



2019 Annual Report

Unlock the value created by the convergence of the **physical** and **digital** worlds...

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

FORM 10-K

**ANNUAL REPORT PURSUANT TO SECTIONS 13 OR 15(d) OF THE
SECURITIES EXCHANGE ACT OF 1934**

For the Fiscal Year Ended: September 30, 2019

OR

**TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE
SECURITIES EXCHANGE ACT OF 1934**

For the transition period from_ to_

Commission File Number: 0-18059

PTC Inc.

(Exact name of registrant as specified in its charter)

Massachusetts
(State or other jurisdiction of
incorporation or organization)

04-2866152
(I.R.S. Employer
Identification Number)

121 Seaport Boulevard, Boston, MA 02210
(Address of principal executive offices, including zip code)

(781) 370-5000

(Registrant's telephone number, including area code)

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

Title of each class	Trading Symbol	Name of each exchange on which registered
Common Stock, \$.01 par value per share	PTC	NASDAQ Global Select Market

**Securities registered pursuant
to Section 12(g) of the Act:
None**

Indicate by check mark whether the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes No

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

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

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

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer or a smaller reporting company. See the definitions of "large accelerated filer," "accelerated filer" and "smaller reporting company" in Rule 12b-2 of the Exchange Act.

Large Accelerated Filer Accelerated Filer Non-accelerated Filer Smaller Reporting Company
Emerging growth company

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

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

The aggregate market value of our voting stock held by non-affiliates was approximately \$10,784,576,792 on April 1, 2019 based on the last reported sale price of our common stock on the Nasdaq Global Select Market on March 29, 2019. There were 118,097,684 shares of our common stock outstanding on that day and 115,492,735 shares of our common stock outstanding on November 15, 2019.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the definitive Proxy Statement in connection with the 2020 Annual Meeting of Stockholders (2020 Proxy Statement) are incorporated by reference into Part III.

PTC Inc.
ANNUAL REPORT ON FORM 10-K FOR FISCAL YEAR 2019
Table of Contents

	<u>Page</u>
<u>PART I.</u>	
Item 1. Business	1
Item 1A. Risk Factors	5
Item 1B. Unresolved Staff Comments	12
Item 2. Properties	12
Item 3. Legal Proceedings	12
Item 4. Mine Safety Disclosures	12
<u>PART II.</u>	
Item 5. Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities	12
Item 6. Selected Financial Data	12
Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations	12
Item 7A. Quantitative and Qualitative Disclosures about Market Risk	44
Item 8. Financial Statements and Supplementary Data	46
Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure	46
Item 9A. Controls and Procedures	46
Item 9B. Other Information	47
<u>PART III.</u>	
Item 10. Directors, Executive Officers and Corporate Governance	47
Item 11. Executive Compensation	47
Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters	48
Item 13. Certain Relationships and Related Transactions, and Director Independence	48
Item 14. Principal Accounting Fees and Services	48
<u>PART IV.</u>	
Item 15. Exhibits and Financial Statement Schedules	49
Item 16. Form 10-K Summary	49
Exhibit Index	50
Signatures	53
<u>APPENDIX A</u>	
Report of Independent Registered Public Accounting Firm	F-1
Consolidated Financial Statements	F-4
Notes to Consolidated Financial Statements	F-9
Selected Consolidated Financial Data	A-1

Forward-Looking Statements

Statements in this Annual Report about our anticipated financial results and growth, as well as about the development of our products and markets, are forward-looking statements that are based on our current plans and assumptions. Important information about factors that may cause our actual results to differ materially from these statements is discussed in Item 1A. "Risk Factors" and generally throughout this Annual Report.

Unless otherwise indicated, all references to a year reflect our fiscal year that ends on September 30.

PART I

ITEM 1. Business

PTC is a global software and services company that, together with a partner ecosystem, drives digital transformation for industrial companies. We serve a broad range of these companies, including discrete manufacturers (industrial machinery & components, aerospace & defense, automotive, and electronics & high technology), process/continuous manufacturers (life sciences, energy & resources, and consumer packaged goods), and operators. Our technology enables customers to improve operational efficiency, accelerate product and service innovation, and increase workforce productivity.

We go to market with four technology platforms, consisting of and supported by products that enable 3D modeling (CAD), lifecycle management (PLM), data orchestration (IIoT), and experience creation (AR). Together, these technologies power the digital thread across industrial enterprises.



We continue to expand our solution offerings to address the most pressing business problems our customers confront. These solutions are being designed to aggregate products and technology from our portfolio as well as from other companies, including our key partners.

Our business is based on a subscription business model, which provides flexibility to customers and increases predictability and consistency of billings to PTC. Our customer success program partners with customers to enable successful deployment and utilization of our solutions.

We generate revenue through the sale of software subscriptions, which include license access and support (technical support and software updates), support for existing perpetual licenses, professional services (consulting, implementation, and training), and cloud services.

Recent Events

On November 1, 2019, we acquired Onshape, creators of the first Software as a Service (SaaS) product development platform that unites robust CAD with powerful data management and collaboration tools, for approximately \$470 million, net of cash acquired. The acquisition is expected to accelerate our ability to attract new customers with a SaaS-based product offering and position the company to capitalize on an industry transition to SaaS. In connection with the acquisition, we borrowed \$455 million under our existing credit facility.

On November 13, 2019, we also increased the revolving loan commitment under the credit facility to \$1 billion and made other amendments to the credit facility.

Our Principal Products and Services

3D (CAD)

Our 3D platform enables users to create conceptual and detailed designs, analyze designs, perform engineering calculations and leverage the information created downstream using 2D, 3D, parametric and direct modeling. Our principal 3D product is described below.



Our **Creo®** interoperable suite of product design software provides a scalable set of packages for design engineers to meet a variety of specialized needs. Creo provides capabilities for design flexibility, advanced assembly design, piping and cabling design, advanced surfacing, comprehensive virtual prototyping and other essential design functions. Our Creo solutions include augmented and virtual reality through a native cloud dependent integration with our Vuforia® augmented reality (AR) solution. With every seat of Creo, our customers can create and publish AR experiences and share their design instantly to collaborate with anyone across the entire enterprise around the world on any device. Creo also now includes the Discovery Live real-time simulation technology from ANSYS. This solution offers customers a unified modeling and simulation environment and provides design engineers with an interactive design experience that will enable them to create higher quality products, while reducing product and development costs.

Lifecycle Management (PLM)

Our PLM platform enables efficient and consistent product data management from inception through design, as well as communication and collaboration across the entire enterprise, including product development, manufacturing and the supply chain. Our principal Lifecycle Management product is described below.



Our **Windchill®** suite of PLM software provides product lifecycle management capabilities - from design to service. Windchill offers a single repository for all product information, thus providing a "single source of truth" for all product-related content such as CAD models, documents, technical illustrations, embedded software, calculations, and requirement specifications for all phases of the product lifecycle to help companies streamline enterprise-wide communication and make informed decisions. As the "single source of truth," Windchill provides the digital thread that connects the full product lifecycle. Our Windchill product now also includes augmented reality (AR) capabilities, enabling customers to build a digital product definition and publish the representation of the resulting product in AR. Using AR in the product development process connects the digital model to the physical product to determine real-time behavior, conduct product design reviews in real-world environments, and share the product definition with disparate stakeholders.

Data Orchestration (IIoT)

Our data orchestration platform delivers tools, technologies, and solutions that empower companies to rapidly develop and deploy powerful industrial IoT applications, enabling them to transform their operations, products, and services - and unlock new business models. Our principal data orchestration product is described below.



Our **ThingWorx®** product enables customers to reduce the time, cost, and risk required to build and deploy IoT applications; connect devices, systems, and applications; manage connected products; and analyze industrial IoT data. ThingWorx includes cloud-based tools that allow customers to easily and more securely connect products and devices to the cloud, and intelligently process and store product and sensor data. ThingWorx Solution Central is a centralized portal in the cloud that allows users of ThingWorx to efficiently discover, deploy, and manage ThingWorx applications across the enterprise from a single location, which allows for cost-effective, efficient, and version controlled management of applications. ThingWorx contains integral communications connectivity to industrial automation environments through our ThingWorx Kepware® product, which enables users to connect, manage,

monitor, and control disparate devices and software applications. ThingWorx also offers sophisticated artificial intelligence and machine learning technology that enables customers to simplify and automate complex analytical processes that enhance industrial IoT solutions through real-time insights, predictions and recommendations from information collected from smart, connected products. ThingWorx also includes AR capabilities that superimpose IoT digital information on a human's view of the physical world, enabling valuable insights.

Experience Creation (AR)

Our Experience Creation platform offers a way to capture, create, and deliver content for industrial augmented reality experiences. Our principal experience creation products are described below.



Our **Vuforia Studio™** product is a powerful, easy-to-use, cloud-based tool that enables industrial enterprises to rapidly author and publish augmented reality experiences. These augmented reality experiences overlay important digital information from IoT, CAD, and other sources onto the view of the physical things on which users work. Our Vuforia **Expert Capture™** product chronicles the real-time movements of a person wearing an AR headset by monitoring the individual both audio-visually and spatially in three dimensions. Vuforia Expert Capture supports a variety of industrial use cases, such as creating step-by-step operating or repair instructions, procedural guidance, and hands-on training. The Vuforia suite also includes the **Vuforia Engine™** technology for application development and **Vuforia Chalk™** collaboration and remote assistance solution.

Strategic Partners

Building an ecosystem of partners is becoming increasingly important as we expand the capabilities of our core solutions, and IoT offerings and as we expand our addressable markets by leveraging our partner sales and services distribution channels. With this in mind, in 2018, we entered into the three strategic alliances described below.

We partnered with Rockwell Automation to align our respective smart factory technologies to address the market for smart, connected operations, with particular focus on the plant and factory setting. As part of this strategic alliance, we have aligned our ThingWorx® IoT, Kepware® industrial connectivity, and Vuforia® augmented reality (AR) platforms with Rockwell Automation's FactoryTalk® MES, FactoryTalk Analytics, and Industrial Automation platforms, and we both offer these solutions in the market. This suite is now launched and marketed as FactoryTalk Innovation Suite Powered by PTC. Rockwell Automation has exclusive rights to resell certain of our solutions to certain customers and geographic regions. In connection with this strategic alliance, Rockwell Automation made a \$1 billion equity investment in PTC.

We partnered with Microsoft to make the ThingWorx® Industrial Innovation Platform available on the Microsoft Azure cloud platform as our preferred cloud platform. By partnering with Microsoft, we are able to leverage the two companies' complementary technologies and together pursue opportunities in industrial sectors. This integration enables us to deliver a combined and connected solution for industrial IoT and digital product lifecycle management that enable companies to bring new products to market faster, enhance customer service, and introduce new revenue streams, while reducing operating costs.

We partnered with ANSYS to enable us to embed Ansys' Discovery Live real-time simulation within Creo, enabling us to offer a fully-integrated CAD and real-time simulation solution.

Our Markets and How We Address Them

We compete in the Industrial IoT (IIoT) and augmented reality markets and the CAD and PLM markets. The markets we serve present different growth opportunities for us. We see greater opportunity for market growth for our IIoT and AR solutions for the enterprise, followed by more moderate market growth for our CAD and PLM solutions.

We derive most of our sales from products and services sold directly by our sales force to end-user customers. Approximately 20% to 30% of our sales of products and services are through third-party resellers and other strategic partners. Our sales force focuses on large accounts, while our reseller channel provides a cost-effective means of covering the small- and medium-size business market. Our strategic services partners provide service offerings to help customers implement our product offerings. As we grow our IIoT business, we expect our go-to-market strategy will rely more on partners, including the types of strategic partners described above, and marketing directly to end users and developers.

Additional financial information about our segments and international and domestic operations may be found in Note 18. Segment and Geographic Information of Notes to Consolidated Financial Statements in this Annual Report, which information is incorporated herein by reference.

Competition

We compete with a number of companies that offer solutions that address one or more specific functional areas covered by our solutions. In our IIoT business, we compete with large established companies like Amazon, IBM, Oracle, SAP, Siemens AG, and GE. There are also a number of small companies that compete in the market for IoT products. We believe our ThingWorx IoT platform and solutions are complementary to the offerings of many of our competitors, and we have partnered with many of the named competitors. For enterprise CAD and PLM solutions and for discrete desktop CAD products, we compete with companies including AutoDesk, Dassault Systèmes SA and Siemens AG. For PLM solutions, we also compete with Oracle and SAP, but we believe our products are more specifically targeted toward the business process challenges of manufacturing companies and offer broader and deeper functionality for those processes than ERP-based solutions.

Proprietary Rights

Our software products and related technical know-how, along with our trademarks, including our company names, product names and logos, are proprietary. We protect our intellectual property rights in these items by relying on copyrights, trademarks, patents and common law safeguards, including trade secret protection. The nature and extent of such legal protection depends in part on the type of intellectual property right and the relevant jurisdiction. In the U.S., we are generally able to maintain our trademark registrations for as long as the trademarks are in use and to maintain our patents for up to 20 years from the earliest effective filing date. We also use license management and other anti-piracy technology measures, as well as contractual restrictions, to curtail the unauthorized use and distribution of our products.

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.

Deferred Revenue and Backlog (Unbilled Deferred Revenue)

Information about Deferred Revenue and Backlog (Unbilled Deferred Revenue) is discussed in Item 7. "Management's Discussion and Analysis of Financial Condition and Results of Operations - Executive Overview" below. You should read that discussion, which is incorporated into this section by reference.

Employees

As of September 30, 2019, we had 6,055 employees, including 1,889 in product development; 1,674 in customer support, training, consulting, cloud services and product distribution; 1,777 in sales and marketing; and 715 in general and administration. Of these employees, 2,203 were located in the United States and 3,852 were located outside the United States.

Website Access to Reports and Code of Business Conduct and Ethics

We make available free of charge on our website at www.ptc.com the following reports as soon as reasonably practicable after electronically filing them with, or furnishing them to, the SEC: our Annual Reports on Form 10-K; our Quarterly Reports on Form 10-Q; our Current Reports on Form 8-K; and amendments to those reports filed or furnished pursuant to Sections 13(a) or 15(d) of the Securities Exchange Act of 1934. Our Proxy Statements for our Annual Meetings and Section 16 trading reports on SEC Forms 3, 4 and 5 also are available on our website. The reference to our website is not intended to incorporate information on our website into this Annual Report by reference.

Our Code of Ethics for Senior Executive Officers is embedded in our Code of Business Conduct and Ethics, which is also available on our website. Additional information about this code and amendments and waivers thereto can be found below in Part III, Item 10 of this Annual Report.

Executive Officers

Information about our executive officers is incorporated by reference from our 2020 Proxy Statement.

Corporate Information

PTC was incorporated in Massachusetts in 1985 and is headquartered in Boston, Massachusetts.

ITEM 1A. Risk Factors

The following are important factors we have identified that could affect our future results and your investment in our securities. You should consider them carefully when evaluating an investment in PTC securities or any forward-looking statements made by us, including those contained in this Annual Report, because these factors could cause actual results to differ materially from historical results or the performance projected in forward-looking statements. The risks described below are not the only risks we face. Additional risks and uncertainties not currently known to us or that we currently deem to be immaterial may also materially adversely affect our business, financial condition and/or operating results. Holders of the 6.00% Senior Notes due 2024 (the "2024 6% Notes") that we issued in May 2016 should also consider the risk factors related to those notes described in the prospectus supplement we filed with the Securities and Exchange Commission on May 5, 2016, which are incorporated herein by reference.

I. Risks Related to Our Business Operations and Industry

We face significant competition, which may reduce our profitability and limit or reduce our market share.

The markets for our products and solutions are rapidly changing and characterized by intense competition, disruptive technology developments, evolving distribution models and increasingly lower barriers to entry. If we are unable to provide products and solutions that address customers' needs as well as our competitors' products and solutions do, or to align our pricing, licensing and delivery models with customer preferences, we could lose customers and/or fail to attract new customers, which could cause us to lose revenue and market share. Competitive pressures could also cause us to reduce our prices, which could reduce our revenue and margins.

Our current and potential competitors range from large and well-established companies to emerging start-ups. Some of our competitors and potential competitors have greater name recognition in the markets we serve and greater financial, technical, sales and marketing, and other resources, which could limit our ability to gain customer recognition and confidence in our products and solutions and successfully sell our products and solutions, which could adversely affect our ability to grow our business.

A breach of security in our products or computer systems, or those of our third-party service providers, could compromise the integrity of our products, cause loss of data, harm our reputation, create additional liability and adversely impact our financial results.

We have implemented and continue to implement measures intended to maintain the security and integrity of our products, source code and computer systems. The potential consequences of a security breach or system disruption (particularly through cyber-attack or cyber-intrusion, including by computer hackers, foreign governments and cyber terrorists) have increased in scope as the number, intensity and sophistication of attempted attacks and intrusions from around the world have increased. Despite efforts to create security barriers to such threats, it is impossible for us to eliminate this risk, and, in fact, we deal with security issues on a regular basis and have experienced security incidents from time to time. Accordingly, there is a risk that we might encounter a material event or issue and that such an event or issue may occur.

In addition, we offer cloud services to our customers and some of our products are hosted by third-party service providers, which expose us to additional risks as those repositories of our customers' proprietary data may be targeted by hackers.

