operating activities	421	602	321
Changes in assets and liabilities, excluding initial effects of acquisitions:			
Accounts receivable	4,327	(7,480)	9,382
Prepaid expenses, prepaid income taxes, and other assets	3,821	(2,421)	(6,106)
Accounts payable, accrued expenses, income taxes payable and other liabilities	1,156	(9,070)	(4,489)
Deferred revenue	13,700	18,477	(6,196)
Net cash provided by operating activities	206,936	182,386	153,744
Investing activities:			
Purchases of marketable securities	—	(683,748)	—
Maturities of marketable securities	—	686,346	58,973
Purchase of property, equipment and leasehold improvements	(331)	(2,720)	(3,483)
Payments for business acquisitions, net of cash acquired	(33,700)	(36,171)	(8,000)
Payments for capitalized computer software costs	(329)	(405)	(269)
Net cash (used in) provided by investing activities	(34,360)	(36,698)	47,221
Financing activities:			
Exercise of stock options	13,466	9,273	3,924
Repurchases of common stock	(205,049)	(371,491)	(178,604)
Payment of tax withholding obligations related to restricted stock	(7,896)	(5,764)	(4,480)
Deferred business acquisition payments	(8,649)	—	—
Excess tax benefits from stock-based compensation	—	5,965	2,208
Proceeds from credit agreement	30,000	—	140,000
Payments of credit agreement issuance costs	(351)	—	(1,707)
Net cash used in financing activities	(178,479)	(362,017)	(38,659)
Effect of exchange rate changes on cash and cash equivalents	114	(53)	(219)
(Decrease) increase in cash and cash equivalents	(5,789)	(216,382)	162,087
Cash and cash equivalents, beginning of year	101,954	318,336	156,249

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Cash and cash equivalents, end of year	$96,165	$101,954	$318,336
Supplemental disclosure of cash flow information:			
Income tax paid, net	$50,557	$65,536	$69,028
Interest paid	5,038	3,444	963
Supplemental disclosure of non-cash investing and financing activities:			
Change in purchases of property, equipment and leasehold improvements included in accounts payable and accrued expenses	(61)	(47)	(825)
Change in common stock repurchases included in accounts payable and accrued expenses	(5,049)	3,509	1,462

See accompanying notes to these consolidated financial statements.

ASPEN TECHNOLOGY, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

(1) Operations

Aspen Technology, Inc., together with its subsidiaries, is a leading global supplier of asset optimization solutions that optimize asset design, operations and maintenance lifecycle in complex, industrial environments. Our aspenONE software and related services have been developed specifically for companies in the process and other capital-intensive industries such as energy, chemicals, engineering and construction, as well as pharmaceuticals, transportation, power, metals and mining, pulp and paper, and consumer packaged goods. Customers use our solutions to improve their competitiveness and profitability by increasing throughput, energy efficiency, and production, reducing unplanned downtime, enhancing capital efficiency, and decreasing working capital requirements over the entire asset lifecycle to support operational excellence. We operate globally in 32 countries as of June 30, 2018.

(2) Significant Accounting Policies

(a) Principles of Consolidation

The accompanying consolidated financial statements include the accounts of Aspen Technology, Inc. and our wholly owned subsidiaries. All intercompany balances and transactions have been eliminated in consolidation.

Reclassifications

Certain line items in prior period financial statements have been reclassified to conform to currently reported presentations.

(b) Management Estimates

The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions. These estimates and assumptions affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenue and expenses during the reporting period. Actual results could differ from those estimates.

(c) Cash and Cash Equivalents

Cash and cash equivalents consist of short-term, highly liquid investments with remaining maturities of three months or less when purchased.

(d) Revenue Recognition

We generate revenue from the following sources: (1) Subscription and software revenue; and (2) Services and other revenue. We sell our software products to end users primarily under fixed-term licenses. We license our software products primarily through a subscription offering which we refer to as our aspenONE licensing model, which includes software maintenance and support, known as our Premier Plus SMS offering, for the entire term. Our aspenONE products are organized into three suites: 1) engineering; 2) manufacturing and supply chain; and 3) asset performance management. The aspenONE licensing model provides customers with access to all of the products within the aspenONE suite(s) they license. We refer to these arrangements as token arrangements. Tokens are fixed units of measure. The amount of software usage is limited by the number of tokens purchased by the customer.

We also license our software through point product term arrangements, which include our Premier Plus SMS offering for the entire term, as well as perpetual license arrangements.

Four basic criteria must be satisfied before software license revenue can be recognized: persuasive evidence of an arrangement between us and an end user; delivery of our product has occurred; the fee for the product is fixed or determinable; and collection of the fee is probable.

Persuasive evidence of an arrangement—We use a signed contract as evidence of an arrangement for software licenses and SMS. For professional services we use a signed contract and a work proposal to evidence an arrangement. In cases where both a signed contract and a purchase order are required by the customer, we consider both taken together as evidence of the arrangement.

Delivery of our product—Software and the corresponding access keys are generally delivered to customers via electronic delivery or via physical medium with standard shipping terms of Free Carrier, our warehouse (i.e., FCA, AspenTech). Our software license agreements do not contain conditions for acceptance.

Fee is fixed or determinable—We assess whether a fee is fixed or determinable at the outset of the arrangement. Significant judgment is involved in making this assessment.

As a standard business practice, we offer fixed-term license arrangements, which are generally payable on an annual basis.

We cannot assert that the fees under our aspenONE licensing model and point product arrangements with Premier Plus SMS are fixed or determinable because of the rights provided to customers, economics of the arrangements, and because we do not have an established history of our arrangements going to term end date without providing concessions to customers. As a result, the amount of revenue recognized for these arrangements is limited by the amount of customer payments that become due.

Collection of fee is probable—We assess the probability of collecting from each customer at the outset of the arrangement based on a number of factors, including the customer's payment history, its current creditworthiness, economic conditions in the customer's industry and geographic location, and general economic conditions. If in our judgment collection of a fee is not probable, revenue is recognized as cash is collected, provided all other conditions for revenue recognition have been met.

Vendor-Specific Objective Evidence of Fair Value (VSOE)

We have established VSOE for professional services and certain training offerings, but not for our software products or our SMS offerings. We assess VSOE for SMS, professional services, and training, based on an analysis of standalone sales of the offerings using the bell-shaped curve approach. We do not have a history of selling our Premier Plus SMS offering to customers on a standalone basis, and as a result are unable to establish VSOE for this deliverable.

Subscription and Software Revenue

Subscription and software revenue consists primarily of product and related revenue from our (i) aspenONE licensing model; (ii) point product arrangements with our Premier Plus SMS offering included for the contract term; and (iii) perpetual arrangements.

When a customer elects to license our products under our aspenONE licensing model, our Premier Plus SMS offering is included for the entire term of the arrangement and the customer receives, for the term of the arrangement, the right to any new unspecified future software products and updates that may be introduced into the licensed aspenONE software suite. Due to our obligation to provide unspecified future software products and updates and because we do not have VSOE for our Premier Plus SMS offering, we are required to recognize revenue ratably over the term of the arrangement, once the other revenue recognition criteria noted above have been met.

Our point product arrangements with Premier Plus SMS include SMS for the term of the arrangement. Since we do not have VSOE for our Premier Plus SMS offering, the SMS element of our point product arrangements is not separable. As a result, revenue associated with point product arrangements with Premier Plus SMS included for the contract term is recognized ratably over the term of the arrangement, once the other revenue recognition criteria have been met.

Services and Other Revenue

Professional Services Revenue

Professional services are provided to customers on a time-and-materials (T&M) or fixed-price basis. We recognize professional services fees for our T&M contracts based upon hours worked and contractually agreed-upon hourly rates. Revenue from fixed-price engagements is recognized using the proportional performance method based on the ratio of costs incurred to the total estimated project costs. Project costs are typically expensed as incurred. The use of the proportional performance method is dependent upon our ability to reliably estimate the costs to complete a project. We use historical experience as a basis for future estimates to complete current projects. Additionally, we believe that costs are the best available measure of performance. Out-of-pocket expenses which are reimbursed by customers are recorded as revenue.

In certain circumstances, professional services revenue may be recognized over a longer time period than the period over which the services are performed. If the costs to complete a project are not estimable or the completion is uncertain, the revenue and related costs are recognized upon completion of the services. In circumstances in which professional services are sold as a single arrangement with, or in contemplation of, a new aspenONE license or point product arrangement with Premier Plus SMS, revenue is deferred and recognized on a ratable basis over the longer of (i) the period the services are performed, or (ii) the license term. When we provide professional services considered essential to the functionality of the software, we recognize the combined revenue from the sale of the software and related services using the completed contract or percentage-of-completion method.

We have occasionally been required to commit unanticipated additional resources to complete projects, which resulted in losses on those contracts. Provisions for estimated losses on contracts are made during the period in which such losses become probable and can be reasonably estimated.

Training Revenue

We provide training services to our customers, including on-site, Internet-based, public and customized training. Revenue is recognized in the period in which the services are performed. In circumstances in which training services are sold as a single arrangement with, or in contemplation of, a new aspenONE license or point product arrangement with Premier Plus SMS, revenue is deferred and recognized on a ratable basis over the longer of (i) the period the services are performed or (ii) the license term.