A significant breach of the security and/ or integrity of our products or systems, or those of our third-party service providers, could prevent our products from functioning properly, could enable access to sensitive, proprietary or confidential information, including that of our customers, or could disrupt our business operations or those of our customers. This could require us to incur significant costs of investigation, remediation, and further protection, harm our reputation, cause customers to stop buying our products, and cause us to face lawsuits and potential liability, which could have a material adverse effect on our financial condition and results of operations.

We may be unable to hire or retain personnel with the necessary skills to operate and grow our business, which could adversely affect our ability to compete.

Our success depends upon our ability to attract and retain highly skilled managerial, sales and marketing, technical, financial and administrative personnel to operate and grow our business. Competition for such personnel in our industry is intense, particularly in the Boston, Massachusetts area where our global headquarters is located.

The technical personnel required to develop our products and solutions are in high demand, particularly technical personnel with augmented and virtual reality and analytics expertise as there are comparatively fewer persons with those skills. If we are unable to attract and retain technical personnel with the requisite skills, our product and solution development efforts could be delayed, which could adversely affect our ability to compete and thereby adversely affect our revenues and profitability.

The managerial, sales and marketing, financial and administrative personnel necessary to guide our operations, market and sell our solutions and support our business operations are also in high demand due to the intense competition in our industry.

If we are unable to attract and retain the personnel we need to develop compelling products and solutions, and guide, operate and support our business, we may be unable to successfully compete in the marketplace, which would adversely affect our revenues and profitability.

We depend on sales within the discrete manufacturing sector and our business could be adversely affected if manufacturing activity does not grow, or if it contracts, or if manufacturers are adversely affected by other economic factors.

A large amount of our sales are to customers in the discrete manufacturing sector. The global Manufacturing Purchasing Managers' Index (PMI) has declined significantly over the past year and remained below the 50% level in September 2019, with a particularly large recent decline in Europe. Although the decline in Manufacturing PMI did not have a significant adverse affect on our business in 2019, if the manufacturing sector does not improve or continues to decline, our customers in this sector may, as they have in the past, reduce or defer purchases of our products and services, which could adversely affect our financial results.

In addition, manufacturers worldwide are facing increasing uncertainty about the global economic climate due to, among other factors, the geopolitical environment and ongoing trade tensions and tariffs. In addition, within the technology industry the U.S. Administration's focus on technology transactions with non-U.S. entities and potential expanded prohibitions has created additional uncertainty. In light of these concerns and challenges, including the potential enactment or expansion of laws that restrict our ability to sell our solutions to customers, customers may delay, reduce or forego purchases of our solutions, which would adversely affect our business and financial results.

If we fail to successfully manage our transition to a subscription-based licensing company, our business and financial results could be adversely affected.

We completed our transition from offering perpetual licenses for our products to offering only subscription-based licenses worldwide in January 2019 (excluding Kepware). While we expect our subscription base, recurring revenue and cash flow to increase over time as a result of this licensing model transition, our ability to achieve these financial objectives is subject to risks and uncertainties. Becoming a subscription-based licensing company requires a considerable investment of technical, financial, legal and sales resources, and a scalable organization. Whether our transition will be successful and will accomplish our business and financial objectives is subject to uncertainties, including but not limited to: customer demand, attach and renewal rates, channel acceptance, our ability to further develop and scale infrastructure, our ability to include functionality and usability in such offerings that address customer requirements, and our costs. If we are unable to successfully establish these new offerings and navigate our business transition due to the foregoing risks and uncertainties, our business and financial results could be adversely impacted.

Because our sales and operations are globally dispersed, we face additional compliance risks and any compliance risk could adversely affect our business and financial results.

We sell and deliver software and services, and maintain support operations, in a large number of countries whose laws and practices differ from one another and are subject to unexpected changes. Managing these geographically dispersed operations requires significant attention and resources to

ensure compliance with laws of those countries and those of the U.S. governing our activities in non-U.S. countries.

Those laws include, but are not limited to, anti-corruption laws and regulations (including the U.S. Foreign Corrupt Practices Act (FCPA) and the U.K. Bribery Act 2010), data privacy laws and regulations (including the European Union's General Data Privacy Regulation), and trade and economic sanctions laws and regulations (including laws administered by the U.S. Department of the Treasury's Office of Foreign Assets Control, the U.S. State Department, the U.S. Department of Commerce, the United Nations Security Council and other relevant sanctions authorities). Our compliance risks are heightened due to the go-to-market approach for our businesses that relies heavily on a partner ecosystem, the fact that we operate in, and are expanding into, countries with a higher incidence of corruption and fraudulent business practices than others, the fact that we deal with governments and state-owned business enterprises, the fact that cyber attacks and intrusions that could expose sensitive information have increased, and the fact that global enforcement of laws has significantly increased.

Accordingly, while we strive to maintain a comprehensive compliance program, we cannot guarantee that an employee, agent or business partner will not act in violation of our policies or U.S. or other applicable laws, that a cyber attack or intrusion would not be successful, or that we may inadvertently violate such laws. Investigations of alleged violations of those laws and cyber intrusions can be expensive and disruptive. Violations of such laws can lead to civil and/or criminal prosecutions, substantial fines and other sanctions, including the revocation of our rights to continue certain operations, and also cause business and reputation loss, which could adversely affect our financial results and/or stock price.

Our international businesses present economic and operating risks, which could adversely affect our business and financial results.

We expect that our international operations will continue to expand and to account for a significant portion of our total revenue. Because we transact business in various foreign currencies, the volatility of foreign exchange rates has had and may in the future have a material adverse effect on our revenue, expenses and operating results.

Other risks inherent in our international operations include, but are not limited to, the following:

- difficulties in staffing and managing foreign sales and development operations;
- possible future limitations upon foreign-owned businesses;
- increased financial accounting and reporting burdens and complexities;
- inadequate local infrastructure; and
- greater difficulty in protecting our intellectual property.

We may have exposure to additional tax liabilities and our effective tax rate may increase or fluctuate, which could increase our income tax expense and reduce our net income.

As a multinational organization, we are subject to income taxes as well as non-income based taxes in the U.S. and in various foreign jurisdictions. Significant judgment is required in determining our worldwide income tax provision and other tax liabilities. In the ordinary course of a global business, there are many intercompany transactions and calculations where the ultimate tax determination is uncertain. Our tax returns are subject to review by various taxing authorities. Although we believe that our tax estimates are reasonable, the final determination of tax audits or tax disputes could be different from what is reflected in our historical income tax provisions and accruals. For example, we have an open tax dispute in South Korea with respect to which we paid \$12 million in 2017 to accommodate the potential tax liability through 2015, which we are disputing. If we do not prevail in that challenge, we could be subject to additional liabilities for periods after 2015, which we estimate could be \$13 million.

Our effective tax rate can be adversely affected by several factors, many of which are outside of our control, including:

- changes in tax laws, regulations, and interpretations in multiple jurisdictions in which we operate;
- assessments, and any related tax interest or penalties, by taxing authorities;
- changes in the relative proportions of revenues and income before taxes in the various jurisdictions in which we operate that have differing statutory tax rates;
- changes to the financial accounting rules for income taxes;
- unanticipated changes in tax rates; and

- changes to a valuation allowance on net deferred tax assets, if any.

II. Risks Related to Acquisitions and Strategic Relationships

Businesses we acquire may not generate the revenue and earnings we anticipate and may otherwise adversely affect our business.

We have acquired, and intend to continue to acquire, new businesses and technologies. If we fail to successfully integrate and manage the businesses and technologies we acquire, or if an acquisition does not further our business strategy as we expect, our operating results will be adversely affected.

Moreover, business combinations involve risks and uncertainties that can adversely affect our operations and operating results, including:

- difficulties managing an acquired company's technologies or lines of business or entering new markets where we have limited or no prior experience or where competitors may have stronger market positions;
- unanticipated operating difficulties in connection with the acquired entities, including potential declines in revenue of the acquired entity;
- failure to achieve the expected return on our investments, which could adversely affect our business or operating results and impair the assets that we recorded as a part of an acquisition, including intangible assets and goodwill;
- diversion of management and employee attention;
- loss of key personnel;
- assumption of unanticipated legal or financial liabilities or other unidentified issues with the acquired business;
- potential incompatibility of business cultures;
- significant increases in our interest expense, leverage and debt service requirements if we incur additional debt to pay for an acquisition; and
- if we were to issue a significant amount of equity securities in connection with future acquisitions, existing stockholders would be diluted and earnings per share would likely decrease.

Our inability to maintain or develop our strategic and technology relationships could adversely affect our business.

We have many strategic and technology relationships with other companies with which we work to offer complementary solutions and services, that market and sell our solutions, and that provide technologies that we embed in our solutions. We may not realize the expected benefits from these relationships and such relationships may be terminated by the other party. If these companies fail to perform or if a company terminates or substantially alters the terms of the relationship, we could suffer delays in product development, reduced sales or other operational difficulties and our business, results of operations and financial condition could be materially adversely affected.

III. Risks Related to Our Intellectual Property

We may be unable to adequately protect our proprietary rights, which could adversely affect our business and our ability to compete effectively.

Our software products are proprietary. We protect our intellectual property rights in these items by relying on copyrights, trademarks, patents and common law safeguards, including trade secret protection, as well as restrictions on disclosures and transferability contained in our agreements with other parties. Despite these measures, the laws of all relevant jurisdictions may not afford adequate protection to our products and other intellectual property. In addition, we frequently encounter attempts by individuals and companies to pirate our software. If our measures to protect our intellectual property rights fail, others may be able to use those rights, which could reduce our competitiveness and revenues.

In addition, any legal action to protect our intellectual property rights that we may bring or be engaged in could be costly, may distract management from day-to-day operations and may lead to additional claims against us, and we may not succeed, all of which would materially adversely affect our operating results.

Intellectual property infringement claims could be asserted against us, which could be expensive to defend and could result in limitations on our use of the claimed intellectual property.

The software industry is characterized by frequent litigation regarding copyright, patent and other intellectual property rights. If a lawsuit of this type is filed, it could result in significant expense to us and divert the efforts of our technical and management personnel. We cannot be sure that we would prevail against any such asserted claims. If we did not prevail, we could be prevented from using the claimed intellectual property or be required to enter into royalty or licensing agreements, which might not be available on terms acceptable to us. In addition to possible claims with respect to our proprietary products, some of our products contain technology developed by and licensed from third parties and we may likewise be susceptible to infringement claims with respect to these third-party technologies.

IV. Risks Related to Our Indebtedness

Our substantial indebtedness could adversely affect our business, financial condition and results of operations, as well as our ability to meet our payment obligations under our debt.

We have a significant amount of indebtedness. As of November 15, 2019, our total debt outstanding was approximately \$1.1 billion, approximately \$628 million of which was under our \$1 billion secured credit facility (which matures in September 2023) and \$500 million of which was associated with the 6% Senior Notes issued May 2016, which mature in May 2024 and are unsecured. Of the \$628 million outstanding under our secured credit facility, \$455 million was borrowed on November 1, 2019 to finance our acquisition of Onshape. In November 2019, we also amended the credit facility to increase the revolving loan commitment from \$700 million to \$1 billion (see *Liquidity and Capital Resources-Outstanding Notes* in Item 7. "Management's Discussion and Analysis of Financial Condition and Results of Operations" of this Annual Report). All amounts outstanding under the credit facility and the notes will be due and payable in full on their respective maturity dates. As of November 15, 2019, we had unused commitments under our credit facility of approximately \$357 million. PTC Inc. and one of our foreign subsidiaries are eligible borrowers under the credit facility and certain other foreign subsidiaries may become borrowers under our credit facility in the future, subject to certain conditions.

Notwithstanding the limits contained in the credit agreement governing our credit facility and the indenture governing our 2024 6% Notes, we may be able to incur substantial additional debt from time to time to finance working capital, capital expenditures, investments or acquisitions, or for other purposes. If we do so, the risks related to our level of debt could intensify. Specifically, our level of debt could:

- make it more difficult for us to satisfy our debt obligations and other ongoing business obligations, which may result in defaults;
- result in an event of default if we fail to comply with the financial and other covenants contained in the agreements governing our debt instruments, which could result in all of our debt becoming immediately due and payable or require us to negotiate an amendment to financial or other covenants that could cause us to incur additional fees and expenses;
- limit our ability to obtain additional financing to fund future working capital, capital expenditures, acquisitions or other general corporate requirements;
- reduce the availability of our cash flow to fund working capital, capital expenditures, acquisitions and other general corporate purposes and limit our ability to obtain additional financing for these purposes;
- increase our vulnerability to the impact of adverse economic and industry conditions;
- expose us to the risk of increased interest rates as certain of our borrowings, including borrowings under the credit facility, are at variable rates of interest;
- limit our flexibility in planning for, or reacting to, and increasing our vulnerability to, changes in our business, the industries in which we operate, and the overall economy;
- place us at a competitive disadvantage compared to other, less leveraged competitors; and
- increase our cost of borrowing.

Any of the above-listed factors could have an adverse effect on our business, financial condition and results of operations and our ability to meet our payment obligations under our debt agreements.

We may not be able to generate sufficient cash to service all of our indebtedness and may be forced to take other actions to satisfy our obligations under our indebtedness, which may not be successful.

Our ability to make scheduled payments on or refinance our debt obligations depends on our financial condition and operating performance, which are subject to prevailing economic and competitive conditions and to certain financial, business, legislative, regulatory and other factors some

of which are beyond our control. We may be unable to maintain a level of cash flows from operating activities sufficient to permit us to pay the principal, premium, if any, and interest on our indebtedness.

If our cash flows and capital resources are insufficient to fund our debt service obligations, we could face substantial liquidity problems and could be forced to reduce or delay investments and capital expenditures or to dispose of material assets or operations, seek additional debt or equity capital or restructure or refinance our indebtedness. We may not be able to effect any such alternative measures, if necessary, on commercially reasonable terms or at all and, even if successful, those alternative actions may not allow us to meet our scheduled debt service obligations. Our debt agreements restrict our ability to dispose of assets and use the proceeds from those dispositions and may also restrict our ability to raise debt or equity capital to be used to repay other indebtedness when it becomes due. We may not be able to consummate those dispositions or to obtain proceeds in an amount sufficient to meet any debt service obligations then due.

Our inability to generate sufficient cash flows to satisfy our debt obligations, or to refinance our indebtedness on commercially reasonable terms or at all, would materially and adversely affect our financial position and results of operations and our ability to satisfy our debt obligations.

If we cannot make scheduled payments on our debt, we will be in default and the lenders under our credit facility could terminate their commitments to loan money, the lenders could foreclose against the assets securing their borrowings, the holders of our 2024 6% Notes could declare all outstanding principal, premium, if any, and interest to be due and payable, and we could be forced into bankruptcy or liquidation. All of these events could result in a loss of your investment.

We are required to comply with certain financial and operating covenants under our debt agreements. Any failure to comply with those covenants could cause amounts borrowed to become immediately due and payable and/or prevent us from borrowing under the credit facility.

We are required to comply with specified financial and operating covenants under our debt agreements and to make payments under our debt, which limit our ability to operate our business as we otherwise might operate it. Our failure to comply with any of these covenants or to meet any debt payment obligations could result in an event of default which, if not cured or waived, would result in any amounts outstanding, including any accrued interest and/or unpaid fees, becoming immediately due and payable. We might not have sufficient working capital or liquidity to satisfy any repayment obligations in the event of an acceleration of those obligations. In addition, if we are not in compliance with the financial and operating covenants under the credit facility when we wish to borrow funds, we will be unable to borrow funds.

In addition, the financial and operating covenants under the credit facility may limit our ability to borrow funds, including for strategic acquisitions and share repurchases.

Our credit facility has variable interest tied to LIBOR and we could become subject to higher interest rates if the replacement rate we agree on with our banks is higher.

Borrowings under our revolving credit facility use the London Interbank Offering Rate (LIBOR) as a benchmark for establishing the interest rate. LIBOR is the subject of recent national, international and other regulatory guidance and proposals for reform. These reforms and other pressures may cause LIBOR to disappear entirely or to perform differently than in the past. Although we believe the recent discussions about alternative rates will not materially increase the interest rates on our credit facility, the final agreed rate may increase the cost of our variable rate indebtedness.

V. Risks Related to Our Common Stock and Debt Securities

Our operating results fluctuate from quarter to quarter, making future operating results difficult to predict; failure to meet market expectations could cause the price of our securities to decline.

Our quarterly operating results historically have fluctuated and are likely to continue to fluctuate depending on many factors, including:

- variability in our contracts, including timing of start dates, length of contracts, and mix of on-premise and cloud-based purchases, which would impact our revenue and earnings;
- a high percentage of our orders historically have been generated in the third month of each fiscal quarter and any failure to receive, complete or process orders at the end of any quarter could cause us to fall short of our financial and operating targets;
- our adoption of Accounting Standards Update 2014-09, *Revenue from Contracts with Customers: Topic 606* in 2019 creates significant revenue volatility;

- a significant percentage of our orders comes from transactions with large customers, which tend to have long lead times that are less predictable;
- because our operating expenses are largely fixed in the short term and are based on expected revenues, any failure to achieve our revenue targets could cause us to miss our earnings targets;
- because a significant portion of our revenue and expenses are generated from outside the U.S., shifts in foreign currency exchange rates could adversely affect our reported results; and
- we may incur significant expenses in a quarter in connection with corporate development initiatives, restructuring efforts or the investigation, defense or settlement of legal actions that would increase our operating expenses and reduce our earnings for the quarter in which those expenses are incurred.