Deferred Revenue

Deferred revenue includes amounts billed or collected in advance of revenue recognition, including arrangements under the aspenONE licensing model, point product arrangements with Premier Plus SMS, professional services, and training. Deferred revenue is recorded as each invoice becomes due.

Other Licensing Matters

Our standard licensing agreements include a product warranty provision. We have not experienced significant claims related to software warranties beyond the scope of SMS support, which we are already obligated to provide, and consequently, we have not established reserves for warranty obligations.

Our agreements with our customers generally require us to indemnify the customer against claims that our software infringes third-party patent, copyright, trademark or other proprietary rights. Such indemnification obligations are generally limited in a variety of industry-standard respects, including our right to replace an infringing product. As of June 30, 2018 and 2017, we had not experienced any material losses related to these indemnification obligations and no claims with respect thereto were outstanding. We do not expect significant claims related to these indemnification obligations, and consequently, have not established any related reserves.

(e) Computer Software Development Costs

Certain computer software development costs are capitalized in the accompanying consolidated balance sheets. Capitalization of computer software development costs begins upon establishing technological feasibility defined as meeting specifications determined by the program design. Amortization of capitalized computer software development costs is provided on a product-by-product basis using the greater of (a) the amount computed using the ratio that current gross revenue for a product bears to total of current and anticipated future gross revenue for that product or (b) the straight-line method, beginning upon commercial release of the product, and continuing over the remaining estimated economic life of the product, not to exceed three years.

Total computer software costs capitalized were $0.4 million, $0.4 million and $0.3 million during the years ended June 30, 2018, 2017 and 2016, respectively. Total amortization expense charged to operations was approximately $0.4 million, $0.5 million and $0.6 million for the years ended June 30, 2018, 2017 and 2016, respectively. Computer software development accumulated amortization totaled $74.7 million and $74.3 million as of June 30, 2018 and 2017, respectively. Weighted average remaining useful life of computer software development costs was 1.0 years and 0.6 years at June 30, 2018 and 2017, respectively.

At each balance sheet date, we evaluate the unamortized capitalized software costs for potential impairment by comparing the balance to the net realizable value of the products. During the years ending June 30, 2018, 2017 and 2016, our computer software development costs were not considered impaired and as such, we did not recognize impairment losses during the periods then ended.

(f) Foreign Currency Translation

The determination of the functional currency of subsidiaries is based on the subsidiaries' financial and operational environment and is the local currency of the subsidiary. Gains and losses from foreign currency translation related to entities whose functional currency is their local currency are credited or charged to accumulated other comprehensive income included in stockholders' deficit in the consolidated balance sheets. In all instances, foreign currency transaction and remeasurement gains or losses are credited or charged to the consolidated statements of operations as incurred as a component of other income (expense), net. Net foreign currency transaction and remeasurement losses were $(0.8) million in fiscal 2018, gains were $0.6 million in fiscal 2017, and losses were $(0.1) million in fiscal 2016.

(g) Concentration of Credit Risk

Financial instruments that potentially subject us to concentrations of credit risk are principally cash and cash equivalents, marketable securities, accounts receivable and installments receivable. Our cash is held in financial institutions and our cash equivalents are invested in money market mutual funds that we believe to be of high credit quality. We diversify our investment portfolio by investing in multiple types of investment-grade securities and attempt to mitigate a risk of loss by using a third-party investment manager.

Concentration of credit risk with respect to receivables is limited to certain customers to which we make substantial sales. To reduce risk, we assess the financial strength of our customers. We do not require collateral or other security in support of our receivables. As of June 30, 2018, we had one customer receivable balance that represented approximately 12% of our total receivables. As of June 30, 2017, we had one customer receivable balance that represented approximately 18% of our total receivables, and was collected subsequent to June 30, 2017.

(h) Computer Software Developed for Internal Use and Long-Lived Assets

Computer Software Developed for Internal Use:

Computer software developed for internal use is capitalized in accordance with ASC Topic 350-40, Intangibles Goodwill and Other—Internal Use Software. We capitalize direct labor costs incurred to develop internal-use software during the application development stage after determining software technological requirements and obtaining management approval for funding projects probable of completion.

In fiscal 2018, 2017 and 2016, there were no capitalized direct labor costs associated with our development of software for internal use.

Impairment of Long-Lived Assets:

We evaluate our long-lived assets, which include finite-lived intangible assets, property and leasehold improvements for impairment as events and circumstances indicate that the carrying amount of an asset or a group of assets may not be recoverable. We assess the recoverability of the asset or a group of assets based on the undiscounted future cash flows the asset is expected to generate, and recognize an impairment loss when estimated undiscounted future cash flows expected to result from the use of the asset are less than its carrying value. If an asset or a group of assets are deemed to be impaired, the amount of the impairment loss, if any, represents the excess of the asset's or a group of assets' carrying value compared to their estimated fair values.

(i) Comprehensive Income

Comprehensive income is defined as the change in equity of a business enterprise during a period from transactions and other events and circumstances from non-owner sources. Comprehensive income and its components for fiscal 2018, 2017 and 2016 are disclosed in the accompanying consolidated statements of comprehensive income.

As of June 30, 2018, accumulated other comprehensive income is comprised of foreign translation adjustments of $1.4 million. As of June 30, 2017 and 2016, accumulated other comprehensive income is comprised of foreign translation adjustments of $1.5 million $2.7 million, respectively, and net unrealized gains (losses) on available for sale securities of $0.1 million and ($0.1) million, respectively.

(j) Accounting for Stock-Based Compensation

Stock-based compensation cost is measured at the grant date based on the fair value of the award and is recognized as expense over the vesting period.

(k) Income Taxes

Deferred income taxes are recognized based on temporary differences between the financial statement and tax bases of assets and liabilities. Deferred tax assets and liabilities are measured using the statutory tax rates and laws expected to apply to taxable income in the years in which the temporary differences are expected to reverse. Valuation allowances are provided against net deferred tax assets if, based upon the available evidence, it is more likely than not that some or all of the deferred tax assets will not be realized. The ultimate realization of deferred tax assets is dependent upon the generation of future taxable income and the timing of the temporary differences becoming deductible. Management considers, among other available information, scheduled reversals of deferred tax liabilities, projected future taxable income, limitations of availability of net operating loss carryforwards, and other matters in making this assessment.

We do not provide deferred taxes on unremitted earnings of foreign subsidiaries since we intend to indefinitely reinvest either currently or sometime in the foreseeable future. Unrecognized provisions for taxes on undistributed earnings of foreign subsidiaries, which are considered indefinitely reinvested, are not material to our consolidated financial position or results of operations. We are continuously subject to examination by the IRS, as well as various state and foreign jurisdictions. The IRS and other taxing authorities may challenge certain deductions and credits reported by us on our income tax returns. In accordance with provisions of ASC Topic 740, Income Taxes (ASC 740), an entity should recognize a tax benefit when it is more-likely-than-not, based on the technical merits, that the position would be sustained upon examination by a taxing authority. The amount to be recognized, if the more-likely-than-not threshold was passed, should be measured as the largest amount of tax benefit that is greater than 50 percent likely of being realized upon ultimate settlement with a taxing authority that has full knowledge of all relevant information. Furthermore, any change in the recognition, de-recognition or measurement of a tax position should be recorded in the period in which the change occurs. We account for interest and penalties related to uncertain tax positions as part of the provision for income taxes.

(l) Loss Contingencies

We accrue estimated liabilities for loss contingencies arising from claims, assessments, litigation and other sources when it is probable that a liability has been incurred and the amount of the claim assessment or damages can be reasonably estimated. We believe that we have sufficient accruals to cover any obligations resulting from claims, assessments or litigation that have met these criteria. Refer to Note 15, "Commitments and Contingencies," to our

Consolidated Financial Statements for discussion of these matters and related liability accruals.

(m) Advertising Costs

Advertising costs are expensed as incurred and are classified as sales and marketing expenses. We incurred advertising expenses of $3.2 million, $3.2 million and $2.3 million during fiscal 2018, 2017 and 2016, respectively.

(n) Research and Development Expense

We charge research and development expenditures to expense as the costs are incurred. Research and development expenses consist primarily of personnel expenses related to the creation of new products, enhancements and engineering changes to existing products and costs of acquired technology prior to establishing technological feasibility.

During fiscal 2017 and 2016, we acquired certain technologies for $2.3 million and $0.3 million, respectively. At the time we acquired the technology, the project to develop a commercially available product did not meet the definition of having reached technological feasibility and as such, the entire cost of the acquired technology was expensed as research and development expense.

(o) Recent Accounting Pronouncements

In May 2014, the FASB issued ASU No. 2014-09, Revenue from Contracts with Customers (Topic 606). ASU No. 2014-09 supersedes the revenue recognition requirements in Revenue Recognition (Topic 605), and requires entities to recognize revenue when they transfer promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. Under the new guidance, an entity is required to evaluate revenue recognition through a five-step process. In applying the principles of ASU 2014-09, it is possible more judgment and estimates may be required within the revenue recognition process than is required under existing U.S. 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. As currently issued and amended, ASU 2014-09 is effective for annual reporting periods beginning after December 15, 2017, including interim periods within that reporting period, though early adoption is permitted for annual reporting periods beginning after December 15, 2016.