Accordingly, our quarterly results are difficult to predict prior to the end of the quarter and we may be unable to confirm or adjust expectations with respect to our operating results for a quarter until that quarter has closed. Any failure to meet our quarterly revenue or earnings targets could adversely impact the market price of our securities.

Our long-range financial targets are predicated on expanding our portfolio of recurring revenue contracts (ARR growth), operating margin improvements and cash flow growth that we may fail to achieve, which could reduce our expected earnings and cause us to fail to meet the expectations of analysts or investors and cause the price of our securities to decline.

We are projecting long-term ARR, operating margin and cash flow growth. Our projections are based on the expected growth potential in the IoT and AR markets, as well as more modest growth in our core CAD and PLM markets. We may not achieve the expected ARR growth if the markets we serve do not grow at expected rates, if customers do not purchase, renew, or expand subscriptions as we expect, if we are not able to deliver solutions desired by customers and potential customers, and/or if acquired businesses do not generate the revenue growth that we expect.

Over time, we expect our operating margin to improve, which improvements are predicated on operating leverage and on improved operating efficiencies, particularly within our sales organization, and on service margin improvements. If we are unable to reduce our sales and marketing expenses as a percentage of revenue through productivity initiatives, or to reduce the amount of services we provide and/or to improve our services margins, we may not achieve our operating margin targets.

If we fail to achieve our long-range financial targets, or if analysts and investors expect that we will not achieve our long-range financial targets, the price of our securities could decline.

Our stock price has been volatile, which may make it harder to resell shares at a favorable time and price.

Market prices for securities of software companies are generally volatile and are subject to significant fluctuations that may be unrelated or disproportionate to the operating performance of these companies. The trading prices and valuations of these stocks, and of ours, may not be predictable. Negative changes in the public's perception of the prospects of software companies, or of PTC or the markets we serve, could depress our stock price regardless of our operating results.

Also, a large percentage of our common stock is held by institutional investors and by Rockwell Automation. Purchases and sales of our common stock by these investors could have a significant impact on the market price of the stock. For more information about those investors, please see our proxy statement with respect to our most recent annual meeting of stockholders and Schedules 13D and 13G filed with the SEC with respect to our common stock.

Our 2024 6% Notes are not listed on any national securities exchange or included in any automated quotation system, which could make it harder to resell the notes at a favorable time and price.

Our 2024 6% Notes are not listed on any national securities exchange or included in any automated quotation system. As a result, an active market for the notes may not exist or be maintained, which would adversely affect the market price and liquidity of the notes. In that case, holders may not be able to sell their notes when they want to or at a favorable price.

The market for non-investment grade debt historically has been subject to severe disruptions that have caused substantial volatility in the prices of securities similar to the notes. The market, if any, for

the notes may experience similar disruptions and any such disruptions may adversely affect the liquidity in that market or the prices at which the notes may be sold.

ITEM 1B. Unresolved Staff Comments

None.

ITEM 2. Properties

We currently have 80 primary office locations used in operations in the United States and internationally, predominately as sales and/or support offices and for research and development work. Of our total of approximately 1,812,000 square feet of leased facilities used in operations, approximately 420,000 square feet are located in the U.S., including 250,000 square feet at our headquarters facility located in Boston, Massachusetts, and approximately 289,000 square feet are located in India, where a significant amount of our research and development is conducted. In addition, approximately 520,000 feet are associated with facilities that have been restructured, primarily our previous headquarters facility in Needham, Massachusetts. We believe that our facilities are adequate for our present and foreseeable needs.

ITEM 3. Legal Proceedings

None.

ITEM 4. Mine Safety Disclosures

Not applicable.

PART II

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

Our common stock is traded on the Nasdaq Global Select Market under the symbol "PTC."

On September 30, 2019, the close of our fiscal year, and on November 13, 2019, our common stock was held by 1,107 and 1,104 shareholders of record, respectively.

The table below shows the shares of our common stock we repurchased in the fourth quarter of 2019.

Period (1)	Total Number of Shares (or Units) Purchased	Average Price Paid per Share (or Unit)	Total Number of Shares (or Units) Purchased as Part of Publicly Announced Plans or Programs	Approximate Dollar Value of Shares (or Units) that May Yet Be Purchased Under the Plans or Programs
June 30, 2019 - July 27, 2019	—	\$—	—	\$310,005,304 (2)
July 28, 2019 - August 24, 2019	301,459	\$66.39	301,459	\$290,006,120 (2)
August 25, 2019 - September 30, 2019	76,705	\$65.19	76,705	\$285,006,347 (2)
Total	378,164	\$66.15	378,164	\$285,006,347 (2)

(1) Periods are our fiscal months within the fiscal quarter.

(2) Our Board of Directors has authorized us to repurchase up to \$1,500 million of our common stock for the period October 1, 2017 through September 30, 2020, which program we announced on September 19, 2017 and announced expansion of in July 2018.

ITEM 6. Selected Financial Data

Our five-year summary of selected financial data and quarterly financial data for the past two years is located on pages A-1 and A-2 at the end of this Form 10-K and incorporated herein by reference.

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

Forward-Looking Statements

Statements in this Annual Report about anticipated financial results and growth, as well as about the development of our products and markets, are forward-looking statements that are based on our current plans and assumptions. Important information about the bases for these plans and assumptions and factors that may cause our actual results to differ materially from these statements is contained below and in Item 1A. "Risk Factors" of this Annual Report.

Unless otherwise indicated, all references to a year reflect our fiscal year that ends on September 30.

Operating and Non-GAAP Financial Measures

Our discussion of results includes discussion of our operating measures (including "ARR," "license and subscription bookings" and other subscription-related measures) and non-GAAP financial measures. Our operating measures and non-GAAP financial measures, including the reasons we use those measures, are described below in *Results of Operations - Operating Measures* and *Results of Operations - Non-GAAP Financial Measures*, respectively. You should read those sections to understand our operating and non-GAAP financial measures.

Revenue Sources and Recognition

We sell software subscription and perpetual licenses, support for perpetual licenses, cloud services and professional services.

Subscription revenue is comprised of time-based licenses whereby customers use our software and receive related support for a specified term. Results for reporting periods beginning on or after October 1, 2018 are presented under the Accounting Standards Update No. 2014-09, *Revenue from Contracts with Customers: Topic 606* (ASC 606), while prior period amounts are not adjusted and continue to be reported in accordance with the guidance provided by ASC 985-605, *Software-Revenue Recognition* and revenues for non-software deliverables in accordance with ASC 605-25, *Revenue Recognition, Multiple-Element Arrangements* (ASC 605). Through 2018, revenue for our subscription contracts was recognized ratably over the term of the contract under ASC 605; this differs from how revenue for such contracts is recognized under ASC 606. Our contracts with customers may include multiple goods and services. Under ASC 606, revenue is recognized for each performance obligation that can be separately identified under the contract. Accordingly, our on-premise subscription contracts are unbundled into multiple performance obligations (i.e., license, cloud and support). Determining whether the software licenses and the cloud services are distinct from each other, and therefore performance obligations to be accounted for separately, or not distinct from each other, and therefore part of a single performance obligation, may require significant judgment. To date, for the majority of our products, we have concluded that the on-premise software licenses and cloud services provided in our subscription offerings are distinct from each other such that revenue from each performance obligation within the offering should be recognized separately. We will continue to review this conclusion as the cloud services that we deliver in combination with our on-premise subscriptions continue to evolve, which could result in changes to how we recognize revenue for such products. The license portion of our on-premise subscription contracts (approximately 50% to 55%) is recognized upfront and the cloud and support portions (approximately 45% to 50%) are recognized ratably over the term. Software as a Service (SaaS) and cloud services for which revenue is generally recognized ratably over the term of the contract are included in subscription revenue and have been immaterial to date.

Perpetual licenses are a perpetual right to use the software, for which revenue is generally recognized up front upon shipment to the customer. Support revenue is comprised of contracts to maintain new and/or previously purchased licenses, for which revenue is recognized ratably over the term of the contract. Professional services engagements typically result from sales of new licenses, and for which revenue is recognized as the services are performed.

Our revenue recognition practices and the effects of our adoption of ASC 606, including adjustments to accumulated deficit related to billed and unbilled deferred revenue, are described in "Revenue Recognition" and "Recently Adopted Accounting Pronouncements" in Note 2. *Summary of Significant Accounting Policies* and in Note 3. *Revenue from Contracts with Customers* in the Notes to Consolidated Financial Statements in this Annual Report.

Our adoption of ASC 606 has increased the volatility of our revenue results as a significant portion of subscription revenue is recognized at the time of delivery, rather than being recognized ratably over the contract period.

Executive Overview

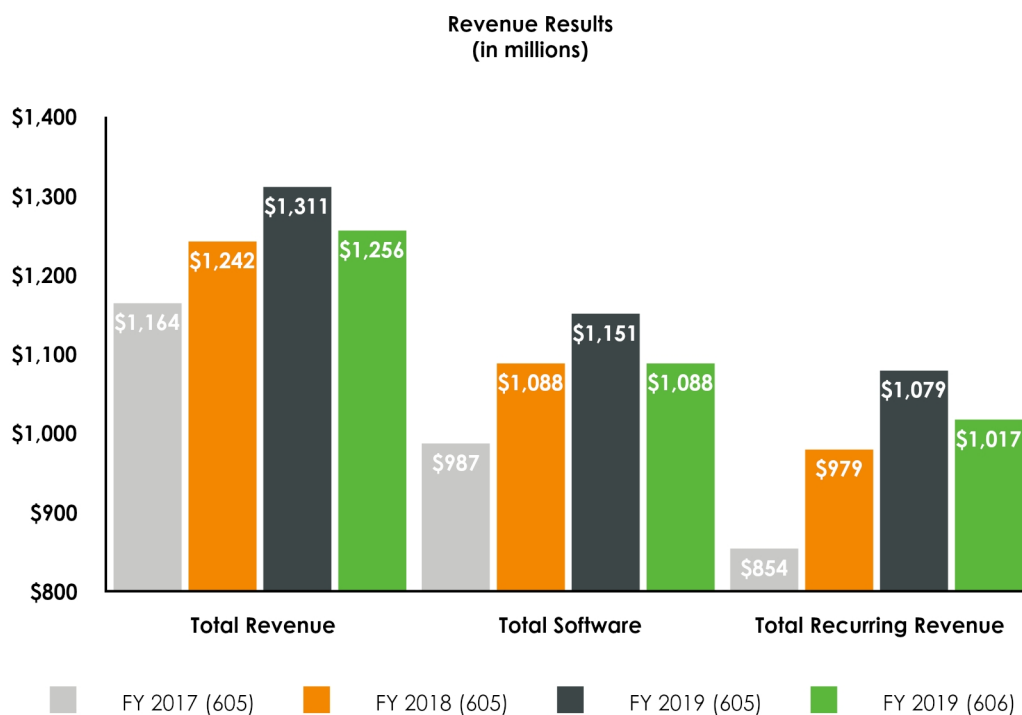
ARR increased 10% to \$1,116 million (\$1,134 million and 12% at the guidance rate) as of the end of 2019 reflecting solid growth for this metric across all our businesses, particularly in our IoT and AR businesses.

Operating cash flow was \$285 million, up 15% in 2019 compared to 2018. We made \$22 million more in restructuring payments in 2019 compared to 2018 related to our workforce realignment and headquarters relocation.

Our 2019 results reflect continued demand for our PLM and CAD products as well as growing demand for our IoT and Augmented Reality (AR) products. License and subscription bookings in the fourth quarter of 2019 were \$150 million, higher than anticipated, driven by strong bookings in IoT and AR, including a mega deal (bookings greater than \$5 million) with our strategic alliance partner, Rockwell Automation. License and subscription bookings were \$472 million, up 1% (4% constant currency) in 2019 compared to 2018, primarily driven by strong IoT and AR bookings growth, offset by declines in PLM and CAD bookings.

Under ASC 605, total revenue, software revenue and subscription revenue grew in 2019 compared to 2018, despite an 800 basis point increase in subscription mix in 2019. Under ASC 605, recurring software revenue was \$1,079 million, an increase of 10% (13% constant currency) in 2019 compared to 2018. Under ASC 605, recurring revenue as a percentage of software revenue was 94% in 2019 compared to 90% in 2018. Under ASC 605, perpetual license and support revenue decreased year over year because we discontinued offering perpetual licenses for most of our solutions effective January 1, 2019. Operating margin under ASC 605 increased 200 basis points in 2019 resulting from the compounding effect of subscription licenses and lower operating expenses due to effective cost discipline. EPS declined under ASC 605 in 2019 primarily due to a higher tax provision.

Summary Revenue and Earnings Results



	Year Ended September 30,				
	As Reported ASC 606	ASC 605	As Reported ASC 605	Percent change	
				ASC 605	
	2019	2019	2018	2019 vs 2018	
			Change	Constant Currency	
Revenue (in thousands)					
Subscription license	\$ 253.7				
Subscription support & cloud services	348.5				
Total subscription	602.2	667.6	482.0	38 %	41 %
Perpetual support	415.2	411.0	496.8	(17)%	(15)%
Total recurring revenue	1,017.4	1,078.6	978.9	10 %	13 %
Perpetual license	70.7	72.2	109.6	(34)%	(32)%
Total software revenue ⁽¹⁾	1,088.1	1,150.8	1,088.5	6 %	8 %
Professional services	167.5	160.7	153.3	5 %	9 %
Total revenue	\$ 1,255.6	\$ 1,311.5	\$ 1,241.8	6 %	8 %

(1) Total software revenue includes:

License ⁽²⁾	\$ 324.4	\$ 666.8	\$ 529.3	26 %	29 %
Support and cloud services	763.7	484.0	559.2	(13)%	(11)%
Total software revenue	\$ 1,088.1	\$ 1,150.8	\$ 1,088.5	6 %	8 %

(2) Under ASC 605, we have classified all subscription revenue as subscription license revenue.

Earnings Measures	Year Ended September 30,			
	As Reported ASC 606	ASC 605	As Reported ASC 605	ASC 605
	2019	2019	2018	Change
Operating Margin	5.0 %	7.7 %	5.8 %	33 %
Earnings (Loss) Per Share	\$ (0.23)	\$ 0.03	\$ 0.44	(94)%
Non-GAAP Operating Margin ⁽¹⁾	20.3 %	22.4 %	18.3 %	22 %
Non-GAAP Earnings Per Share ⁽¹⁾	\$ 1.64	\$ 1.74	\$ 1.45	20 %

(1) Non-GAAP financial measures are reconciled to GAAP results under *Results of Operations - Non-GAAP Measures* below.

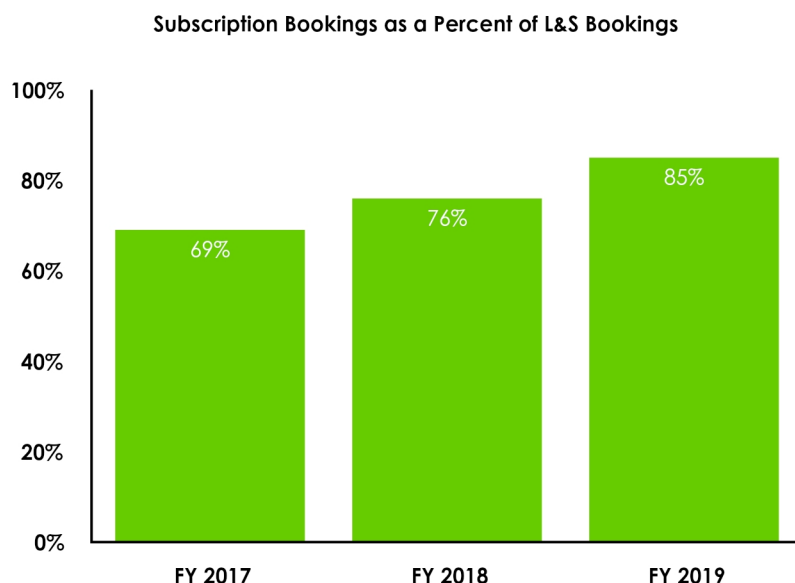
We ended 2019 with cash, cash equivalents and marketable securities of \$327 million, up from \$316 million at the end of 2018. We generated \$285 million of cash from operations in 2019 compared to \$248 million in 2018. Cash from operations in 2019 includes \$25 million of restructuring payments compared to \$3 million in the year-ago period. In 2019, we also used cash from operations to repurchase \$115 million of common stock. As of September 30, 2019, the balance outstanding under our credit facility was \$173 million and total debt outstanding was \$673 million.

Operating Measures

We provide these measures to help investors understand the progress of our subscription transition. These measures are not necessarily indicative of revenue for the period or any future period.

ARR

ARR at the end of 2019 grew 10% (12% constant currency) compared to the end of 2018, reflecting the strength of our products and solutions and the value we provide to our customers. Our CAD and PLM businesses saw combined ARR growth of 8% (10% constant currency). Our IoT and AR businesses delivered 26% ARR growth (28% constant currency). With the combination of IoT and AR exiting fiscal 2019 at greater than 12% of total ARR and one-third of total bookings, these businesses represent a growing portion of the PTC business. Our focused solutions group closed the year stronger than expected, delivering 8% (10% constant currency) ARR growth for the year.