We will adopt ASU No. 2014-09 during the first quarter of fiscal 2019 and plan to utilize the full retrospective method. The adoption of ASU No. 2014-09 will primarily impact the timing of the license portion of the revenue recognized from our term contracts. Under the new standard, for arrangements that include term-based software licenses bundled with maintenance and support, we will be required to recognize as revenue a portion of the arrangement fee upon delivery of the software license. We expect to recognize as revenue a portion of the arrangement fee related to maintenance and support, professional services, and training over time as the services are provided. Additionally, under the new standard, we expect to capitalize certain direct and incremental commission costs to obtain a contract and amortize such costs over the expected period of benefit, rather than expensing them as incurred in the period that the commissions are earned.

The quantitative ranges provided below represent management's best estimates of the effects of adopting ASU No. 2014-09 at the time of preparation of this Annual Report on Form 10-K. The actual impact of adopting ASU No. 2014-09 is subject to change from these estimates, and such changes may be significant, pending the completion of our assessment in the first quarter of fiscal 2019. In order to complete this assessment, we are continuing to update and enhance our internal accounting systems and internal controls over financial reporting.

Based upon the work performed to date, we expect to record a cumulative-effect adjustment as of June 30, 2016 to increase retained earnings by approximately $781.0 million to $1,072.0 million, which includes an estimated $670.0 million to $920.0 million increase in retained earnings due to changes in revenue recognition, an estimated $16.0 million to $22.0 million increase in retained earnings due to deferred commission expense, and an estimated $95.0 million to $130.0 million increase in retained earnings due to interest income. We expect the cumulative-effect adjustment to result in a corresponding increase to unbilled contract assets and receivables of approximately $660.0 million to $900.0 million, an increase to deferred commission costs of approximately $16.0 million to $22.0 million, and a decrease to deferred revenue and interest of approximately $150.0 million to $220.0 million. We estimate the revised total revenue for fiscal 2017 and fiscal 2018 to be in the range of $420.0 million to $600.0 million and $440.0

million to $630.0 million, respectively. We estimate interest income related to the changes in revenue recognition for fiscal 2017 and fiscal 2018 to be in the range of $19.0 million to $26.0 million and $21.0 million to $29.0 million, respectively. We expect to fully disclose the impacts of the new standard in connection with our Form 10-Q filing for the first quarter of fiscal 2019.

In February 2016, the FASB issued ASU No. 2016-02, Leases (Topic 842). Under the amendment, lessees will be required to recognize virtually all of their leases on the balance sheet, by recording a right-of-use asset and lease liability. The ASU is effective for annual periods, including interim periods within those annual periods, beginning after December 15, 2018. Early adoption is permitted. We are currently evaluating the impact of ASU No. 2016-02 on our consolidated financial statements.

In March 2016, the FASB issued ASU No. 2016-09, Compensation - Stock Compensation (Topic 718): Improvements to Employee Share-Based Payment Accounting. The amendment identifies several areas for simplification applicable to entities that issue share-based payment awards to their employees, including income tax consequences, the option to recognize gross stock compensation expense with actual forfeitures recognized when they occur, and certain classifications on the statements of cash flows. The ASU is effective for annual periods, including interim periods within those annual periods, beginning after December 15, 2016. We adopted ASU No. 2016-09 effective July 1, 2017.

As a result of adopting the new standard, excess tax benefits from stock-based compensation are now reflected in the consolidated statements of operations as a component of the provision for income taxes, whereas they were previously a component of stockholders' deficit. The adoption of ASU No. 2016-09 resulted in a decrease in our provision for income taxes of $3.0 million during fiscal 2018. This represents a decrease in our effective tax rate of approximately one percentage point during fiscal 2018, due to the recognition of excess tax benefits for options exercised and the vesting of equity awards. There was no change as a result of how we account for forfeitures for financial statement reporting purposes. We adopted the cash flow presentation prospectively, and accordingly, excess tax benefits from stock-based compensation of $3.0 million is presented as a cash inflow from operating activity included within the change in income tax payable during fiscal 2018, while $6.0 million and $2.2 million of excess tax benefits from equity-based compensation are presented as a financing activity during fiscal 2017 and 2016, respectively. We prospectively excluded the excess tax benefits from the assumed proceeds available to repurchase shares in the computation of diluted earnings per share under the treasury stock method, which did not have a material impact on our diluted earnings per share during fiscal 2018.

In June 2016, the FASB issued ASU No. 2016-13, Financial Instruments - Credit Losses (Topic 326). The amendment changes the impairment model for most financial assets and certain other instruments. Entities will be required to use a model that will result in the earlier recognition of allowances for losses for trade and other receivables, held-to-maturity debt securities, loans, and other instruments. For available-for-sale debt securities with unrealized losses, the losses will be recognized as allowances rather than as reductions in the amortized cost of the securities. The ASU is effective for annual periods, including interim periods within those annual periods, beginning after December 15, 2019. Early adoption is permitted. We are currently evaluating the impact of ASU No. 2016-13 on our consolidated financial statements.

In August 2016, the FASB issued ASU No. 2016-15, Statement of Cash Flows (Topic 230). The amendment updates the guidance as to how certain cash receipts and cash payments should be presented and classified, and is intended to reduce the existing diversity in practice. The ASU is effective for annual periods, including interim periods within those annual periods, beginning after December 15, 2017. Early adoption is permitted. We are currently evaluating the impact of ASU No. 2016-15 on our consolidated financial statements.

In January 2017, the FASB issued ASU No. 2017-01, Business Combinations (Topic 805) - Clarifying the Definition of a Business. The amendment changes the definition of a business to assist entities in evaluating when a set of transferred assets and activities constitutes a business. The ASU is effective for annual periods, including interim periods within those annual periods, beginning after December 15, 2017. Early adoption is permitted. We do not anticipate the adoption of ASU No. 2017-01 will have a material effect on the consolidated financial statements or related disclosures.

In January 2017, the FASB issued ASU No. 2017-04, Intangibles - Goodwill and Other Topics (Topic 350) - Simplifying the Test for Goodwill Impairment. The amendment eliminates Step 2 of the goodwill impairment test and requires goodwill impairment to be measured as the amount by which a reporting unit's carrying amount exceeds its fair value, not to exceed the carrying amount of its goodwill. The ASU is effective for annual periods, including interim periods within those annual periods, beginning after December 15, 2017. Early adoption is permitted. We early adopted ASU No. 2017-04 during the three months ended December 31, 2017, prior to our annual testing of goodwill impairment. There was no impact on our consolidated financial statements and related disclosures as a result of adopting ASU No. 2017-04.

In March 2018, the FASB issued ASU No. 2018-05, Income Taxes (Topic 740) - Amendments to SEC Paragraphs Pursuant to SEC Staff Accounting Bulletin No. 118. The amendment provides guidance on accounting for the impact of the Tax Cuts and Jobs Act (the "Tax Act") and allows entities to complete the accounting under ASC 740 within a one-year measurement period from the Tax Act enactment date. This standard is effective upon issuance. The Tax Act has several significant changes that impact all taxpayers, including a transition tax, which is a one-time tax charge on accumulated, undistributed foreign earnings. The calculation of accumulated foreign earnings requires an analysis of each foreign entity's financial results going back to 1986. We are currently estimating that we will not be subject to the transition tax associated with our accumulated, undistributed foreign earnings. We will continue to evaluate this area and expect to finalize our conclusions by the second quarter of fiscal 2019.

(3) Fair Value

We determine fair value by utilizing a fair value hierarchy that ranks the quality and reliability of the information used in its determination. Fair values determined using "Level 1 inputs" utilize unadjusted quoted prices in active markets for identical assets or liabilities that we have the ability to access. Fair values determined using "Level 2 inputs" utilize data points that are observable, such as quoted prices, interest rates and yield curves for similar assets and liabilities.

Cash equivalents of $5.0 million and $79.7 million as of June 30, 2018 and June 30, 2017, respectively, were reported at fair value utilizing quoted market prices in identical markets, or "Level 1 inputs." Our cash equivalents consist of short-term, highly liquid investments with remaining maturities of three months or less when purchased.

Financial instruments not measured or recorded at fair value in the accompanying unaudited consolidated financial statements consist of accounts receivable, installments receivable, accounts payable and accrued liabilities. The estimated fair value of these financial instruments approximates their carrying value. The estimated fair value of the borrowings under the Credit Agreement (described below in Note 10, Credit Agreement) approximates its carrying value due to the floating interest rate.

(4) Accounts Receivable

Our accounts receivable, net of the related allowance for doubtful accounts, were as follows as of June 30, 2018 and 2017:

	Gross	Allowance	Net
	(Dollars in Thousands)		
June 30, 2018:			
Accounts Receivable	$24,613	$ 2,703	$21,910
June 30, 2017:			
Accounts Receivable	$28,955	$ 1,285	$27,670

As of June 30, 2018, we had one customer receivable balance that individually represented approximately 12% of our total receivables.

(5) Property and Equipment

Property, equipment and leasehold improvements in the accompanying consolidated balance sheets consist of the following:

	Year Ended June 30,	
	2018	2017
	(Dollars in Thousands)	
Property, equipment and leasehold improvements, at cost:		
Computer equipment	$8,344	$8,262
Purchased software	24,225	24,091
Furniture & fixtures	6,850	6,805

Leasehold improvements	12,023	12,025
Property, equipment and leasehold improvements, at cost	51,442	51,183
Accumulated depreciation	(41,636)	(37,783)
Property, equipment and leasehold improvements, net	$9,806	$13,400

Property and equipment are stated at cost. We provide for depreciation and amortization, primarily computed using the straight-line method, by charges to operations in amounts estimated to allocate the cost of the assets over their estimated useful lives, as follows:

Asset Classification	Estimated Useful Life
Computer equipment	3 years
Purchased software	3 - 5 years
Furniture and fixtures	3 - 10 years
Leasehold improvements	Life of lease or asset, whichever is shorter

During fiscal 2018, we wrote off fully depreciated property, equipment and leasehold improvements that were no longer in use with gross book values of $0.1 million.

Depreciation expense was $3.9 million, $5.0 million and $5.1 million for fiscal 2018, 2017 and 2016, respectively.

We account for asset retirement obligations in accordance with ASC Topic 410, Asset Retirement and Environmental Obligations. Our asset retirement obligations relate to leasehold improvements for leased properties. The balance of our asset retirement obligations was $0.9 million as of June 30, 2018 and 2017, respectively.

(6) Acquisitions

Technology

In March 2018, we acquired certain assets, principally technology, for a total cash consideration of $5.0 million. The purchase price consisted of $4.5 million of cash paid at closing and an additional $0.5 million to be held back until March 2019 as security for certain representations, warranties, and obligations of the seller. The acquisition met the definition of a business combination as it contained inputs and processes that are capable of being operated as a business. We allocated, on a preliminary basis, $1.0 million of the purchase price to developed technology and $4.0 million to goodwill. The fair value of the developed technology of $1.0 million was determined using the replacement cost approach. The developed technology is being amortized on a straight-line basis over its estimated useful life of three years. The acquisition is treated as an asset purchase for tax purposes and, accordingly, the goodwill resulting from the acquisition is expected to be deductible.

Apex Optimisation

On February 5, 2018, we completed the acquisition of all the outstanding shares of Apex Optimisation and affiliates (“Apex”), a provider of software which aligns Advanced Process Control with Planning and Scheduling to unify production optimization, for a total cash consideration of $23.0 million. The purchase price consisted of $18.4 million of cash paid at closing and an additional $4.6 million to be held back until February 2020 as security for certain representations, warranties, and obligations of the sellers. The holdback is recorded in other non-current liabilities in our consolidated balance sheet.

A preliminary allocation of the purchase price is as follows. The valuation of the net assets acquired and the deferred tax liabilities are considered preliminary as of June 30, 2018:

	Amount (Dollars in Thousands)
Liabilities assumed, net	$ (1,164)
Identifiable intangible assets:	
Technology-related	4,500
Customer relationships	3,800
Goodwill	17,483
Deferred tax liabilities	(1,619)
Total assets acquired, net	$ 23,000

We used the relief from royalty and income approaches to derive the fair value of the technology-related and customer relationship intangible assets, respectively. The weighted-average discount rate (or rate of return) used to determine the value of

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the Apex intangible assets was 28% and the effective tax rate used was 21%. The technology-related and customer relationship intangible assets will each be amortized on a straight-line basis over their estimated useful lives of seven years.

The goodwill, which is not deductible for tax purposes, reflects the value of the assembled workforce and the company-specific synergies we expect to realize by selling Apex products and services to our existing customers. The results of operations of Apex have been included prospectively in our results of operations since the date of acquisition.

RtTech Software, Inc.

In December 2017, we acquired certain net assets, principally technology, from RtTech Software, Inc. ("RtTech") for a total cash consideration of $12.0 million. The purchase price consisted of $10.8 million of cash paid at closing and an additional $1.2 million to be held back until December 2018 as security for certain representations, warranties, and obligations of the sellers. The acquisition met the definition of a business combination as it contained inputs and processes that are capable of being operated as a business. We allocated $8.0 million of the purchase price to developed technology and $4.0 million to goodwill. The fair value of the developed technology of $8.0 million was determined using the replacement cost approach. The developed technology is being amortized on a straight-line basis over its estimated useful life of seven years. The acquisition is treated as an asset purchase for tax purposes and accordingly, the goodwill resulting from the acquisition is expected to be deductible.

Mtelligence Corporation

On October 26, 2016, we completed the acquisition of all the outstanding shares of Mtelligence Corporation ("Mtell"), a provider of predictive and prescriptive maintenance software and related services used to optimize asset performance, for total cash consideration of $37.4 million. The purchase price consisted of $31.9 million of cash paid at closing and an additional $5.5 million held back as security for certain representations, warranties, and obligations of the sellers. The holdback was recorded at its fair value as of the acquisition date of $5.3 million, and was paid in April 2018.

An allocation of the purchase price is as follows:

	Amount (Dollars in Thousands)
Tangible assets acquired, net	$ 779
Identifiable intangible assets:	
Developed technology	11,385
Customer relationships	679
Non-compete agreements	553
Goodwill	25,888
Deferred tax liabilities, net	(2,099)
Total assets acquired	$ 37,185

We used the income approach to determine the values of the identifiable intangible assets. The weighted-average discount rate (or rate of return) used to determine the value of the Mtell intangible assets was 19% and the effective tax rate used was 34%. The values of the developed technology, customer relationships and non-compete agreements are being amortized on a straight-line basis, except technology, which is being amortized on a proportional use basis, over their estimated useful lives of 12 years, 6 years and 3 years, respectively.

The goodwill, which is not deductible for tax purposes, reflects the value of the assembled workforce and the company-specific synergies we expect to realize by selling Mtell products and services to our existing customers. The results of operations of Mtell have been included prospectively in our results of operations since the date of acquisition.

(7) Intangible Assets

We include in our amortizable intangible assets those intangible assets acquired in our business and asset acquisitions. We amortize acquired intangible assets with finite lives over their estimated economic lives, generally using the straight-line method. Each period, we evaluate the estimated remaining useful lives of acquired intangible assets to determine whether events or changes in circumstances warrant a revision to the remaining period of amortization. Acquired intangibles are removed from the accounts when fully amortized and no longer in use.

Intangible assets consist of the following as of June 30, 2018 and 2017:

	Gross Carrying Amount	Accumulated Amortization	Effect of Currency Translation	Net Carrying Amount
	(Dollars in Thousands)			
June 30, 2018:				
Technology and patents	$35,898	$ (5,182)	$ (254)	$ 30,462
Customer relationships	5,181	(377)	(202)	4,602
Non-compete agreements	553	(307)	—	246
Total	$41,632	$ (5,866)	$ (456)	$ 35,310
June 30, 2017:				
Technology and patents	$22,350	$ (3,254)	$ —	$ 19,096
Customer relationships	1,432	(169)	—	1,263
Non-compete agreements	553	(123)	—	430
Total	$24,335	$ (3,546)	$ —	$ 20,789

Total amortization expense related to intangible assets amounted to $2.2 million, $1.0 million and $0.1 million in fiscal 2018, 2017 and 2016, respectively. Amortization expense is expected to be approximately $4.6 million in fiscal 2019, $4.7 million in fiscal 2020, $4.8 million in fiscal 2021, $4.7 million in fiscal 2022, $4.6 million in fiscal 2023, and $11.9 million thereafter.

(8) Goodwill

The changes in the carrying amount of goodwill for our subscription and software reporting unit during fiscal years ending June 30, 2018 and 2017 were as follows:

	Gross Carrying Amount	Accumulated Impairment Losses	Effect of Currency Translation	Net Carrying Amount
June 30, 2017:	$116,833	$ (65,569)	$ (16)	$51,248
Goodwill from acquisitions	25,483	—	—	25,483
Foreign currency translation	—	—	(1,141)	(1,141)
June 30, 2018:	$142,316	$ (65,569)	$ (1,157)	$75,590

	Gross Carrying Amount	Accumulated Impairment Losses	Effect of Currency Translation	Net Carrying Amount
June 30, 2016:	$89,007	$ (65,569)	$ —	$23,438
Goodwill from acquisitions	27,826	—	—	27,826
Foreign currency translation	—	—	(16)	(16)
June 30, 2017:	$116,833	$ (65,569)	$ (16)	$51,248

We test goodwill for impairment annually (or more often if impairment indicators arise), at the reporting unit level. We first assess qualitative factors to determine whether the existence of events or circumstances indicates that it is more likely than not that the fair value of a reporting unit is less than its carrying amount. If we determine based on this assessment that it is more likely than not that the fair value of a reporting unit is less than its carrying amount, we perform the goodwill impairment test. The first step requires us to determine the fair value of the reporting unit and compare it to the carrying amount,
including goodwill, of such reporting unit. If the fair value exceeds the carrying amount, no impairment loss is recognized. However, if the carrying amount of the reporting unit exceeds its fair value, the goodwill of the unit is impaired. In January 2017, the FASB issued ASU No. 2017-04, which eliminates Step 2 of the goodwill impairment test and requires goodwill impairment to be measured as the amount by which a reporting unit's carrying amount exceeds its fair value, not to exceed the carrying amount of its goodwill. We early adopted ASU No. 2017-04 during the three months ended December 31, 2017, prior to our annual testing of goodwill impairment. There was no impact on our consolidated financial statements and related disclosures as a result of adopting ASU No. 2017-04.