License and subscription bookings for 2019 were \$472 million, up 1% over 2018 (4% on a constant currency basis). In the fourth quarter of 2019 we had a mega deal (bookings greater than \$5 million) with Rockwell Automation. The mega deal from Rockwell Automation was issued to satisfy a portion of expected 2020 demand and will be credited against committed ACV minimums due in 2020 under the parties' strategic alliance agreement, as amended.

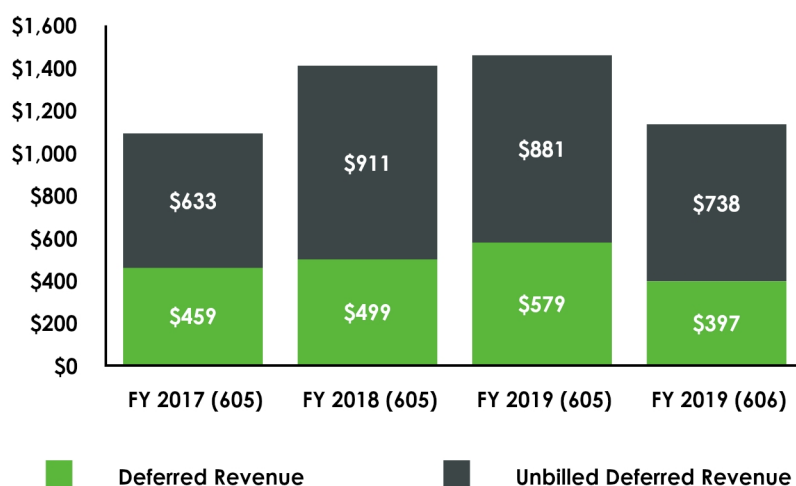
Subscription ACV

New subscription ACV increased 13% over 2018 to \$199 million due to continued adoption of our subscription offerings around the globe.

Deferred Revenue and Backlog (Unbilled Deferred Revenue)

Deferred revenue primarily relates to software agreements invoiced to customers for which the revenue has not yet been recognized. Unbilled deferred revenue (backlog) is the aggregate of booked orders for license, support and subscription (including multi-year subscription contracts with start dates after October 1, 2018 through the third quarter of 2019 that were subject to a limited annual cancellation right, of which approximately \$158 million was cancellable at September 30, 2019) for which the associated revenue has not been recognized and the customer has not yet been invoiced. Early in the fourth quarter of 2019, we discontinued the cancellation right for substantially all new contracts. We do not record unbilled deferred revenue on our Consolidated Balance Sheets; such amounts are recorded as deferred revenue when we invoice the customer. We provide this view of deferred revenue and backlog to enable investors to understand the significant contractual commitments we have to customers and to provide a view of future revenue that we expect will be recognized, even if those commitments are not reflected on our balance sheet.

**Total Deferred Revenue and Unbilled Deferred Revenue
(in millions)**



(Dollar amounts in millions)

	September 30,			
	ASC 606 ⁽¹⁾	ASC 605	ASC 605	ASC 605
	2019	2019	2018	2017
Deferred revenue	\$ 397	\$ 579	\$ 499	\$ 459
Unbilled deferred revenue	738	881	911	633
Total	\$ 1,135	\$ 1,460	\$ 1,410	\$ 1,092

(1) Upon adoption of ASC 606, approximately \$367 million of total deferred revenue was recorded as a decrease to accumulated deficit with an offsetting \$219 million increase to unbilled accounts receivable, a \$143 million decrease to deferred revenue and a \$5 million increase in other assets net of liabilities, primarily as a result of the acceleration of subscription license revenue under ASC 606.

Of the unbilled deferred revenue balance at September 30, 2019, we expect to invoice customers approximately \$504 million within the next twelve months. Unbilled deferred revenue decreased by 3% year over year due to initial multi-year contracts renewing for shorter periods.

We expect that the amount of deferred revenue and unbilled deferred revenue will fluctuate from quarter to quarter due to the specific timing, duration and size of customer subscription and support agreements, varying billing cycles of such agreements, the specific timing of customer renewals (which are typically for one year), foreign currency fluctuations, the timing of when deferred revenue is recognized as revenue and the timing of our fiscal quarter ends. The average contract duration was approximately 2 years for new subscription contracts in 2019, 2018 and 2017.

The effects of our adoption of ASC 606, including the adjustments to accumulated deficit related to billed and unbilled deferred revenue, are described in Note 3. *Revenue from Contracts with Customers* in the Notes to Consolidated Financial Statements.

Subsequent Events

On November 1, 2019, PTC acquired Onshape, creators of the first Software as a Service (SaaS) product development platform that unites robust CAD with powerful data management and collaboration tools, for approximately \$470 million, net of cash acquired. The acquisition is expected to accelerate PTC's ability to attract new customers with a SaaS-based product offering and position the company to capitalize on the inevitable industry transition to SaaS. In connection with the acquisition, PTC borrowed \$455 million under its existing credit facility.

On November 13, 2019 we increased the revolving loan commitment under the credit facility to \$1 billion and made other administrative amendments to the credit facility.

Future Expectations, Strategies and Risks

Our transition to a subscription model has been a headwind for revenue and earnings in 2019 with an increase in our subscription bookings mix of 800 basis points as compared to 2018. We expect the effect of the transition to moderate in fiscal 2020. We expect to grow revenue and expand our margins in fiscal 2020. We anticipate that IoT and AR adoption rates will continue to expand and will be the most significant driver to growth. In addition, we believe the recent acquisition of Onshape will provide us an opportunity to participate in the higher growth CAD and PLM markets serving small and medium businesses where we traditionally have not had a presence.

PTC remains committed to long-term development of Creo and Windchill. We want to be best-in-class with both the on-premise and SaaS deployment models in the CAD market. We will continue our pursuits of real-time simulation, generative design, additive manufacturing, and embedded IoT and AR capabilities.

With the growth opportunity in the SaaS-based CAD market and other strategic initiatives we have undertaken, as well as our continued commitment to operating margin improvement, we are realigning our workforce in 2020 to shift investment to support these strategic, high growth opportunities. We expect this realignment will result in a restructuring charge of up to \$25 million in 2020. The effect of the realignment is reflected in our 2020 guidance.

As we move into 2020, our three overriding goals are:



Sustainable Growth

We are focused on driving ARR growth both in the high-growth Industrial IoT and AR markets and in our core CAD and PLM markets.



Cost Controls and Margin Expansion

Our goal is to drive continued margin expansion over the long term. We continue to proactively manage our cost structure and invest in what we believe are high return opportunities in our business. We expect to deliver continued long-term operating margin expansion, as we drive ARR growth and realize the compounding benefit of our maturing subscription business.



Expand Free Cash Flow

Our goal is to grow our free cash flow. PTC's free cash flow is driven primarily by increasing operating profit and efficiently managing both working capital and capital expenditures. Our plan for 2020 is to increase operating profit by expanding ARR and maintaining an efficient cost structure.

Results of Operations

The following table shows the financial measures that we consider the most significant indicators of the performance of our business. In addition to providing measures calculated under generally accepted accounting principles ("GAAP"), we also provide non-GAAP financial measures for the reported periods. Investors should use these non-GAAP financial measures only in conjunction with our GAAP results.

For discussion of 2018 results and comparison with 2017 results refer to "Management's Discussion and Analysis of Financial Conditions and Results of Operations" in our Annual Report on Form 10-K for the fiscal year ended September 30, 2018.

(Dollar amounts in millions, except per share data)

	Year ended September 30,							
					Percent Change			
					ASC 605			
	As Reported ASC 606	ASC 605	As Reported ASC 605	As Reported ASC 605	2019 vs. 2018		2018 vs. 2017	
2019	2019	2018	2017	Actual	Constant Currency	Actual	Constant Currency	
Subscription	\$ 602.2	\$ 667.6	\$ 482.0	\$ 279.2	38 %	41 %	73 %	69 %
Perpetual support	415.2	411.0	496.8	574.7	(17)%	(15)%	(14)%	(16)%
Total recurring revenue	1,017.4	1,078.6	978.9	853.9	10 %	13 %	15 %	12 %
Perpetual license	70.7	72.2	109.6	133.4	(34)%	(32)%	(18)%	(20)%
Total software revenue	1,088.1	1,150.8	1,088.5	987.3	6 %	8 %	10 %	8 %
Professional services	167.5	160.7	153.3	176.7	5 %	9 %	(13)%	(16)%
Total revenue	1,255.6	1,311.5	1,241.8	1,164.0	6 %	8 %	7 %	4 %
Total cost of revenue	325.4	318.2	326.5	328.5	(3)%		(1)%	
Gross margin	930.3	993.3	915.3	835.5	9 %		10 %	
Operating expenses	867.2	891.7	842.7	793.8	6 %		6 %	
Total costs and expenses	1,192.6	1,209.9	1,169.2	1,122.3	3 %	5 %	4 %	2 %
Operating income	\$ 63.0	\$ 101.6	\$ 72.6	\$ 41.8	40 %	55 %	74 %	52 %
Non-GAAP operating income ⁽¹⁾	\$ 255.3	\$ 293.9	\$ 229.4	\$ 189.3	28 %	33 %	21 %	15 %
Operating margin	5.0 %	7.7 %	5.8 %	3.6 %				
Non-GAAP operating margin ⁽¹⁾	20.3 %	22.4 %	18.3 %	16.2 %				
Diluted earnings (loss) per share ⁽²⁾	\$ (0.23)	\$ 0.03	\$ 0.44	\$ 0.05				
Non-GAAP diluted earnings per share ⁽²⁾	\$ 1.64	\$ 1.74	\$ 1.45	\$ 1.17				
Cash flow from operations ⁽³⁾	\$ 285.1	\$ 285.1	\$ 247.8	\$ 135.2				

(1) See *Non-GAAP Financial Measures* below for a reconciliation of our GAAP results to our non-GAAP measures.

(2) We have a full valuation allowance against our U.S. net deferred tax assets and a valuation allowance against net deferred tax assets in certain foreign jurisdictions. As we are profitable on a non-GAAP basis, the 2019 - 2017 non-GAAP tax provisions are calculated assuming there is no valuation allowance. Income tax adjustments reflect the tax effects of non-GAAP adjustments which are calculated by applying the applicable tax rate by jurisdiction to the non-GAAP adjustments listed above. We recorded the impact of the Tax Cuts and Jobs Act in our 2018 GAAP earnings, resulting in a non-cash benefit of approximately \$12 million. We have excluded this benefit from our non-GAAP results.

(3) Cash flow from operations for 2019 includes \$25 million of restructuring payments. Cash flow from operations for 2018 includes \$3 million of restructuring payments. Cash flow from operations for 2017 includes \$37 million of restructuring payments, a \$12 million payment related to a Korea tax audit and \$3 million of legal settlement payments.

Impact of Foreign Currency Exchange on Results of Operations

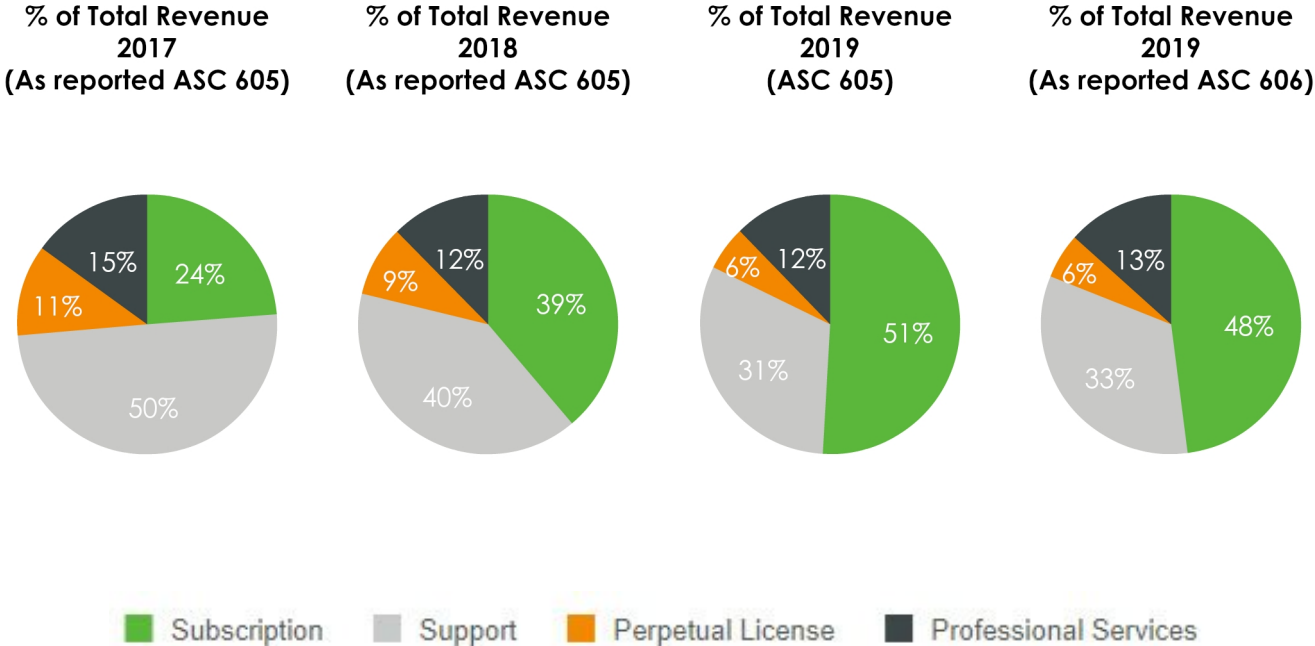
Approximately 60% of our revenue and 40% of our expenses are transacted in currencies other than the U.S. dollar. Currency translation affects our reported results, which are in U.S. Dollars. If 2019 reported

results were converted into U.S. dollars based on the corresponding prior year's foreign currency exchange rates, 2019 revenue would have been higher by \$34 million and expenses would have been higher by \$22 million. The net impact on year-over-year results would have been an increase in operating income of \$12 million in 2019. The results of operations, revenue by line of business and revenue by geographic region in the tables that follow present both actual percentage changes year over year and percentage changes on a constant currency basis.

Revenue

We discuss our revenue results by line of business, by product group and by geographic region below. Our discussion is focused on our results under ASC 605 for purposes of comparability. In 2019 our ASC 606 software revenue results were lower than under ASC 605 primarily as a result of the acceleration of our on-premise subscription revenue associated with the retained earnings adoption adjustment recorded in the first quarter, offset by revenue recognized in 2019, which would otherwise have been recognized ratably over future years under ASC 605. Professional services revenue under ASC 606 was higher than under ASC 605 due to the requirement to separately identify certain performance obligations, which would have otherwise been combined and recognized ratably under ASC 605, but instead were recognized in 2019.

Revenue by Line of Business



Software

Software revenue consists of subscription, support, and perpetual license revenue. Under ASC 605, recurring software revenue consists of subscription and support revenue and was 82% of total revenue and 94% of software revenue for 2019. Our subscription revenue includes an immaterial amount of Software as a Service (SaaS) and cloud services revenue.

As our mix of subscription sales relative to perpetual license sales has increased, perpetual license revenue and support revenue have declined and are expected to continue to decline as customers purchase our solutions as subscriptions and convert existing perpetual licenses with support contracts to subscriptions. Effective January 1, 2019, new software licenses for our core solutions and ThingWorx solutions became available only by subscription worldwide.

Our results have been impacted, and we expect will continue to be impacted, by our ability to close large transactions. The amount of bookings and revenue, particularly license and subscriptions, attributable to large transactions, and the number of such transactions, may vary significantly from quarter to quarter based on customer purchasing decisions and macroeconomic conditions. Such transactions may have long lead times as they often follow a lengthy product selection and evaluation

process and, for existing customers, are influenced by contract expiration cycles. This may cause volatility in our results.

Professional Services

Professional services engagements typically result from sales of new licenses; revenue is recognized over the term of the engagement. Under ASC 605 professional services revenue was up 5% (9% constant currency) in 2019 compared to 2018. Professional services revenue in 2018 includes a \$14.5 million write-down related to a settlement of a customer dispute concerning a receivable. Excluding the impact of this write-down, professional services revenue in 2019 would have declined 4% year over year. We expect that professional services revenue will trend flat-to-down over time due to our strategy to expand margins by migrating services engagements to our partners and delivering products that require less consulting and training services.

Revenue by Product Group

(Dollar amounts in millions)

	Year ended September 30,							
					Percent Change			
					ASC 605			
	As Reported ASC 606	ASC 605	As Reported ASC 605	As Reported ASC 605	2019 vs. 2018		2018 vs. 2017	
2019	2019	2018	2017	Actual	Constant Currency	Actual	Constant Currency	
Solutions Products								
Software revenue	\$ 947.9	\$ 1,000.2	\$ 964.6	\$ 893.6	4 %	6 %	8 %	5 %
Professional services	151.9	135.7	137.9	167.1	(2)%	2 %	(17)%	(20)%
Total revenue	\$ 1,099.8	\$ 1,135.9	\$ 1,102.5	\$ 1,060.7	3 %	6 %	4 %	1 %
IoT Products								
Software revenue	\$ 140.2	\$ 150.6	\$ 123.9	\$ 93.7	22 %	24 %	32 %	31 %
Professional services	15.6	25.0	15.4	9.6	62 %	65 %	60 %	57 %
Total revenue	\$ 155.8	\$ 175.6	\$ 139.3	\$ 103.3	26 %	28 %	35 %	33 %

Solutions Group

Under ASC 605, Solutions Group software revenue grew in 2019 compared to 2018, driven by growth in subscription revenue, which was up 41% (44% on a constant currency basis) year over year. This growth was offset in part by the 49% (46% on a constant currency basis) decline in perpetual license revenue in 2019 due to the end of life of perpetual licenses.