Fair value of a reporting unit is determined using a combined weighted average of a market-based approach (utilizing fair value multiples of comparable publicly traded companies) and an income-based approach (utilizing discounted projected cash flows). In applying the income-based approach, we would be required to make assumptions about the amount and timing of future expected cash flows, growth rates and appropriate discount rates. The amount and timing of future cash flows would be based on our most recent long-term financial projections. The discount rate we would utilize would be determined using
estimates of market participant risk-adjusted weighted-average costs of capital and reflect the risks associated with achieving future cash flows.

We have elected December 31st as the annual impairment assessment date and perform additional impairment tests if triggering events occur. We performed our annual impairment test for the subscription and software reporting unit as of December 31, 2017 and, based upon the results of our qualitative assessment, determined that it was not likely that its fair value was less than its carrying amount. As such, we did not recognize impairment losses as a result of our analysis. If an event occurs or circumstances change that would more likely than not reduce the fair value of a reporting unit below its carrying value, goodwill will be evaluated for impairment between annual tests. No triggering events indicating goodwill impairment occurred during fiscal 2018, 2017 and 2016.

(9) Accrued Expenses and Other Liabilities

Accrued expenses and other current liabilities in the accompanying consolidated balance sheets consist of the following:

	June 30, 2018	June 30, 2017
	(Dollars in Thousands)	
Payroll and payroll-related	$21,796	$20,864
Royalties and outside commissions	3,333	2,733
Professional fees	1,695	2,216
Deferred acquisition payments	1,700	8,548
Other	10,991	13,788
Total accrued expenses and other current liabilities	$39,515	$48,149

Other non-current liabilities in the accompanying consolidated balance sheets consist of the following:

	June 30, 2018	June 30, 2017
	(Dollars in Thousands)	
Deferred rent	$6,442	$6,916
Uncertain tax positions	3,931	3,921
Deferred acquisition payments	4,294	—
Other	3,825	2,311
Total other non-current liabilities	$18,492	$13,148

(10) Credit Agreement

On February 26, 2016, we entered into a $250.0 million Credit Agreement (the "Credit Agreement") with JPMorgan Chase Bank, N.A., as administrative agent, Silicon Valley Bank, as syndication agent, and the lenders and other parties named therein (the "Lenders"). On August 9, 2017, we entered into an Amendment to increase the Credit Agreement to $350.0 million. The indebtedness evidenced by the Credit Agreement matures on February 26, 2021. Prior to the maturity of the Credit Agreement, any amounts borrowed may be repaid and, subject to the terms and conditions of the Credit Agreement, borrowed again in whole or in part without penalty. We had $170.0 million and $140.0 million in outstanding borrowings under the Credit Agreement as of June 30, 2018 and 2017, respectively.

Borrowings under the Credit Agreement bear interest at a rate equal to either, at our option, the sum of (a) the highest of (1) the rate of interest publicly announced by JPMorgan Chase Bank, N.A. as its prime rate in effect, (2) the Federal Funds Effective Rate plus 0.5%, and (3) the one-month Adjusted LIBO Rate plus 1.0%, plus (b) a margin initially of 0.5% for the first full fiscal quarter ending after the date of the Credit Agreement and thereafter based on our Leverage Ratio; or the Adjusted LIBO Rate plus a margin initially of 1.5% for the first full fiscal quarter ending after the date of the Credit Agreement and thereafter based on our Leverage Ratio. We must also pay, on a quarterly basis, an unused commitment fee at a rate of between 0.2% and 0.3% per annum, based on our Leverage Ratio. The interest rates as of June 30, 2018 were 3.60% on $159.0 million of our outstanding borrowings, and 3.55% on the remaining $11.0 million of our outstanding borrowings.

All borrowings under the Credit Agreement are secured by liens on substantially all of our assets. The Credit Agreement contains affirmative and negative covenants customary for facilities of this type, including restrictions on: incurrence of additional debt; liens; fundamental changes; asset sales; restricted payments; and transactions with affiliates. The Credit Agreement contains financial covenants regarding maintenance as of the end of each fiscal quarter, commencing with the quarter ending June 30, 2016, of a maximum Leverage Ratio of 3.0 to 1.0 and a minimum Interest Coverage Ratio of 3.0 to 1.0. We were in compliance with all covenants as of June 30, 2018.

(11) Stock-Based Compensation

Stock Compensation Plans

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In December 2016, the shareholders approved the establishment of the 2016 Omnibus Incentive Plan (the 2016 Plan), which provides for the issuance of a maximum of 6,000,000 shares of common stock. The 2016 Plan provides for the grant of incentive and nonqualified stock options, stock appreciation rights, restricted stock, restricted stock units, other stock-related awards, and performance awards that may be settled in cash, stock, or other property. As of June 30, 2018, there were 6,000,000 shares of common stock available for issuance subject to awards under the 2016 Plan.

In April 2010, the shareholders approved the establishment of the 2010 Equity Incentive Plan (the 2010 Plan), which provides for the issuance of a maximum of 7,000,000 shares of common stock. The 2010 Plan provides for the grant of incentive and nonqualified stock options, stock appreciation rights, restricted stock, restricted stock units, other stock-related awards, and performance awards that may be settled in cash, stock, or other property. As of June 30, 2018, there were 2,170,674 shares of common stock available for issuance subject to awards under the 2010 Plan.

General Award Terms

We issue stock options and restricted stock units (RSUs) to our employees and outside directors, pursuant to shareholder-approved equity compensation plans. Option awards are granted with an exercise price equal to the market closing price of our stock on the trading day prior to the grant date. Those options generally vest over four years and expire within 7 or 10 years of grant. RSUs generally vest over four years. Historically, our practice has been to settle stock option exercises and RSU vesting through newly-issued shares.

Stock Compensation Accounting

Our stock-based compensation is accounted for as awards of equity instruments. Our policy is to issue new shares upon the exercise of stock awards. We use the "with-and-without" approach for determining if excess tax benefits are realized under ASC 718.

We utilize the Black-Scholes option valuation model for estimating the fair value of options granted. The Black-Scholes option valuation model incorporates assumptions regarding expected stock price volatility, the expected life of the option, the risk-free interest rate, dividend yield and the market value of our common stock. The expected stock price volatility is determined based on our stock's historic prices over a period commensurate with the expected life of the award. The expected life of an option represents the period for which options are expected to be outstanding as determined by historic option exercises and cancellations. The risk-free interest rate is based on the U.S. Treasury yield curve for notes with terms approximating the expected life of the options granted. The expected dividend yield is zero, based on our history and expectation of not paying dividends on common shares. We recognize compensation costs on a straight-line basis, net of forfeitures, over the requisite service period for time-vested awards. The weighted average estimated fair value of option awards granted during fiscal 2018, 2017 and 2016 was \$17.07, \$13.16, and \$13.16, respectively.

We utilized the Black-Scholes option valuation model with the following weighted average assumptions:

	Year Ended June 30,		
	2018	2017	2016
Risk-free interest rate	1.7 %	1.2 %	1.4 %
Expected dividend yield	None	None	None
Expected life (in years)	4.6	4.6	4.6
Expected volatility factor	28 %	31 %	34 %

The stock-based compensation expense and its classification in the accompanying consolidated statements of operations for fiscal 2018, 2017 and 2016 was as follows:

	Year Ended June 30,		
	2018	2017	2016
	(Dollars in Thousands)		
Recorded as expenses:			
Cost of service and other	$1,479	$1,477	$1,390
Selling and marketing	3,862	3,652	4,351
Research and development	7,617	5,806	3,423
General and administrative	9,730	7,865	6,563
Total stock-based compensation	$22,688	$18,800	$15,727

A summary of stock option and RSU activity under all equity plans in fiscal 2018 is as follows:

	Stock Options				Restricted Stock Units	
	Shares	Weighted Average Exercise Price	Weighted Average Remaining Contractual Term	Aggregate Intrinsic Value (in 000's)	Shares	Weighted Average Grant Date Fair Value
Outstanding at June 30, 2017	1,353,558	$ 37.98	7.30	$ 23,535	615,998	$ 45.62
Granted	421,253	64.30			348,902	64.32
Settled (RSUs)					(307,731)	49.68
Exercised	(362,515)	37.05				
Cancelled / Forfeited	(42,854)	50.51			(35,469)	53.69
Outstanding at June 30, 2018	1,369,442	$ 45.93	7.23	$ 64,103	621,700	$ 53.64
Exercisable at June 30, 2018	778,286	$ 38.83	6.20	$ 41,960		
Vested and expected to vest at June 30, 2018	1,312,546	$ 45.47	7.17	$ 62,046	561,265	$ 53.62

During fiscal 2018, 2017 and 2016, the weighted average grant-date fair value of RSUs granted was $64.32, $46.59 and $41.86, respectively. During fiscal 2018, 2017 and 2016 the total fair value of vested shares from RSU grants amounted to $23.0 million, $16.6 million and $12.7 million, respectively.