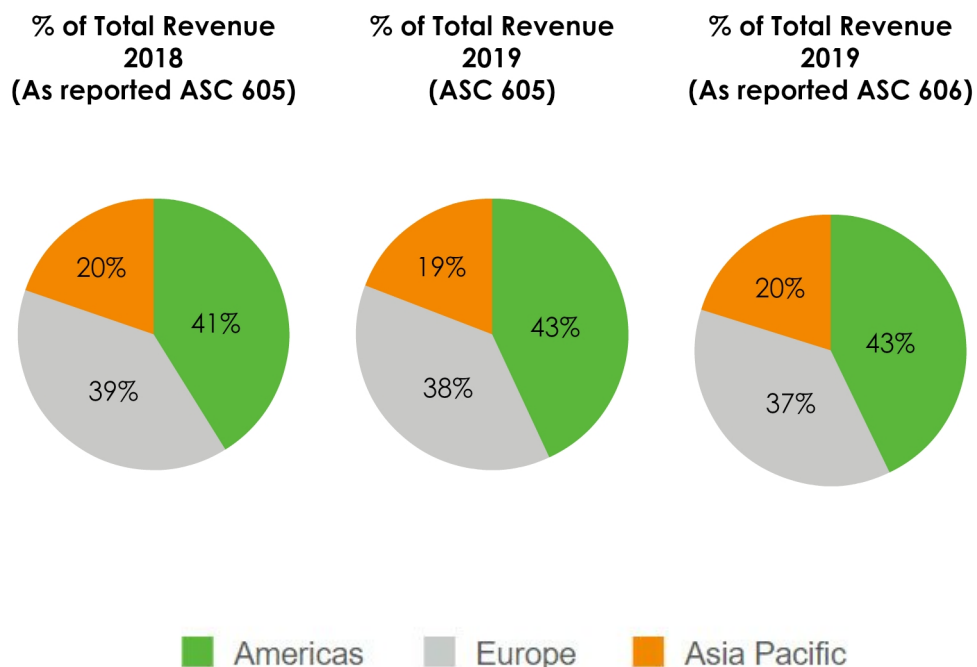
Solutions professional services revenue in 2018 reflects the \$14.5 million write-down described above. Excluding the impact of this write-down, Solutions professional services revenue would have declined 11% year over year. Solutions professional services revenue for 2019 declined compared to 2018 due to our strategy to limit the amount of professional services we provide.

IoT Group

Under ASC 605, IoT recurring software revenue grew by 25% (27% on a constant currency basis) in 2019, reflecting the strong bookings growth over the past several years and the compounding benefit of our maturing subscription model. IoT software revenue in 2018 reflects \$5.2 million of new subscription revenue related to the customer dispute settlement described above, which settlement included the purchase of new subscription licenses.

IoT professional services revenue increased in 2019 due to implementation and adoption services we sell in connection with new software licenses as part of our efforts to help customers' IoT initiatives succeed.

Revenue by Geographic Region



(Dollar amounts in millions)

	Year ended September 30,							
					Percent Change			
					ASC 605			
	As Reported ASC 606	ASC 605	AS Reported ASC 605	AS Reported ASC 605	2019 vs. 2018		2018 vs. 2017	
2019	2019	2018	2017	Actual	Constant Currency	Actual	Constant Currency	
Americas								
Software revenue	\$ 484.1	\$ 512.3	\$ 468.3	\$ 433.7	9 %	10 %	8 %	8 %
Professional services revenue	53.4	53.0	42.9	67.2	24 %	24 %	(36)%	(36)%
Total Revenue	\$ 537.5	\$ 565.3	\$ 511.2	\$ 500.9	11 %	11 %	2 %	2 %
Europe								
Software revenue	\$ 379.9	\$ 417.2	\$ 402.9	\$ 356.5	4 %	9 %	13 %	7 %
Professional services revenue	84.8	77.7	83.0	78.7	(6)%	(1)%	5 %	(1)%
Total Revenue	\$ 464.7	\$ 494.9	\$ 485.9	\$ 435.2	2 %	7 %	12 %	5 %
Asia Pacific								
Software revenue	\$ 224.1	\$ 221.3	\$ 217.3	\$ 197.1	2 %	4 %	10 %	8 %
Professional services revenue	29.4	29.9	27.4	30.9	9 %	12 %	(11)%	(13)%
Total Revenue	\$ 253.4	\$ 251.3	\$ 244.7	\$ 228.0	3 %	5 %	7 %	5 %

Americas

The growth in ASC 605 software revenue in 2019 was due to growth of subscription revenue, which was up 37% over 2018. This growth was offset in part by a decline of 9% (8% on a constant currency basis) in perpetual license revenue in 2019 due to the end of life of perpetual licenses in the Americas as of January 1, 2018.

Professional services revenue in 2018 reflects the \$14.5 million write-down related to the customer dispute settlement described above. Excluding the impact of this write-down, professional services revenue in the Americas would have declined 8% year over year.

Europe

Under ASC 605, software revenue in 2019 grew over 2018 driven by the growth in subscription revenue, which was up 37% (44% on a constant currency basis) year over year. This growth was offset in part by the decline of 51% (47% on a constant currency basis) in perpetual license revenue in 2019 due to the end of life of perpetual licenses in Europe as of January 1, 2018.

Year-over-year declines in foreign currency exchange rates, particularly the Euro, impacted European revenue unfavorably in 2019 by \$26 million.

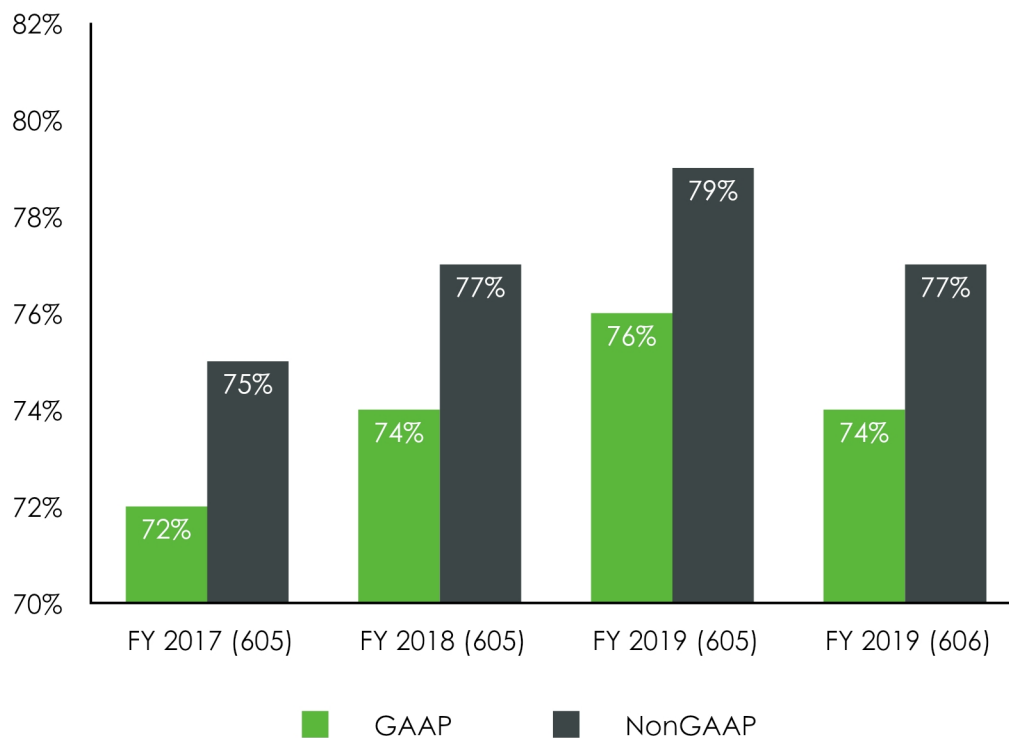
Asia Pacific

Under ASC 605, software revenue in 2019 grew slightly over 2018 driven by growth in subscription revenue of 49% (51% on a constant currency basis) year over year. This growth was offset in part by the decline of 38% (36% on a constant currency basis) in perpetual license revenue in 2019 due to the end of life of perpetual licenses in Asia Pacific as of January 1, 2019.

Year-over-year changes in foreign currency exchange rates unfavorably impacted Asia Pacific revenue by \$6 million in 2019.

Gross Margin

Gross Margin as % of Total Revenue



(Dollar amounts in millions)

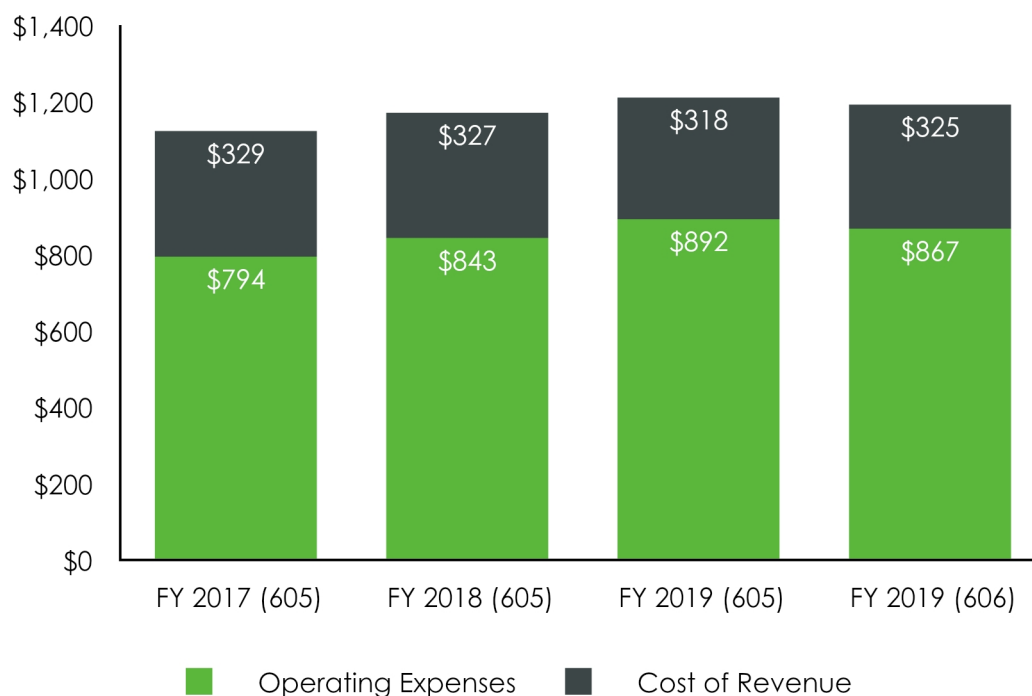
	Year ended September 30,					
	As Reported ASC 606	ASC 605	As Reported ASC 605	As Reported ASC 605	Percent Change	
	2019	2019	2018	2017	ASC 605	
					2019 vs. 2018	2018 vs. 2017
Gross margin	\$ 930.3	\$ 993.3	\$ 915.3	\$ 835.5	9 %	10 %
Non-GAAP gross margin	970.0	1,033.1	963.7	877.0	7 %	10 %
Gross margin as a % of revenue:						
License	84 %	92 %	91 %	81 %		
Support and cloud services	83 %	73 %	76 %	82 %		
Professional services	16 %	16 %	6 %	15 %		
Gross margin as a % of total revenue	74 %	76 %	74 %	72 %		
Non-GAAP gross margin as a % of total non-GAAP revenue	77 %	79 %	77 %	75 %		

Under ASC 605, the increase in total gross margin in 2019 compared to 2018 reflects higher software revenue driven by the increase in recurring subscription revenue. Margins for license and subscription are beginning to expand as the subscription model matures and revenue that has been deferred begins to contribute to each quarterly period. Under ASC 605, support gross margins are down in 2019 compared 2018 due to the decrease in perpetual support revenue due to conversions of support to subscription and the end of life of perpetual licenses.

Professional services revenue in 2018 reflects the \$14.5 million revenue write-down associated with the customer dispute described above. Without the revenue write-down, professional services gross margin would have been 17% in 2018.

Total Costs and Expenses

Total Costs and Expenses (in millions)



(Dollar amounts in millions)

	Year ended September 30,					
	As Reported ASC 606	ASC 605	As Reported ASC 605	As Reported ASC 605	Percent Change	
	2019	2019	2018	2017	2019 vs. 2018	2018 vs. 2017
Cost of license revenue	51.9	50.2	47.7	66.8	5 %	(29)%
Cost of support and cloud services revenue	133.5	133.0	135.1	110.9	(2)%	22 %
Cost of professional services revenue	140.0	134.9	143.7	150.7	(6)%	(5)%
Sales and marketing	417.4	442.0	414.8	372.7	7 %	11 %
Research and development	246.9	246.9	249.8	236.0	(1)%	6 %
General and administrative	127.9	127.9	143.0	145.0	(11)%	(1)%
Amortization of acquired intangible assets	23.8	23.8	31.4	32.1	(24)%	(2)%
Restructuring and other charges, net	51.1	51.1	3.8	7.9	1,258 %	(53)%
Total costs and expenses	\$ 1,192.6	\$ 1,209.8	\$ 1,169.2	\$ 1,122.3	3 % (1)	4 % (1)
Total headcount at end of period	6,055	6,055	6,110	6,041	(1)%	1 %

(1) On a constant currency basis from the prior period, total costs and expenses increased 5% from 2018 to 2019 and increased 2% from 2017 to 2018.

2019 compared to 2018

ASC 605 costs and expenses in 2019 compared to 2018 increased primarily due to the following:

- a \$32.7 million restructuring charge associated with exiting our Needham headquarters facility in the second quarter of 2019 and a \$15.7 million restructuring charge for our workforce realignment in the first quarter of 2019,
- a \$9.3 million increase in cloud services hosting costs,
- a \$3.6 million increase in royalty expense,
- a \$2.4 million increase in rent expense partially due to one month of overlapping rent in Needham and the new Seaport location in January 2019, and
- a \$2.1 million increase in marketing expenses.

The increases above were partially offset by:

- a \$15.0 million decrease in total compensation benefit costs and travel expenses, primarily driven by a \$12.5 million decrease in performance-based compensation and a \$4.7 million decrease in salaries, benefits and travel costs, partially offset by a \$2.2 million increase in commissions expense, and
- a \$9.6 million decrease in amortization of intangible assets and depreciation of fixed assets expenses, which were higher in 2018 due to the accelerated depreciation associated with the headquarters relocation, and

Costs and expenses for 2019 compared to 2018 include a \$22.2 million decrease due to changes in foreign currency exchange rates.

Cost of License Revenue

(Dollar amounts in millions)

	Year ended September 30,					
	As Reported ASC 606	ASC 605	As Reported ASC 605	As Reported ASC 605	Percent Change	
					ASC 605	
	2019	2019	2018	2017	2019 vs. 2018	2018 vs. 2017
Cost of license revenue	\$ 51.9	\$ 50.2	\$ 47.7	\$ 66.8	5 %	(29)%
% of total revenue	4 %	4 %	4 %	6 %		
% of total license revenue	16 %	8 %	9 %	19 %		

Our cost of license revenue consists of fixed and variable costs associated with reproducing and distributing software and documentation, as well as royalties paid to third parties for technology embedded in or licensed with our software products, amortization of intangible assets associated with acquired products, and cost of subscription licensing. Costs associated with providing post-contract support such as providing software updates and technical support for both our subscription offerings and our perpetual licenses are included in cost of support and cloud service revenue. Cost of license revenue as a percentage of license revenue can vary depending on the subscription mix percentage, the product mix sold, the effect of fixed and variable royalties, headcount and the level of amortization of acquired software intangible assets.

Cost of license revenue in 2019 under ASC 606 is higher than under ASC 605 due to the timing of revenue recognition under ASC 606, resulting in earlier recognition of the associated royalty costs. Under ASC 605, the support component of subscription revenue is included in license revenue, which reduces cost of license as a percentage of total license revenue.

Cost of license revenue in 2019 compared to 2018 increased primarily due to a \$3.2 million increase in royalty expense, offset by \$2.8 million lower compensation costs.

Cost of license revenue as a percentage of license revenue under ASC 605 decreased in 2019 compared to 2018 due to higher revenue as recurring subscription revenue increased.

Cost of Support and Cloud Services Revenue

(Dollar amounts in millions)

	Year ended September 30,					
	As Reported ASC 606	ASC 605	As Reported ASC 605	As Reported ASC 605	Percent Change	
	2019	2019	2018	2017	ASC 605	
					2019 vs. 2018	2018 vs. 2017
Cost of support and cloud services revenue	\$ 133.5	\$ 133.0	\$ 135.1	\$ 110.9	(2)%	22 %
% of total revenue	11 %	10 %	11 %	10 %		
% of total support and cloud services revenue	17 %	27 %	24 %	18 %		

Our cost of support and cloud services revenue includes costs associated with providing post-contract support such as providing software updates and technical support for both our subscription offerings and our perpetual licenses, cost of cloud services (including third party hosting costs), and cost of software as a service revenue. Cost of support and cloud services revenue consists of costs such as salaries, benefits, and computer equipment and facilities associated with customer support and cloud services and the release of support updates (including related royalty costs).