As of June 30, 2018, the total future unrecognized compensation cost related to stock options and RSUs was $8.0 million and $26.6 million, respectively, and are expected to be recorded over a weighted average period of 2.50 years and 2.48 years, respectively.

During fiscal 2018, 2017 and 2016 the weighted average exercise price of stock options granted was $64.30, $46.31 and $42.66. The total intrinsic value of options exercised during fiscal 2018, 2017 and 2016 was $15.1 million, $7.9 million and $4.1 million, respectively. We received $13.5 million, $9.3 million and $3.9 million in cash proceeds from option exercises during fiscal 2018, 2017 and 2016, respectively. We paid $8.1 million, $5.8 million and $4.4 million for withholding taxes on vested RSUs during fiscal 2018, 2017 and 2016, respectively.

At June 30, 2018, common stock reserved for future issuance or settlement under equity compensation plans was 10.2 million shares.

(12) Common Stock

On January 22, 2015, our Board of Directors approved a share repurchase program (the "Share Repurchase Program") for up to $450 million worth of our common stock. On April 26, 2016, June 8, 2017, and April 18, 2018, the Board of Directors

approved a $400 million, $200 million, and $200 million increase in our current share repurchase plan, respectively. The timing and amount of any shares repurchased are based on market conditions and other factors. All share repurchases of our common stock have been recorded as treasury stock under the cost method.

During fiscal 2018, we repurchased 2,797,623 shares of our common stock in the open market for $200.0 million. During fiscal 2017, we repurchased 5,185,257 shares of our common stock in the open market for $275.0 million and 2,106,709 shares of our common stock for $100.0 million as part of an accelerated share repurchase program. During fiscal 2016, we repurchased 4,750,692 shares of our common stock in the open market for $180.1 million.

As of June 30, 2018, the remaining dollar value under the Share Repurchase Program was $346.3 million.

(13) Net Income Per Share

Basic income per share is determined by dividing net income by the weighted average common shares outstanding during the period. Diluted income per share is determined by dividing net income by diluted weighted average shares outstanding during the period. Diluted weighted average shares reflect the dilutive effect, if any, of potential common shares. To the extent their effect is dilutive, employee equity awards and other commitments to be settled in common stock are included in the calculation of diluted net income per share based on the treasury stock method.

The calculations of basic and diluted net income per share and basic and dilutive weighted average shares outstanding for the years ended June 30, 2018, 2017 and 2016 are as follows:

	Year Ended June 30,		
	2018	2017	2016
	(Dollars and Shares in Thousands, Except per Share Data)		
Net income	$148,688	$162,196	$139,951
Weighted average shares outstanding	72,140	76,491	82,892
Dilutive impact from:			
Employee equity awards	816	487	417
Dilutive weighted average shares outstanding	72,956	76,978	83,309
Income per share			
Basic	$2.06	$2.12	$1.69
Dilutive	$2.04	$2.11	$1.68

For the years ended June 30, 2018, 2017 and 2016, certain employee equity awards were anti-dilutive based on the treasury stock method. The following employee equity awards were excluded from the calculation of dilutive weighted average shares outstanding because their effect would be anti-dilutive as of the balance sheet date:

	Year Ended June 30,		
	2018	2017	2016
	(Shares in Thousands)		
Employee equity awards	419	525	1,028

Included in the table above are options to purchase 32,609 shares of our common stock as of June 30, 2018 which were not included in the computation of dilutive weighted average shares outstanding, because their exercise prices ranged from $75.74 per share to $93.59 per share and were greater than the average market price of our common stock during the period then ended. These options were outstanding as of June 30, 2018 and expire at various dates through May 28, 2028.

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(14) Income Taxes

Income before provision for income taxes consists of the following:

	Year Ended June 30,		
	2018	2017	2016
	(Dollars in Thousands)		
Domestic	$195,442	$202,053	$201,885
Foreign	7,901	8,293	8,754
Income before provision for income taxes	$203,343	$210,346	$210,639

The provision for income taxes shown in the accompanying consolidated statements of operations is composed of the following:

	Year Ended June 30,		
	2018	2017	2016
	(Dollars in Thousands)		
Federal—			
Current	$47,734	$69,385	$56,535
Deferred	2,468	(22,449)	7,496
State—			
Current	1,471	1,737	1,866
Deferred	419	(1,079)	204
Foreign—			
Current	2,296	2,067	4,554
Deferred	267	(1,511)	33
	$54,655	$48,150	$70,688

On December 22, 2017, the President of the United States signed into law Public Law No. 115-97, commonly referred to as the Tax Cuts and Jobs Act (the “Tax Act”), following its passage by the United States Congress. The Tax Act made significant changes to U.S. federal income tax laws, including reduction of the corporate tax rate from 35.0% to 21.0%, limitation of the tax deduction for interest expense to 30.0% of adjusted taxable income (except for certain small businesses), limitation of the deduction for net operating losses to 80.0% of current year taxable income and elimination of net operating loss carrybacks, one time taxation of offshore earnings at reduced rates regardless of whether they are repatriated, elimination of U.S. tax on foreign earnings (subject to certain important exceptions), immediate deductions for certain new investments instead of deductions for depreciation expense over time, and modifying or repealing many business deductions. As a result of the enactment of the Tax Act, the blended U.S. statutory federal income tax rate for fiscal 2018 was 28.1%.

The Tax Act has several significant changes that impact all taxpayers, including a transition tax, which is a one-time tax charge on accumulated, undistributed foreign earnings. The calculation of accumulated foreign earnings requires an analysis of each foreign entity’s financial results going back to 1986. In response to the Tax Act, the Securities and Exchange Commission (“SEC”) staff issued a Staff Accounting Bulletin No. 118 (“SAB 118”) that provides guidance on accounting for the impact of the Tax Act. SAB 118 allows companies to record provisional amounts while the accounting impact of the Tax Act is still under analysis, not to extend beyond the measurement period of one year from the enactment of the Tax Act. We are currently estimating that we will not be subject to the transition tax associated with our accumulated, undistributed foreign earnings. We will continue to evaluate this area and expect to finalize our conclusions by the second quarter of fiscal 2019.

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The provision for income taxes differs from that based on the federal statutory rate due to the following:

	Year Ended June 30,		
	2018	2017	2016
	(Dollars in Thousands)		
Federal tax provision at statutory rate	$57,058	$73,621	$73,723
State income taxes	1,231	967	1,153
Tax Cuts and Jobs Act	5,162	—	—
Effect of foreign operations	4,700	2,912	3,581
Foreign taxes and rate differences	(164)	(206)	(663)
Stock-based compensation	(2,951)	991	1,359
Tax credits	(7,912)	(6,614)	(3,867)
Tax contingencies	(185)	(19,645)	(581)
Return to provision adjustments	(487)	464	658
Domestic Production Activity Deduction	(4,869)	(6,261)	(4,892)
Valuation allowance	2,326	1,522	49
Other	746	399	168
Provision for income taxes	$54,655	$48,150	$70,688

Deferred tax assets (liabilities) consist of the following at June 30, 2018 and 2017:

	Year Ended June 30,	
	2018	2017
	(Dollars in Thousands)	
Deferred tax assets:		
Federal and state credits	$4,363	$2,553
Capital loss carryforwards	4,856	7,940
Net operating loss carryforwards	1,452	3,028
Deferred revenue	10,990	5,881
Other reserves and accruals	6,550	10,701
Intangible assets	1,015	1,730
Property, leasehold improvements, and other basis differences	1,647	2,470
Other temporary differences	651	971
	31,524	35,274
Deferred tax liabilities:		
Deferred revenue	(4,671)	(44)
Intangible assets	(5,431)	(7,017)
Property, leasehold improvements, and other basis differences	(1,340)	(2,634)
	(11,442)	(9,695)
Valuation allowance	(10,416)	(11,259)
Net deferred tax assets	$9,666	$14,320

Reflected in the deferred tax assets above at June 30, 2018, we have foreign net operating loss carryforwards of $1.5 million, some of which will expire beginning in 2019 and others with unlimited carryforwards, and state research and development credits of $4.3 million which begin to expire in 2025.

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We adopted ASU No. 2016-09 effective July 1, 2017. As a result of adopting the new standard, excess tax benefits from stock-based compensation are now reflected in the consolidated statements of operations as a component of the provision for income taxes, whereas they were previously a component of stockholders' deficit. The adoption of ASU No. 2016-09 resulted in a decrease in our provision for income taxes of $3.0 million during fiscal 2018. This represents a decrease in our effective tax rate of approximately one percentage point during fiscal 2018, due to the recognition of excess tax benefits for options exercised and the vesting of equity awards.