Under ASC 605, the support component of subscription revenue is included in license revenue, which increases the cost of support and cloud services as a percentage of total support and cloud services revenue.

In 2019 compared to 2018, cloud services hosting costs increased 32% (\$4.5 million), offset by a decrease in total support and cloud services compensation, benefit costs and travel expenses of 1% (\$1.2 million) and in third-party consulting costs of 23% (\$1.5 million).

Cost of Professional Services Revenue

(Dollar amounts in millions)

	Year ended September 30,					
	As Reported ASC 606	ASC 605	As Reported ASC 605	As Reported ASC 605	Percent Change	
	2019	2019	2018	2017	ASC 605	
					2019 vs. 2018	2018 vs. 2017
Cost of professional service revenue	\$ 140.0	\$ 134.9	\$ 143.7	\$ 150.7	(6)%	(5)%
% of total revenue	11 %	10 %	12 %	13 %		
% of total professional service revenue	84 %	84 %	94 %	85 %		

Our cost of professional services revenue includes costs such as salaries, benefits, information technology costs and facilities expenses for our training and consulting personnel, and third-party subcontractor fees.

Cost of professional services revenue is higher in 2019 under ASC 606 than under ASC 605 due to the timing of professional services revenue recognition and associated professional service costs.

In 2019 compared to 2018, total professional services compensation, benefit costs and travel expenses decreased by 11% (\$11.6 million), partially offset by higher third-party subcontractor fees, which increased by 20% (\$5.3 million).

Sales and Marketing

(Dollar amounts in millions)

	Year ended September 30,					
	As Reported ASC 606	ASC 605	As Reported ASC 605	As Reported ASC 605	Percent Change	
					ASC 605	
	2019	2019	2018	2017	2019 vs. 2018	2018 vs. 2017
Sales and marketing expenses	\$ 417.4	\$ 442.0	\$ 414.8	\$ 372.7	7 %	11 %
% of total revenue	33 %	34 %	33 %	32 %		

Our sales and marketing expenses primarily include salaries and benefits, sales commissions, advertising and marketing programs, travel and facility costs.

Sales and marketing costs are lower under ASC 606 than under ASC 605 due to the deferral of ongoing commission expenses, offset by the amortization of commission costs capitalized upon adoption of ASC 606.

In 2019 compared to 2018, total sales and marketing compensation, benefit costs and travel expenses under ASC 605 increased 6% (\$19.8 million) due to an increase in headcount, and marketing expenses increased by 7% (\$2.1 million).

Research and Development

(Dollar amounts in millions)

	Year ended September 30,					
	As Reported ASC 606	ASC 605	As Reported ASC 605	As Reported ASC 605	Percent Change	
					ASC 605	
	2019	2019	2018	2017	2019 vs. 2018	2018 vs. 2017
Research and development expenses	\$ 246.9	\$ 246.9	\$ 249.8	\$ 236.0	(1)%	6 %
% of total revenue	20 %	19 %	20 %	20 %		

Our research and development expenses consist principally of salaries and benefits, costs of computer equipment and facility expenses. Major research and development activities include developing new products and releases and updates of our software that enhance functionality and add features.

In 2019 compared to 2018, total research and development compensation, benefit costs and travel expenses decreased 1% (\$2.9 million) primarily due to decreases in headcount, and third-party consulting services decreased by 33% (\$2.5 million). Offsetting these lower costs is a 62% (\$2.5 million) increase in cloud services hosting costs.

General and Administrative

(Dollar amounts in millions)

	Year ended September 30,					
	As Reported ASC 606	ASC 605	As Reported ASC 605	As Reported ASC 605	Percent Change	
					ASC 605	
	2019	2019	2018	2017	2019 vs. 2018	2018 vs. 2017
General and administrative expenses	\$ 127.9	\$ 127.9	\$ 143.0	\$ 145.0	(11)%	(1)%
% of total revenue	10 %	10 %	12 %	12 %		

Our general and administrative expenses include the costs of our corporate, finance, information technology, human resources, legal and administrative functions, as well as acquisition-related charges, bad debt expense and outside professional services, including accounting and legal fees.

In 2019 compared to 2018, total general and administrative compensation, benefit costs and travel expenses decreased by 14% (\$16.3 million) primarily due to a decrease in performance-based

compensation, and third-party consulting services declined by 56% (\$2.6 million). Offsetting these lower costs is a 11% (\$1.4 million) increase in hosted subscription costs.

Amortization of Acquired Intangible Assets

(Dollar amounts in millions)

	Year ended September 30,					
	As Reported ASC 606	ASC 605	As Reported ASC 605	As Reported ASC 605	Percent Change	
	2019	2019	2018	2017	ASC 605	
					2019 vs. 2018	2018 vs. 2017
Amortization of acquired intangible assets	\$ 23.8	\$ 23.8	\$ 31.4	\$ 32.1	(24)%	(2)%
% of total revenue	2 %	2 %	3 %	3 %		

Amortization of acquired intangible assets reflects the amortization of acquired non-product related intangible assets, primarily customer and trademark-related intangible assets, recorded in connection with completed acquisitions. The decrease in amortization of acquired intangible assets in 2019 compared to 2018 is due to some assets being fully amortized as well as the impact of foreign currency exchange rates.

Restructuring and Other Charges, net

(Dollar amounts in millions)

	Year ended September 30,					
	As Reported ASC 606	ASC 605	As Reported ASC 605	As Reported ASC 605	Percent Change	
	2019	2019	2018	2017	ASC 605	
					2019 vs. 2018	2018 vs. 2017
Restructuring charges (credits), net	\$ 48.6	\$ 48.6	\$ (1.0)	\$ 7.9	(4,947)%	(113)%
Headquarters relocation charges	2.5	2.5	4.8	—	(48)%	-
Restructuring and Other Charges, Net	51.1	51.1	3.8	7.9	1,258 %	(53)%
% of total revenue	4 %	4 %	— %	1 %		

In January 2019, we relocated to our new worldwide headquarters in the Boston Seaport District. Our prior headquarters lease expires in November 2022. As a result, we have overlapping rent obligations for those premises and in 2019 we recorded a restructuring charge of \$32.7 million associated with the restructuring of that lease. The facility restructuring charge is based on the net present value of remaining lease commitments net of estimated sublease income of \$7.6 million, of which \$3.9 million is committed as of the end of fiscal 2019. We continue to seek additional subtenants for the space. Restructuring charges and estimated cash outflows could increase if we are unable to sublease our prior headquarters as we expect.

The headquarters relocation charges include accelerated depreciation expense and duplicate rent for January associated with exiting our prior headquarters facility.

In the first quarter of 2019, we initiated a restructuring plan to realign our workforce to shift investment to support Industrial Internet of Things and Augmented Reality strategic opportunities. As this was a realignment of resources rather than a cost-savings initiative, it did not result in significant cost savings. The restructuring plan was completed in the first quarter of 2019. In 2019 we recorded restructuring charges of \$15.7 million related to this restructuring plan.

In 2019, we made cash payments related to restructuring charges of \$24.7 million. At September 30, 2019, accrued restructuring totaled \$31.1 million, of which we expect to pay \$12 million within the next twelve months.

Interest Expense

(Dollar amounts in millions)

	Year ended September 30,					
	As Reported ASC 606	ASC 605	As Reported ASC 605	As Reported ASC 605	Percent Change	
					ASC 605	
	2019	2019	2018	2017	2019 vs. 2018	2018 vs. 2017
Interest expense	\$ (43.0)	\$ (43.0)	\$ (41.7)	\$ (42.4)	3 %	(2)%

Interest expense includes interest under our credit facility and senior notes. We had \$673 million of total debt at September 30, 2019, compared to \$648 million at September 30, 2018.

The average interest rate on our total borrowings was 5.4% in 2019, 5.2% in 2018 and 4.9% in 2017.

Other Income (Expense), net

(Dollar amounts in millions)

	Year ended September 30,					
	As Reported ASC 606	ASC 605	As Reported ASC 605	As Reported ASC 605	Percent Change	
					ASC 605	
	2019	2019	2018	2017	2019 vs. 2018	2018 vs. 2017
Foreign currency losses, net	\$ (3.2)	\$ (3.3)	\$ (7.0)	\$ (5.7)	(52)%	23 %
Interest income	4.1	4.1	3.8	3.2	7 %	18 %
Other non-operating income (expense), net	(0.6)	(0.6)	0.9	1.7	(172)%	(47)%
Other income (expense), net	\$ 0.3	\$ 0.1	\$ (2.3)	\$ (0.8)	(106)%	196 %

Foreign currency net losses include costs of hedging contracts, certain realized and unrealized foreign currency transaction gains or losses, and foreign exchange gains or losses resulting from the required period-end currency re-measurement of the assets and liabilities of our subsidiaries that use the U.S. dollar as their functional currency. Because a large portion of our revenue and expenses is transacted in foreign currencies, we engage in hedging transactions involving the use of foreign currency forward contracts to reduce our exposure to fluctuations in foreign exchange rates. Changes in the balance year over year are due to required period-end currency re-measurement of the assets and liabilities of our subsidiaries that use the U.S. Dollar as their functional currency. Hedging costs decreased \$4.0 million in 2019 compared to 2018 due to implementation of favorable net investment hedges of foreign currency exposure.

Interest income represents earnings on the investment of our available cash balances.

Other non-operating income (expense), net is primarily made up of other non-operating gains and losses.

Income Taxes

Tax Provision and Effective Income Tax Rate

(Dollar amounts in millions)

	Year ended September 30,					
	As Reported ASC 606	ASC 605	As Reported ASC 605	As Reported ASC 605	Percent Change	
					ASC 605	
	2019	2019	2018	2017	2019 vs. 2018	2018 vs. 2017
Income (loss) before income taxes	\$ 20.3	\$ 58.7	\$ 28.7	\$ (1.4)	105 %	(2,138)%
Provision (benefit) for income taxes	47.8	55.7	(23.3)	(7.6)	(339)%	205 %
Effective income tax rate	235 %	95 %	(81)%	544 %		

In 2019, our tax rate is higher than the statutory federal income tax rate of 21% due in large part, to the scheduling of the reversal of existing temporary differences resulting in deferred tax liabilities that

cannot be offset against deferred tax assets requiring an increase to the U.S. valuation allowance, U.S. tax reform (as described below) and foreign withholding taxes, an obligation of the U.S. parent. This is offset by our corporate structure in which our foreign taxes are at a net effective tax rate lower than the U.S. rate, the excess tax benefit related to stock-based compensation and the indirect effects of the adoption of ASC 606. A significant amount of our foreign earnings is generated by our subsidiaries organized in Ireland. In 2019 the foreign rate differential predominantly relates to these Irish earnings.

On December 22, 2017, the United States enacted tax reform legislation through the Tax Cuts and Jobs Act, (the "Tax Act"), which significantly changed existing U.S. tax laws by a reduction of the corporate tax rate, the implementation of a new system of taxation for non-U.S. earnings, the imposition of a one-time tax on the deemed repatriation of undistributed earnings of non-U.S. subsidiaries, and the expansion of the limitations on the deductibility of executive compensation and interest expense. As we have a September 30 fiscal year-end, a blended U.S. statutory federal rate of approximately 24.5% applies for our fiscal year ended September 30, 2018 and 21% for subsequent fiscal years. The Tax Act also provides that net operating losses generated in years ending after December 31, 2017 (our fiscal 2018) will be carried forward indefinitely and can no longer be carried back, and that net operating losses generated in years beginning after December 31, 2017 can only reduce taxable income by up to 80% when utilized in a future period. The Tax Act includes a provision to tax global intangible low-tax income (GILTI) of foreign subsidiaries, a deduction for Foreign-Derived Intangible Income (FDII), and the base erosion anti-abuse tax (BEAT) measure that taxes certain payments between a U.S. corporation and its foreign subsidiaries. The GILTI, FDII and BEAT provisions were effective for us beginning October 1, 2018. Our accounting policy is to treat tax on GILTI as a current period cost included in tax expense in the year incurred.

In 2018, we provided no federal income taxes payable as a result of the deemed repatriation of undistributed earnings as the tax was offset by a combination of current year losses and existing attributes which had a full valuation allowance recorded against the related deferred tax assets. In 2018, we recorded a state income taxes payable on the deemed repatriation of \$1.7 million. We also recorded a deferred tax benefit of \$14.1 million for the impact of the Tax Act on our net U.S. deferred income tax balances. This was primarily attributable to the reduction of the federal tax rate on the net deferred tax liability in the U.S., and the ability to realize net operating losses from the reversal of existing deferred tax assets which can now be carried forward indefinitely and can therefore be netted against deferred tax liabilities for indefinite lived intangible assets.

The U.S. Securities and Exchange Commission issued rules that allow for a period of up to one year after the enactment date of the Tax Act to finalize the recording of the related tax impacts. We finalized recording the impacts of the Tax Act in the quarter ended December 29, 2018 and did not record any significant adjustments.

In October 2016, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update (ASU) 2016-16, Income Taxes (Topic 740): Intra-Entity Transfers of Assets Other Than Inventory. The purpose of ASU 2016-16 is to simplify the income tax accounting of an intra-entity transfer of an asset other than inventory and to record its effect when the transfer occurs. We adopted this amendment beginning in the first quarter of 2019 using the modified retrospective method with a cumulative effect adjustment to accumulated deficit of \$72.3 million, with a corresponding increase of \$75.3 million to deferred tax assets, a \$6.0 million decrease to income tax assets and a \$3.0 million decrease to income tax liabilities. The adjustment primarily relates to deductible amortization of intangible assets in Ireland. Post adoption, our effective tax rate no longer includes the benefit of this amortization.

Valuation Allowance

We have concluded, based on the weight of available evidence, that a full valuation allowance continues to be required against our U.S. net deferred tax assets as they are not more likely than not to be realized in the future. We will continue to reassess our valuation allowance requirements each financial reporting period. However, we believe that there is a reasonable possibility that within the next 12 months, sufficient positive evidence may become available to allow us to reach a conclusion that a significant portion of the valuation allowance will no longer be needed. Release of the valuation allowance would result in the recognition of certain deferred tax assets and a decrease to income tax expense for the period the release is recorded. However, the exact timing and amount of the valuation allowance release are subject to change on the basis of the level of profitability that we are able to actually achieve.

Tax Audits and Examinations

In the normal course of business, PTC and its subsidiaries are examined by various taxing authorities, including the Internal Revenue Service (IRS) in the U. S. We regularly assess the likelihood of additional assessments by tax authorities and provide for these matters as appropriate. We are currently under audit by tax authorities in several jurisdictions. Audits by tax authorities typically involve examination of the deductibility of certain permanent items, transfer pricing, limitations on net operating losses and tax credits. Although we believe our tax estimates are appropriate, the final determination of tax audits and any related litigation could result in material changes in our estimates.

In the fourth quarter of 2016, we received an assessment of approximately \$12 million from the tax authorities in South Korea. The assessment relates to various tax issues, primarily foreign withholding taxes. We have appealed and intend to vigorously defend our positions. We believe that upon completion of a multi-level appeal process it is more likely than not that our positions will be sustained. Accordingly, we have not recorded a tax reserve for this matter. We paid this assessment in the first quarter of 2017, pending resolution of the appeal process. If the South Korean tax authorities were to prevail the potential additional exposure through 2019 would be approximately \$13 million.

Our Future Effective Income Tax Rate

Our future effective income tax rate may be materially impacted by the amount of income taxes associated with our foreign earnings, which are taxed at rates different from the U.S. federal statutory income tax rate, as well as the timing and extent of the realization of deferred tax assets and changes in the tax law. Further, our tax rate may fluctuate within a fiscal year, including from quarter to quarter, due to items arising from discrete events, including settlements of tax audits and assessments, the resolution or identification of tax position uncertainties, and acquisitions of other companies.

In July 2015, the U.S. Tax Court issued an opinion in *Altera Corp. v. Commissioner* related to the treatment of stock-based compensation expense in an intercompany cost-sharing arrangement. The opinion invalidated part of a treasury regulation requiring stock-based compensation to be included in any qualified intercompany cost-sharing arrangement. The Company previously recorded a tax benefit based on the opinion in the case, which was offset by a corresponding increase in the valuation allowance against U.S. deferred tax assets. On June 7, 2019, the U.S. Court of Appeals for the Ninth Circuit reversed the U.S. Tax Court's decision. On July 22, 2019, Altera Corp. filed a petition for an en banc rehearing before the U.S. Court of Appeals for the Ninth Circuit, which was denied on November 12, 2019. Altera Corp. has 90 days from this date to petition the U.S. Supreme Court for review of the decision. Due to the fact that the Altera decision is not yet final, as well as uncertainty surrounding the status of the current regulations and questions related to jurisdiction given the Company does not reside in the Ninth Circuit, we have determined no adjustment is required to the consolidated financial statements as a result of this ruling. The Company will continue to monitor ongoing developments and potential impacts to its consolidated financial statements.

Operating Measures

ARR

To help investors understand and assess the success of our subscription transition, we provide an ARR operating measure. On September 5, 2019, we revised the ARR definition. ARR represents the annualized value of our portfolio of recurring customer arrangements as of the end of the reporting period, including subscription software, cloud, and support contracts. This is a change from our prior definition where ARR for a quarter was calculated by dividing the portion of non-GAAP software revenue attributable to subscription and support under ASC 605 for the quarter by the number of days in the quarter and multiplying by 365. The definition change did not materially change the amount of ARR reported under ASC 605 for the period.