Our valuation allowance for deferred tax assets was $10.4 million and $11.3 million as of June 30, 2018 and 2017 respectively. The most significant portion of the valuation allowance is attributable to a reserve against US capital loss carryforward deferred tax assets of $4.9 million and state R&D tax credits of $4.0 million.

For fiscal 2018, our income tax provision included amounts determined under the provisions of ASC 740 intended to satisfy additional income tax assessments, including interest and penalties, that could result from any tax return positions for which the likelihood of sustaining the position on audit does not meet a threshold of "more likely than not." Tax liabilities were recorded as a component of our income taxes payable and other non-current liabilities. The ultimate amount of taxes due will not be known until examinations are completed and settled or the audit periods are closed by statutes.

A reconciliation of the reserve for uncertain tax positions is as follows:

	Year Ended June 30,		
	2018	2017	2016
	(Dollars in Thousands)		
Uncertain tax positions, beginning of year	$3,921	$23,535	$19,870
Gross increases (decreases) —tax positions in prior period	544	(19,116)	67
Gross increases—tax positions in current period	—	—	5,474
Gross decreases—lapse of statutes	(637)	(830)	(1,772)
Currency translation adjustment	103	332	(104)
Uncertain tax positions, end of year	$3,931	$3,921	$23,535

At June 30, 2018, the total amount of unrecognized tax benefits is $3.9 million. Upon being recognized, the amount would reduce the effective tax rate. Our policy is to recognize interest and penalties related to income tax matters as provision for (benefit from) income taxes. At June 30, 2018, we had approximately $0.4 million of accrued interest and $0.2 million of penalties related to uncertain tax positions. We recorded a benefit for interest and penalties of approximately $0.1 million during fiscal 2018.

During the fourth quarter of fiscal 2017, we settled an audit with the Internal Revenue Services ("IRS") for the fiscal 2015. As a result of settling the audit, we released a significant portion of our reserve for US tax positions. The amount reversed in the fourth quarter related to settling the tax audit was $19.2 million.

We are subject to income tax in many jurisdictions outside the U.S. Our operations in certain jurisdictions remain subject to examination for tax years 2008 to 2017, some of which are currently under audit by local tax authorities. The resolutions of these audits are not expected to be material to our consolidated financial statements.

(15) Commitments and Contingencies

Operating Leases

We lease certain facilities and various office equipment under non-cancellable operating leases with terms in excess of one year. Rental expense, including short term leases, maintenance charges and taxes on leased facilities, was approximately $8.2 million, $8.4 million and $8.3 million for fiscal years 2018, 2017 and 2016, respectively.

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Future minimum lease payments under these leases as of June 30, 2018 are as follows:

Year Ended June 30,	Operating Leases (Dollars in Thousands)
2019	$ 7,938
2020	7,697
2021	6,247
2022	5,356
2023	4,775
Thereafter	6,718
Total	$ 38,731

Letters of Credit

Standby letters of credit for $3.5 million secure our performance on professional services contracts and certain facility leases. The letters of credit expire at various dates through fiscal 2025.

Legal Matters

In the ordinary course of business, we are, from time to time, involved in lawsuits, claims, investigations, proceedings and threats of litigation. These matters include an April 2004 claim by a customer that certain of our software products and implementation services failed to meet the customer's expectations. In March 2014, a judgment was issued by the trial court against us in the amount of approximately 1.9 million Euro ("€") plus interest and a portion of legal fees. We subsequently filed an appeal of that judgment. In March 2016, the appellate court determined that we are liable for damages in the amount of approximately €1.7 million plus interest, with the possibility of additional damages to be determined in further proceedings by the appellate court. In December 2017, the appellate court issued a final judgment against us in the amount of approximately €3.5 million, including interest, plus approximately €0.2 million in costs and legal fees. As of June 30, 2018, all payments associated with this judgment have been paid.

While the outcome of the proceedings and claims referenced above cannot be predicted with certainty, there are no such matters, as of June 30, 2018 that, in the opinion of management, are reasonably possible to have a material adverse effect on our financial position, results of operations or cash flows. Liabilities, if applicable, related to the aforementioned matters discussed in this Note have been included in our accrued liabilities at June 30, 2018, and are not material to our financial position for the periods then ended. As of June 30, 2018, we do not believe that there is a reasonable possibility of a material loss exceeding the amounts already accrued for the proceedings or matters discussed above. However, the results of litigation (including the above-referenced appeal) and claims cannot be predicted with certainty; unfavorable resolutions are possible and could materially affect our results of operations, cash flows or financial position. In addition, regardless of the outcome, litigation could have an adverse impact on us because of attorneys' fees and costs, diversion of management resources and other factors.

(16) Retirement Plans

We maintain a defined contribution retirement plan under Section 401(k) of the Internal Revenue Code (IRC) covering all eligible employees, as defined. Under the plan, a participant may elect to defer receipt of a stated percentage of his or her compensation, subject to limitation under the IRC, which would otherwise be payable to the participant for any plan year. We may make discretionary contributions to this plan, including making matching contributions of 50%, up to a maximum of 6% of an employee's pretax contribution. We made matching contributions of approximately $2.7 million, $2.5 million and $2.4 million in fiscal 2018, 2017 and 2016, respectively. Additionally, we participate in certain government mandated and defined contribution plans throughout the world for which we comply with all funding requirements.

(17) Segment and Geographic Information

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Operating segments are defined as components of an enterprise that engage in business activities for which discrete financial information is available and regularly reviewed by the chief operating decision maker in deciding how to allocate resources and to assess performance. Our chief operating decision maker is our President and Chief Executive Officer.

We have two operating and reportable segments, which are consistent with our reporting units: i) subscription and software and ii) services. The subscription and software segment is engaged in the licensing of asset optimization software solutions and associated support services. The services segment includes professional services and training. The accounting policies of the operating segments are the same as those described in the summary of significant accounting policies (refer to Note 2). We do not track assets or capital expenditures by operating segments. Consequently, it is not practical to present assets, capital expenditures, depreciation or amortization by operating segments.

The following table presents a summary of our reportable segments' profits:

	Subscription and software	Services	Total
	(Dollars in Thousands)		
Year Ended June 30, 2018:			
Segment revenue	$471,041	$28,473	$499,514
Segment expenses(1)	(206,381)	(27,416)	(233,797)
Segment profit	$264,660	$1,057	$265,717
Year Ended June 30, 2017:			
Segment revenue	$453,512	$29,430	$482,942
Segment expenses(1)	(193,214)	(26,415)	(219,629)
Segment profit	$260,298	$3,015	$263,313
Year Ended June 30, 2016:			
Segment revenue	$440,408	$31,936	$472,344
Segment expenses(1)	(179,064)	(28,235)	(207,299)
Segment profit	$261,344	$3,701	$265,045

(1) Our reportable segments’ operating expenses include expenses directly attributable to the segments. Segment expenses include selling and marketing, research and development, stock-based compensation and certain corporate expenses incurred in support of the segments. Segment expenses do not include allocations of general and administrative; interest income, net; and other income (expense), net.

Reconciliation to Income Before Provision for Income Taxes

The following table presents a reconciliation of total segment operating profit to income before provision for income taxes:

	Year Ended June 30,		
	2018	2017	2016
	(Dollars in Thousands)		
Total segment profit for reportable segments	$265,717	$263,313	$265,045
General and administrative	(56,076)	(51,297)	(53,664)
Other (expense) income, net	(838)	1,309	29
Interest (expense), net	(5,460)	(2,979)	(771)
Income before provision for income taxes	$203,343	$210,346	$210,639

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Geographic Information:
Revenue to external customers is attributed to individual countries based on the location the product or services are sold. Domestic and international sales as a percentage of total revenue are as follows:

	Year Ended June 30,		
	2018	2017	2016
United States	38.0 %	37.9 %	35.4 %
Europe	27.8	28.1	29.6
Other(1)	34.2	34.0	35.0
	100.0%	100.0%	100.0%

(1) Other consists primarily of Asia Pacific, Canada, Latin America and the Middle East.

We have long-lived assets of approximately $93.9 million that are located domestically and $39.8 million that reside in other geographic locations as of June 30, 2018. We had long-lived assets of approximately $71.9 million that were located domestically and $15.5 million that reside in other geographic locations as of June 30, 2017.