We believe ARR is a valuable operating metric to measure the health of a subscription business because it captures expected subscription and support cash generation from new customers, existing customer expansions and includes the impact of total churn, which reflects churn, offset by the impact of any pricing increases.

Because this measure represents the annualized value of recurring customer contracts as of the end of a reporting period, ARR does not represent revenue for any particular period or remaining revenue that will be recognized in future periods.

Subscription Bookings and Subscription ACV

On September 5, 2019, we announced a revision to our reporting measures. Effective in 2020, we will no longer provide bookings but instead we will provide ARR, which we believe provides a more comprehensive view of a subscription business.

Given the difference in revenue recognition between the sale of a perpetual software license and a subscription, during our transition to a subscription business model we used bookings for internal planning, forecasting and reporting of new license and cloud services transactions (as subscription bookings includes cloud services bookings).

In order to normalize between perpetual and subscription licenses, we define subscription bookings as the subscription annualized contract value (subscription ACV) of new subscription contracts multiplied by a conversion factor of 2. We arrived at the conversion factor of 2 by considering a number of variables, including pricing, support, length of term, and renewal rates. In 2019, 2018 and 2017, the average subscription contract term was approximately two years.

We define subscription ACV as the total value of a new subscription contract (which may include annual values that increase over time and without regard to contractual termination options) divided by the term of the contract (in days), multiplied by 365. If the term of the subscription contract is less than a year, and is not associated with an existing contract, the booking is equal to the total contract value. Beginning in the third quarter of 2018, minimum ACV commitments under our Strategic Alliance Agreement with Rockwell Automation are included in subscription ACV if the period-to-date minimum ACV commitment exceeds actual ACV sold under the Agreement.

We define license and subscription bookings as subscription bookings plus perpetual license bookings.

Because subscription bookings is a metric we use to approximate the value of subscription sales if sold as perpetual licenses, it does not represent the actual revenue that will be recognized with respect to subscription sales or that would be recognized if the sales were perpetual licenses, nor does the annualized value of monthly software rental bookings represent the value of any such booking.

Non-GAAP Financial Measures

The non-GAAP financial measures presented in the discussion of our results of operations and the respective most directly comparable GAAP measures are:

- non-GAAP revenue—GAAP revenue
- non-GAAP gross margin—GAAP gross margin
- non-GAAP operating income—GAAP operating income
- non-GAAP operating margin—GAAP operating margin
- non-GAAP net income—GAAP net income
- non-GAAP diluted earnings per share—GAAP diluted earnings per share

The non-GAAP financial measures exclude fair value adjustments related to acquired deferred revenue and deferred costs, stock-based compensation expense, amortization of acquired intangible assets expense, acquisition-related charges, pension plan termination-related costs, a legal accrual, restructuring charges, non-operating credit facility refinancing costs, identified discrete charges included in non-operating other expense, net and the related tax effects of the preceding items, and any other identified tax items.

These items are normally included in the comparable measures calculated and presented in accordance with GAAP. Our management excludes these items when evaluating our ongoing performance and/or predicting our earnings trends, and therefore excludes them when presenting non-GAAP financial measures. Management uses non-GAAP financial measures in conjunction with our GAAP results, as should investors.

Settlement Revenue Exclusions. In Q4'18, we settled a previously disclosed dispute with respect to a customer receivable. The settlement included partial payment of the receivable and new software purchases. The net revenue write-down recorded in Q4'18 was \$9.3 million, comprised of a \$14.5 million professional services revenue write-down, partially offset by new subscription revenue of \$5.2 million. We excluded the professional services revenue write-down because the write-down related to revenue that was recorded in periods prior to fiscal 2017 and is not reflective of current operating performance and

excluded the new subscription revenue because it mitigated the impact of the professional services revenue write-down.

Fair value of acquired deferred revenue is a purchase accounting adjustment recorded to reduce acquired deferred revenue to the fair value of the remaining obligation, so our GAAP revenue after an acquisition does not reflect the full amount of revenue that would have been reported if the acquired deferred revenue was not written down to fair value. We believe excluding these adjustments to revenue from these contracts (and associated costs in *fair value adjustment to deferred services cost*) is useful to investors as an additional means to assess revenue trends of our business.

Stock-based compensation is a non-cash expense relating to stock-based awards issued to executive officers, employees and outside directors, consisting of restricted stock, stock options and restricted stock units. We exclude this expense as it is a non-cash expense and we assess our internal operations excluding this expense and believe it facilitates comparisons to the performance of other companies in our industry.

Amortization of acquired intangible assets is a non-cash expense that is impacted by the timing and magnitude of our acquisitions. We believe the assessment of our operations excluding these costs is relevant to our assessment of internal operations and comparisons to the performance of other companies in our industry.

Acquisition-related and other transactional charges included in general and administrative costs are direct costs of potential and completed acquisitions and expenses related to acquisition integration activities, including transaction fees, due diligence costs, severance and professional fees. Subsequent adjustments to our initial estimated amount of contingent consideration associated with specific acquisitions are also included within acquisition-related charges. Other transactional charges include third-party costs related to structuring unusual transactions. We do not include these costs when reviewing our operating results internally. The occurrence and amount of these costs will vary depending on the timing and size of acquisitions.

U.S. pension plan termination-related costs include charges related to our plan that we began terminating in the second quarter of 2014. Costs associated with termination of the plan are not considered part of our regular operations.

Restructuring and other charges, net include excess facility restructuring charges, headquarters relocation charges and severance costs resulting from reductions of personnel driven by modifications to our business strategy. Headquarters relocation charges are non-cash accelerated depreciation expense recorded in anticipation of exiting our prior headquarters facility due to changes in the estimated useful lives of fixed assets. We do not include these costs when reviewing our operating results internally. These costs may vary in size based on our restructuring plan.

Non-operating credit facility refinancing costs are non-operating charges we record as a result of the refinancing of our credit facility. We assess our internal operations excluding these costs and believe it facilitates comparisons to the performance of other companies in our industry.

Income tax adjustments include the tax impact of the items above and assumes that we are profitable on a non-GAAP basis in the U.S. and one foreign jurisdiction. It also eliminates the effect of the valuation allowance recorded against our net deferred tax assets in those jurisdictions. Additionally, we exclude other material tax items that we do not include when reviewing our operating results internally.

We use these non-GAAP financial measures, and we believe that they assist our investors, to make period-to-period comparisons of our operational performance because they provide a view of our operating results without items that are not, in our view, indicative of our core operating results. We believe that these non-GAAP financial measures help illustrate underlying trends in our business, and we use the measures to establish budgets and operational goals (communicated internally and externally) for managing our business and evaluating our performance. We believe that providing non-GAAP financial measures also affords investors a view of our operating results that may be more easily compared to the results of other companies in our industry that use similar financial measures to supplement their GAAP results.

The items excluded from the non-GAAP financial measures often have a material impact on our financial results and such items often recur. Accordingly, the non-GAAP financial measures included in this Annual Report should be considered in addition to, and not as a substitute for or superior to, the

comparable measures prepared in accordance with GAAP. The following tables reconcile each of these non-GAAP financial measures to its most closely comparable GAAP measure on our financial statements.

(in millions, except per share amounts)

	Year ended September 30,			
	As Reported ASC 606	ASC 605	As Reported ASC 605	As Reported ASC 605
	2019	2019	2018	2017
GAAP revenue	\$ 1,255.6	\$ 1,311.5	\$ 1,241.8	\$ 1,164.0
Settlement revenue exclusion	—	—	9.3	—
Fair value of acquired deferred revenue	0.8	0.8	1.3	2.7
Non-GAAP revenue	<u>\$ 1,256.4</u>	<u>\$ 1,312.3</u>	<u>\$ 1,252.4</u>	<u>\$ 1,166.8</u>
GAAP gross margin	\$ 930.3	\$ 993.3	\$ 915.3	\$ 835.5
Settlement revenue exclusion	—	—	9.3	—
Fair value of acquired deferred revenue	0.8	0.8	1.3	2.7
Fair value to acquired deferred costs	(0.3)	(0.3)	(0.4)	(0.4)
Stock-based compensation	11.9	11.9	11.5	12.6
Amortization of acquired intangible assets included in cost of revenue	27.3	27.3	26.7	26.6
Non-GAAP gross margin	<u>\$ 970.0</u>	<u>\$ 1,033.1</u>	<u>\$ 963.7</u>	<u>\$ 877.0</u>
GAAP operating income (loss)	\$ 63.0	\$ 101.6	\$ 72.6	\$ 41.8
Settlement revenue exclusion	—	—	9.3	—
Fair value of acquired deferred revenue	0.8	0.8	1.3	2.7
Fair value to acquired deferred costs	(0.3)	(0.3)	(0.4)	(0.4)
Stock-based compensation	86.4	86.4	82.9	76.7
Amortization of acquired intangible assets included in cost of revenue	27.3	27.3	26.7	26.6
Amortization of acquired intangible assets	23.8	23.8	31.4	32.1
Acquisition-related and other transactional charges included in general and administrative expenses	3.1	3.1	1.9	1.6
U.S. pension plan termination-related costs	—	—	—	0.3
Restructuring and other charges, net	51.1	51.1	3.8	7.9
Non-GAAP operating income	<u>\$ 255.3</u>	<u>\$ 293.9</u>	<u>\$ 229.4</u>	<u>\$ 189.3</u>
GAAP net income (loss)	\$ (27.5)	\$ 3.0	\$ 52.0	\$ 6.2
Settlement revenue exclusion	—	—	9.3	—
Fair value of acquired deferred revenue	0.8	0.8	1.3	2.7
Fair value to acquired deferred costs	(0.3)	(0.3)	(0.4)	(0.4)
Stock-based compensation	86.4	86.4	82.9	76.7
Amortization of acquired intangible assets included in cost of revenue	27.3	27.3	26.7	26.6
Amortization of acquired intangible assets	23.8	23.8	31.4	32.1
Acquisition-related and other transactional charges included in general and administrative expenses	3.1	3.1	1.9	1.6
U.S. pension plan termination-related costs	—	—	—	0.3
Restructuring and other charges, net	51.1	51.1	3.8	7.9
Non-operating credit facility refinancing costs	—	—	—	1.2
Income tax adjustments ⁽¹⁾	29.7	11.8	(37.6)	(17.4)
Non-GAAP net income	<u>\$ 194.5</u>	<u>\$ 207.0</u>	<u>\$ 171.2</u>	<u>\$ 137.6</u>
GAAP diluted earnings (loss) per share	\$ (0.23)	\$ 0.03	\$ 0.44	\$ 0.05
Settlement revenue exclusion	—	—	0.08	—
Fair value of acquired deferred revenue	0.01	0.01	0.01	0.02
Stock-based compensation	0.73	0.73	0.70	0.65
Total amortization of acquired intangible assets	0.43	0.43	0.49	0.50

Acquisition-related and other transactional charges included in general and administrative expenses	0.03	0.03	0.02	0.01
Restructuring and other charges, net	0.43	0.43	0.03	0.07
Non-operating credit facility refinancing costs	—	—	—	0.01
Income tax adjustments ⁽¹⁾	0.25	0.10	(0.32)	(0.15)
Non-GAAP diluted earnings per share ⁽²⁾	<u>\$ 1.64</u>	<u>\$ 1.74</u>	<u>\$ 1.45</u>	<u>\$ 1.17</u>

(1) We have a full valuation allowance against our U.S. net deferred tax assets and a valuation allowance against net deferred tax assets in certain foreign jurisdictions. As we are profitable on a non-GAAP basis, the 2019, 2018 and 2017 non-GAAP tax provisions are being calculated assuming there is no valuation allowance. Income tax adjustments reflect the tax effects of non-GAAP adjustments which are calculated by applying the applicable tax rate by jurisdiction to the non-GAAP adjustments listed above. We recorded the impact of the Tax Cuts and Jobs Act in 2018 GAAP earnings, resulting in a non-cash benefit of approximately \$12 million. We have excluded these benefits from our non-GAAP results.

(2) Diluted earnings per share impact of non-GAAP adjustments is calculated by dividing the dollar amount of the non-GAAP adjustment by the diluted weighted average shares outstanding for the respective year.

	Year ended September 30,			
	As Reported ASC 606	ASC 605	As Reported ASC 605	As Reported ASC 605
Operating margin impact of non-GAAP adjustments:	2019	2019	2018	2017
GAAP operating margin	5.0 %	7.7 %	5.8 %	3.6 %
Settlement revenue exclusion	— %	— %	0.6 %	— %
Fair value of acquired deferred revenue	0.1 %	0.1 %	0.1 %	0.2 %
Stock-based compensation	6.9 %	6.6 %	6.7 %	6.6 %
Total amortization of acquired intangible assets	4.1 %	3.9 %	4.7 %	5.0 %
Acquisition-related and other transactional charges included in general and administrative expenses	0.2 %	0.2 %	0.1 %	0.1 %
Restructuring and other charges, net	4.1 %	3.9 %	0.3 %	0.7 %
Non-GAAP operating margin	20.3 %	22.4 %	18.3 %	16.2 %

Critical Accounting Policies and Estimates

We have prepared our consolidated financial statements in accordance with accounting principles generally accepted in the United States of America. In preparing our financial statements, we make estimates, assumptions and judgments that can have a significant impact on our reported revenues, results of operations, and net income, as well as on the value of certain assets and liabilities on our balance sheet. These estimates, assumptions and judgments are made based on our historical experience and on other assumptions that we believe to be reasonable under the circumstances. These estimates may change as new events occur or additional information is obtained, and we may periodically be faced with uncertainties, the outcomes of which are not within our control and may not be known for a prolonged period of time.

The accounting policies, methods and estimates used to prepare our financial statements are described generally in *Note 2. Summary of Significant Accounting Policies* of Notes to Consolidated Financial Statements in this Annual Report. The most important accounting judgments and estimates that we made in preparing the financial statements involved:

- revenue recognition;
- accounting for income taxes; and
- valuation of assets and liabilities acquired in business combinations.

A critical accounting policy is one that is both material to the presentation of our financial statements and requires us to make subjective or complex judgments that could have a material effect on our financial condition and results of operations. Critical accounting policies require us to make assumptions about matters that are uncertain at the time of the estimate, and different estimates that we could have used, or changes in the estimates that are reasonably likely to occur, may have a material impact on our financial condition or results of operations. Because the use of estimates is inherent in the financial reporting process, actual results could differ from those estimates.

Accounting policies, guidelines and interpretations related to our critical accounting policies and estimates are generally subject to numerous sources of authoritative guidance and are often reexamined by accounting standards rule makers and regulators. These rule makers and/or regulators may promulgate interpretations, guidance or regulations that may result in changes to our accounting policies, which could have a material impact on our financial position and results of operations.

Revenue Recognition

Nature of Products and Services

Our sources of revenue include: (1) subscription, (2) perpetual license, (3) support for perpetual licenses and (4) professional services. Revenue is derived from the licensing of computer software products and from related support and/or professional services contracts. Effective October 1, 2018, we record revenues in accordance with the guidance provided by ASC 606, Revenue from Contracts with Customer. In accordance with ASC 606, revenue is recognized when a customer obtains control of promised products or services. The amount of revenue recognized reflects the consideration that we expect to be entitled to receive in exchange for these products or services. To achieve the core principle of this standard, we apply the following five steps:

- (1) Identify the contract with the customer,
- (2) identify the performance obligations in the contract,
- (3) determine the transaction price,
- (4) allocation the transaction price to performance obligations in the contract,
- (5) recognize revenue when or as we satisfy a performance obligation.

We enter into contracts that include combinations of products, support and professional services, which are accounted for as separate performance obligations with differing revenue recognition patterns referenced below.

Performance Obligation	When Performance Obligation is Typically Satisfied
Term-based subscriptions	
On-premise software licenses	Point in Time: Upon the later of when the software is made available or the subscription term commences
Support and cloud-based offerings	Over Time: Ratably over the contractual term; commencing upon the later of when the software is made available or the subscription term commences
Perpetual software licenses	Point in Time: when the software is made available
Support for perpetual software licenses	Over Time: Ratably over the contractual term
Professional services	Over time: As services are provided

Through 2018, we recorded revenues for software related deliverables in accordance with the guidance provided by ASC 985-605, *Software-Revenue Recognition* and revenues for non-software deliverables in accordance with ASC 605-25, *Revenue Recognition, Multiple-Element Arrangements*. Under those standards, revenue is recorded when the following criteria are met: (1) persuasive evidence of an arrangement exists, (2) delivery has occurred (generally, FOB shipping point or electronic distribution), (3) the fee is fixed or determinable, and (4) collection is probable. We exercise judgment and use estimates in connection with determining the amounts of software license and services revenues to be recognized in each accounting period.

Judgments and Estimates

Our contracts with customers for subscriptions typically include commitments to transfer term-based, on-premise software licenses bundled with support and/or cloud services. On-premise software is determined to be a distinct performance obligation from support which is sold for the same term of the subscription. For subscription arrangements which include cloud services, we assess whether the cloud

component is highly interrelated with on-premise term software licenses. Other than a limited population of subscriptions, the cloud component is not currently deemed to be interrelated with the on-premise term software and, as a result, cloud services are accounted for as a distinct performance obligation from the software and support components of the subscription.