(18) Quarterly Financial Data (Unaudited)

The following tables present quarterly consolidated statement of operations data for fiscal 2018 and 2017. The below data is unaudited but, in our opinion, reflects all adjustments necessary for a fair presentation of this data in accordance with GAAP:

	Three Months Ended			
	June 30, 2018	March 31, 2018	December 31, 2017	September 30, 2017
	(Dollars and Shares in Thousands, Except per Share Data)			
Total revenue	$125,960	$125,871	$124,902	$ 122,781
Gross profit	112,913	113,095	112,813	110,049
Income from operations	50,706	51,157	54,465	53,313
Net income	38,020	37,835	38,078	34,755
Net income per common share:				
Basic	$0.53	$0.53	$0.53	$ 0.48
Diluted	$0.53	$0.52	$0.52	$ 0.47
Weighted average shares outstanding:				
Basic	71,349	71,828	72,342	73,024
Diluted	72,315	72,663	73,036	73,609

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

	Three Months Ended			
	June 30, 2017	March 31, 2017	December 31, 2016	September 30, 2016
	(Dollars and Shares in Thousands, Except per Share Data)			
Total revenue	$123,682	$119,277	$119,933	$ 120,050
Gross profit	111,568	107,010	108,354	108,544
Income from operations	48,948	52,273	56,065	54,730
Net income	54,352	35,834	37,010	35,000
Net income per common share:				
Basic	$0.73	$0.47	$0.48	$ 0.44
Diluted	$0.73	$0.47	$0.48	$ 0.44
Weighted average shares outstanding:				
Basic	74,294	75,676	76,905	79,048
Diluted	74,830	76,182	77,318	79,385

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EXHIBIT INDEX

Exhibit Number	Description	Filed with this Form 10-K	Incorporated by Reference		
			Form	Filing Date with SEC(1)	Exhibit Number
3.1	Certificate of Incorporation of Aspen Technology, Inc., as amended		8-K	August 22, 2003	4
3.2	Amended and Restated By-laws of Aspen Technology, Inc.		8-K	October 24, 2016	3.1
4.1	Specimen certificate for common stock, $.10 par value, of Aspen Technology, Inc.		8-A/A	June 12, 1998	4
10.1	Lease Agreement dated January 27, 2014 between RAR2-Crosby Corporate Center QRS, Inc. and Aspen Technology, Inc. regarding 20, 22 and 28 Crosby Drive, Bedford, Massachusetts		10-Q	January 30, 2014	10.1
10.2	System License Agreement dated March 30, 1982 between Aspen Technology, Inc. and the Massachusetts Institute of Technology		10-K	April 11, 2008	10.4
10.3	Amendment dated March 30, 1982 to System License Agreement dated March 30, 1982 between Aspen Technology, Inc. and the Massachusetts Institute of Technology		10-K	April 11, 2008	10.5
10.4	Rule 2.7 Announcement, dated January 12, 2016		8-K	January 19, 2016	2.1
10.5	364-Day Bridge Credit Agreement, dated as of January 12, 2016, among Aspen Technology, Inc., as borrower, the lenders party thereto, JPMorgan Chase Bank, N.A., as administrative agent, and J.P. Morgan Securities LLC, as sole lead arranger and sole bookrunner		8-K	January 19, 2016	10.1
10.6	Credit Agreement, dated as of February 26, 2016, among Aspen Technology, Inc., as borrower, the lenders, co-documentation agents and issuing banks party thereto, JPMorgan Chase Bank, N.A., as administrative agent, joint lead arranger and joint bookrunner, and Silicon Valley Bank, as syndication agent, joint lead arranger and joint bookrunner		8-K	February 29, 2016	10.1
10.7	Incremental Facility Amendment, dated as of August 9, 2017, to the Credit Agreement dated as of February 26, 2016 among Aspen Technology, Inc. as borrower, the lenders, JPMorgan		10-K	August 10, 2017	10.7

	Chase Bank, N.A. as administrative agent and issuing bank, and certain other Lenders acting in such capacity from time to time, as issuing banks			
10.8	Master Confirmation-Accelerated Share Repurchase Dated August 29, 2016, with J.P. Morgan Securities, as agent for JP Morgan Chase Bank	8-K	August 30, 2016	10.1

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Exhibit Number	Description	Filed with this Form 10-K	Incorporated by Reference Form	Filing Date with SEC(1)	Exhibit Number
10.9	Stock Purchase Agreement dated October 26, 2016 by and among AspenTech Holding Corporation, Mtelligence Corporation, each of the stockholders and key sellers of Mtelligence Corporation, and Cito Capital Corporation		10-Q	October 27, 2016	10.4
10.10	Stock Purchase Agreement dated February 5, 2018 by and among AspenTech Holding Corporation, Apex Optimisation, and each of the stockholders and key sellers of Apex Optimisation		10-Q	April 25, 2018	10.1
10.11^	Aspen Technology, Inc. 2005 Stock Incentive Plan (as amended)		10-K	November 9, 2009	10.39
10.12^	Form of Terms and Conditions of Stock Option Agreement granted under Aspen Technology, Inc. 2005 Stock Incentive Plan		10-Q	November 14, 2006	10.8
10.13^	Form of Restricted Stock Unit Agreement granted under Aspen Technology, Inc. 2005 Stock Incentive Plan		10-Q	November 14, 2006	10.9
10.14^	Form of Restricted Stock Unit Agreement—G granted under Aspen Technology, Inc. 2005 Stock Incentive Plan		10-Q	November 14, 2006	10.10
10.15^	Terms and Conditions of Restricted Stock Unit Agreement granted under 2005 Stock Incentive Plan		10-K	November 9, 2009	10.43
10.16^	Aspen Technology, Inc. 2010 Equity Incentive Plan		8-K	April 21, 2010	10.1
10.17^	Form of Terms and Conditions of Restricted Stock Unit Agreement granted under Aspen Technology, Inc. 2010 Equity Incentive Plan		10-K	September 2, 2010	10.42
10.18^	Form of Terms and Conditions of Stock Option Agreement Granted under Aspen Technology, Inc. 2010 Equity Incentive Plan		10-K	September 2, 2010	10.43
10.19^	Aspen Technology, Inc. 2016 Omnibus Incentive Plan		10-Q	October 27, 2016	10.4
10.20^	Form of Terms and Conditions of Restricted Stock Unit Agreement Granted Under Aspen Technology Inc. 2016 Omnibus Incentive Plan		10-Q	January 26, 2017	10.2

10.21^	Form of Terms and Conditions of Stock Option Agreement Granted Under Aspen Technology Inc. 2016 Omnibus Incentive Plan	10-Q	January 26, 2017	10.3
10.22^	Aspen Technology, Inc. Executive Annual Incentive Bonus Plan (Fiscal Year 2015)	8-K	July 25, 2014	10.1
10.23^	Aspen Technology, Inc. Executive Annual Incentive Bonus Plan (Fiscal Year 2016)	8-K	July 24, 2015	10.1
10.24^	Aspen Technology, Inc. Executive Annual Bonus Plan (Fiscal Year 2017)	8-K	July 22, 2016	10.1

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Exhibit Number	Description	Filed with this Form 10-K	Incorporated by Reference		
			Form	Filing Date with SEC(1)	Exhibit Number
10.25^	Aspen Technology, Inc. Executive Annual Bonus Plan (Fiscal Year 2017) (Correction of the exhibit filed as Exhibit 10.1 of the 8-K filed on July 22, 2016, in which Growth in Annual Spend was referred to as Growth in License Annual Spend)		10-Q	October 27, 2016	10.3
10.26^	Aspen Technology, Inc. Executive Annual Incentive Bonus Plan (Fiscal Year 2018)		8-K	July 19, 2017	10.1
10.27^	Aspen Technology, Inc. Executive Annual Incentive Bonus Plan (Fiscal Year 2018)		8-K	July 27, 2018	10.1
10.28^	Form of Amended and Restated Executive Retention Agreement entered into by Aspen Technology, Inc. and each executive officer of Aspen Technology, Inc. (other than Antonio J. Pietri)		10-K	August 13, 2014	10.29
10.29^	Amended and Restated Executive Retention Agreement dated July 1, 2013 entered into by Aspen Technology, Inc. and Antonio J. Pietri		10-K	August 15, 2013	10.29
10.30^	Form of Confidentiality and Non-Competition Agreement of Aspen Technology, Inc.		10-K	April 11, 2008	10.45
10.31^	Non-Competition and Non-Solicitation Agreement dated July 1, 2013 entered into by Aspen Technology, Inc. and Antonio J. Pietri		10-K	August 15, 2013	10.30
21.1	Subsidiaries of Aspen Technology, Inc.	X			
23.1	Consent of KPMG LLP	X			
31.1	Certification of Principal Executive Officer Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002	X			
31.2	Certification of Principal Financial Officer Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002	X			
32.1*	Certification Pursuant to 18 U.S.C. Section 1350, As Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002	X			
101.INS	Instance Document	X			

101.SCH	XBRL Taxonomy Extension Schema Document	X
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document	X
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document	X
101.LAB	XBRL Taxonomy Extension Label Linkbase Document	X
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document	X

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(1) The SEC File No. is 000-24786 for Exhibits 3.1, 4.1, 10.2 through 10.3, 10.11 through 10.15, and 10.30, inclusive. The SEC File No. for all other exhibits is 001-34630.

^ Management contract or compensatory plan or arrangement

* The certification attached as Exhibit 32.1 that accompanies this Form 10-K is not deemed filed with the SEC and is not to be incorporated by reference into any filing of Aspen Technology, Inc. under the Securities Act of 1933 or the Securities Exchange Act of 1934, whether made before or after the date of this Form 10-K, irrespective of any general incorporation language contained in such filing.

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