Judgment is required to allocate the transaction price to each performance obligation. We use the estimated standalone selling price method to allocate the transaction price for items that are not sold separately. The estimated standalone selling price is determined using all information reasonably available to us, including market conditions and other observable inputs. The corresponding revenues are recognized as the related performance obligations are satisfied. We determined that 50% to 55% of the estimated standalone selling price for subscriptions that contain distinct license and support performance obligations are attributable to software licenses and 45% to 50%, depending upon the product offering, is attributable to support for those licenses.

Our multi-year, non-cancellable on-premise subscription contracts provide customers with an annual right to exchange software within the original subscription with other software. Although the exchange right is limited to software products within a similar product grouping, the exchange right is not limited to products with substantially similar features and functionality as those originally delivered. We determined that this right to exchange previously delivered software for different software represents variable consideration to be accounted for as a liability. We have identified a standard portfolio of contracts with common characteristics and applied the expected value method of determining variable consideration associated with this right. Additionally, where there are isolated situations that are outside of the standard portfolio of contracts due to contract size, longer contract duration, or other unique contractual terms, we use the most likely amount method to determine the amount of variable consideration. In both circumstances, the variable consideration included in the transaction price is constrained to the extent it is probable that a significant reversal in the amount of cumulative revenue recognized will not occur when the uncertainty associated with the variable consideration is subsequently resolved.

Accounting for Income Taxes

As part of the process of preparing our consolidated financial statements, we are required to calculate our income tax expense based on taxable income by jurisdiction. There are many transactions and calculations about which the ultimate tax outcome is uncertain; as a result, our calculations involve estimates by management. Some of these uncertainties arise as a consequence of revenue-sharing, cost-reimbursement and transfer pricing arrangements among related entities and the differing tax treatment of revenue and cost items across various jurisdictions. If we were compelled to revise or to account differently for our arrangements, that revision could affect our tax liability.

The income tax accounting process also involves estimating our actual current tax liability, together with assessing temporary differences resulting from differing treatment of items for tax and accounting purposes. These differences result in deferred tax assets and liabilities, which are included within our consolidated balance sheets. We must then assess the likelihood that our deferred tax assets will be recovered from future taxable income and, to the extent we believe that it is more likely than not that all or a portion of our deferred tax assets will not be realized, we must establish a valuation allowance as a charge to income tax expense.

As of September 30, 2019, we have a valuation allowance of \$146.1 million against net deferred tax assets in the U.S. and a valuation allowance of \$31.6 million against net deferred tax assets in certain foreign jurisdictions. We have concluded, based on the weight of available evidence, that a full valuation allowance continues to be required against our U.S. net deferred tax assets as they are not more likely than not to be realized in the future. We will continue to reassess our valuation allowance requirements each financial reporting period.

The valuation allowance recorded against net deferred tax assets of certain foreign jurisdictions is established primarily for our net operating loss carryforwards, the majority of which do not expire. There are limitations imposed on the utilization of such net operating losses that could further restrict the recognition of any tax benefits.

Prior to the passage of the U.S. Tax Act, the Company asserted that substantially all of the undistributed earnings of its foreign subsidiaries were considered indefinitely invested and accordingly, no deferred taxes were provided. Pursuant to the provisions of the U.S. Tax Act, these earnings were subjected to a one-time transition tax. We maintain our assertion to permanently reinvest these earnings outside the U.S. unless repatriation can be done with no significant tax cost, with the exception of a

foreign holding company formed in 2018 and our Taiwan subsidiary. If we decide to repatriate any additional non-U.S. earnings in the future, we may be required to establish a deferred tax liability on such earnings. The amount of unrecognized deferred tax liability on the undistributed earnings would not be material.

In the normal course of business, PTC and its subsidiaries are examined by various taxing authorities, including the Internal Revenue Service (IRS) in the U.S. We regularly assess the likelihood of additional assessments by tax authorities and provide for these matters as appropriate. We are currently under audit by tax authorities in several jurisdictions. Audits by tax authorities typically involve examination of the deductibility of certain permanent items, transfer pricing, limitations on net operating losses and tax credits. Although we believe our tax estimates are appropriate, the final determination of tax audits and any related litigation could result in material changes in our estimates.

Valuation of Assets and Liabilities Acquired in Business Combinations

In accordance with business combination accounting, we allocate the purchase price of acquired companies to the tangible and intangible assets acquired and liabilities assumed based on their estimated fair values. Determining these fair values requires management to make significant estimates and assumptions, especially with respect to intangible assets.

Our identifiable intangible assets acquired consist of developed technology, core technology, tradenames, customer lists and contracts, and software support agreements and related relationships. Developed technology consists of products that have reached technological feasibility. Core technology represents a combination of processes, inventions and trade secrets related to the design and development of acquired products. Customer lists and contracts and software support agreements and related relationships represent the underlying relationships and agreements with customers of the acquired company's installed base. We have generally valued intangible assets using a discounted cash flow model. Critical estimates in valuing certain of the intangible assets include but are not limited to:

- future expected cash flows from software license sales, customer support agreements, customer contracts and related customer relationships and acquired developed technologies and trademarks and trade names;
- expected costs to develop the in-process research and development into commercially viable products and estimating cash flows from the projects when completed;
- the acquired company's brand awareness and market position, as well as assumptions about the period of time the acquired brand will continue to be used by the combined company; and
- discount rates used to determine the present value of estimated future cash flows.

In addition, we estimate the useful lives of our intangible assets based upon the expected period over which we anticipate generating economic benefits from the related intangible asset.

Net tangible assets consist of the fair values of tangible assets less the fair values of assumed liabilities and obligations. Except for deferred revenues, net tangible assets were generally valued by us at the respective carrying amounts recorded by the acquired company, if we believed that their carrying values approximated their fair values at the acquisition date. The values assigned to deferred revenue reflect an amount equivalent to the estimated cost plus an appropriate profit margin to perform the services related to the acquired company's software support contracts.

In addition, uncertain tax positions and tax related valuation allowances assumed in connection with a business combination are initially estimated as of the acquisition date and we reevaluate these items quarterly with any adjustments to our preliminary estimates being recorded to goodwill provided that we are within the measurement period (up to one year from the acquisition date) and we continue to collect information in order to determine their estimated values. Subsequent to the measurement period or our final determination of the estimated value of uncertain tax positions or tax related valuation allowances, whichever comes first, changes to these uncertain tax positions and tax related valuation allowances will affect our provision for income taxes in our Consolidated Statements of Operations.

Our estimates of fair value are based upon assumptions believed to be reasonable at that time, but which are inherently uncertain and unpredictable. Assumptions may be incomplete or inaccurate, and unanticipated events and circumstances may occur, which may affect the accuracy or validity of such assumptions, estimates or actual results.

When events or changes in circumstances indicate that the carrying value of a finite-lived intangible asset may not be recoverable, we perform an assessment of the asset for potential impairment. This assessment is based on projected undiscounted future cash flows over the asset's remaining life. If the carrying value of the asset exceeds its undiscounted cash flows, we record an impairment loss equal to the excess of the carrying value over the fair value of the asset, determined using projected discounted future cash flows of the asset.

Liquidity and Capital Resources

(in thousands)

	September 30,		
	2019	2018	2017
Cash and cash equivalents	\$ 269,579	\$ 259,946	\$ 280,003
Marketable securities	57,435	55,951	50,315
Total	<u>\$ 327,014</u>	<u>\$ 315,897</u>	<u>\$ 330,318</u>

Activity for the year included the following:

Cash provided by operating activities	\$ 285,145	\$ 247,752	\$ 135,203
Cash used by investing activities	(150,024)	(49,212)	(16,127)
Cash used by financing activities	(122,960)	(210,846)	(118,105)

Cash and cash equivalents

We invest our cash with highly rated financial institutions and in diversified domestic and international money market mutual funds. Cash and cash equivalents include highly liquid investments with original maturities of three months or less. In addition, we hold investments in marketable securities totaling approximately \$57 million with an average maturity of 12 months. At September 30, 2019, cash and cash equivalents totaled \$270 million, compared to \$260 million at September 30, 2018, reflecting \$285 million in operating cash flow, \$25 million of net borrowings under our credit facility, \$13 million in proceeds from issuance of common stock, and \$10 million from settlements of net investment hedges, offset by \$115 million used for repurchases of common stock, \$87 million used for acquisitions, \$64 million used for capital expenditures, \$44 million used to pay withholding taxes on stock-based awards that vested in the period, \$8 million used for purchases of investments, \$2 million used for the payment of contingent consideration, and \$1 million used to purchase marketable securities, net of proceeds from maturities.

Cash provided by operating activities

Cash provided by operating activities was \$285 million in 2019 compared to \$248 million in 2018. The increase in 2019 is primarily due to higher cash collection of accounts receivable of approximately \$80 million, offset by an increase in payments related to payables and accruals due to timing, a decrease in net income of \$79 million, and an increase in restructuring payments of \$22 million (year over year).

Restructuring payments totaled \$25 million in 2019, compared to \$3 million in 2018. Cash paid for income taxes was \$39 million in 2019 compared to \$23 million in 2018.

Cash used by investing activities

(in thousands)

	Year ended September 30,		
	2019	2018	2017
Acquisitions of businesses, net of cash acquired	\$ (86,737)	\$ (3,000)	\$ (4,960)
Additions to property and equipment	(64,411)	(36,041)	(25,444)
Purchases of short- and long-term marketable securities	(33,027)	(24,311)	(19,726)
Proceeds from maturities of short- and long-term marketable securities	31,976	18,140	18,785
Proceeds from sales of investments	—	—	15,218
Purchase on intangible asset	—	(3,000)	—
Settlement of net investment hedges	9,675	—	—
Purchases of investments	(7,500)	(1,000)	—
	<u>\$ (150,024)</u>	<u>\$ (49,212)</u>	<u>\$ (16,127)</u>

The 2019 increase in property, plant and equipment payments is primarily attributable to capitalized expenditures related to construction of our new worldwide headquarters in the Boston Seaport District (a portion of which is offset by landlord reimbursements included in cash from operations above). We used \$70 million to acquire Frustum and an additional \$17 million for two smaller acquisitions as described in Note 6. Acquisitions included in the Notes to Consolidated Financial Statements in this Annual Report.

Our expenditures for property and equipment consist primarily of facility improvements, office equipment, computer equipment, and software.

Cash used by financing activities

	Year ended September 30,		
	2019	2018	2017
Borrowings under debt agreements	\$ 205,000	\$ 250,000	\$ 150,000
Repayments of borrowings under credit facility	(180,000)	(320,000)	(190,000)
Repurchases of common stock	(114,994)	(1,100,000)	(50,991)
Proceeds from issuance of common stock	12,975	1,015,654	10,778
Payments of withholding taxes in connection with vesting of stock-based awards	(44,366)	(45,374)	(26,654)
Credit facility origination costs	—	(2,851)	(184)
Contingent consideration	(1,575)	(8,275)	(11,054)
	<u>\$ (122,960)</u>	<u>\$ (210,846)</u>	<u>\$ (118,105)</u>

The net borrowings in 2019 reflect borrowings of \$205 million under our credit facility to fund the working capital requirements and Frustum acquisition, offset by repayments of \$180 million. In 2019 we repurchased \$115 million of our common stock, paid \$44 million in withholding taxes in connection with stock-based awards, received \$13 million in proceeds from issuance of common stock under our ESPP, and made \$2 million in contingent consideration payments.

Credit Agreement

In November 2019, we amended and restated our existing credit facility to increase the revolving loan commitment from \$700 million to \$1 billion and amend other provisions. The credit facility is a multi-currency credit facility with a syndicate of sixteen banks for which JPMorgan Chase Bank, N.A. acts as Administrative Agent. Outstanding revolving loan amounts may be repaid in whole or in part, without penalty or premium, prior to the September 13, 2023 maturity date, when all remaining amounts outstanding will be due and payable in full.

We use the credit facility for general corporate purposes, including acquisitions of businesses, share repurchases and working capital requirements. As of September 30, 2019, we had \$173.1 million in revolving loans outstanding under the credit facility, the fair value of which approximated its book value. As of September 30, 2019, we had approximately \$527 million undrawn, of which \$512 million would be available to borrow, the availability of which is reduced by letters of credit and certain other long-term liabilities. Giving effect to the Onshape acquisition and the amendment to the credit facility, we had approximately \$357 million available to borrow.

Any borrowings by PTC Inc. or certain of our foreign subsidiaries under the credit facility would be guaranteed, respectively, by our material domestic subsidiaries that become parties to the subsidiary guaranty, if any, and/or by PTC Inc. Borrowings are also secured by first priority liens on property of PTC and certain of our material domestic subsidiaries, including 100% of the voting equity interests of certain of our domestic subsidiaries and 65% of our material first-tier foreign subsidiaries. Loans under the credit facility bear interest at variable rates that reset every 30 to 180 days depending on the rate and period selected by us and based upon our total leverage ratio. During 2019, the weighted average annual interest rate for all borrowings outstanding was 5.38% and, as of September 30, 2019, the rate on the credit facility was 3.44%. We also pay a quarterly commitment fee on the undrawn portion of the credit facility ranging from 0.175% to 0.30% per year based on our total leverage ratio.

The credit facility imposes customary covenants that limit our ability to incur liens or guarantee obligations, pay dividends and make other distributions, make investments and engage in certain other transactions. In addition, we and our material domestic subsidiaries may not invest in, or loan to, our

foreign subsidiaries in aggregate amounts exceeding \$100 million for any purpose and an additional \$200 million for acquisitions of businesses. We also must maintain the following financial ratios:

	Required Ratio	Ratio as of September 30, 2019
Total Leverage Ratio		
Ratio of consolidated total indebtedness to the consolidated trailing four quarters EBITDA.	Not > 4.50:1.00	1.73:1.00
Interest Coverage Ratio		
Ratio of consolidated trailing four quarters EBITDA to consolidated trailing four quarters cash basis interest expense.	> 3.00:1.00	9.76:1.00
Senior Secured Leverage Ratio		
Ratio of senior consolidated total indebtedness (which excludes unsecured indebtedness) to consolidated trailing four quarters EBITDA as of the last day of any fiscal quarter.	Not > 3.00:1.00	0.47:1.00

Any failure to comply with such covenants would prevent us from being able to borrow additional funds, and would constitute a default, permitting the lenders to, among other things, accelerate the amounts outstanding and terminate the credit facility. As of September 30, 2019, we were in compliance with all financial and operating covenants of the credit facility.

Outstanding Notes

On May 12, 2016, we issued \$500 million of 6.00% Senior Notes due 2024 (the "2024 6% Notes") in a registered offering and used the net proceeds to repay indebtedness under our senior credit facility. As of September 30, 2019, unamortized deferred financing fees associated with the offering and presented as a direct reduction from the carrying amount of the 2024 6% Notes were \$4.0 million.

The 2024 6% Notes are unsecured, mature on May 15, 2024, and bear interest at a rate of 6.00% per annum, payable semi-annually (November and May). We may redeem some or all of the 2024 6% Notes at redemption prices specified in the 2024 6% Notes plus accrued and unpaid interest. In addition, if we undergo a change of control, we will be required to make an offer to purchase all the 2024 6% Notes at a price equal to 101% of the principal amount of the 2024 6% Notes plus accrued and unpaid interest.

The notes were issued under an indenture that contains customary covenants. Subject to certain exceptions, our ability to incur certain additional debt is limited unless, after giving pro forma effect to such incurrence and the application of the proceeds thereof, the ratio of our EBITDA to our Consolidated Fixed Charges (as both terms are defined in the indenture) is not greater than 2.00 to 1.00. The indenture also restricts our ability to incur liens, pay dividends or make certain other distributions, sell assets or engage in sale/leaseback transactions. Any failure to comply with these and other covenants included in the indenture could constitute an event of default that could result in the acceleration of the payment of the aggregate principal amount of 2024 6% Notes then outstanding and accrued interest. As of September 30, 2019, we were in compliance with all such covenants.

Share Repurchase Authorization

Our Articles of Organization authorize us to issue up to 500 million shares of our common stock. Our Board of Directors has authorized us to repurchase up to \$1,500 million of our common stock for the October 1, 2017 through September 30, 2020 period. We use cash from operations and borrowings under our credit facility to make such repurchases. All shares of our common stock repurchased are automatically restored to the status of authorized and unissued.

In 2019, we repurchased 1.4 million shares in the open market for \$115 million. In addition, in 2019 and 2018, we repurchased 3.0 million and 9.4 million shares, respectively, under accelerated share repurchase agreements.

Expectations for Fiscal 2020

We believe that existing cash and cash equivalents, together with cash generated from operations and amounts available under the credit facility, will be sufficient to meet our working capital and capital expenditure requirements (which we expect to be \$28 million in 2020) through at least the next twelve months and to meet our known long-term capital requirements.

On November 1, 2019, we acquired Onshape for approximately \$470 million, net of cash acquired. In

connection with the acquisition, we borrowed \$455 million under our existing credit facility, and we also increased the loan commitment to \$1 billion on November 13, 2019. We plan to suspend our share repurchase program in 2020 in order to accelerate debt repayments.

Our expected uses of cash could change, our cash position could be reduced, and we could incur additional debt obligations if we purchase our outstanding shares or retire debt or engage in strategic transactions, any of which could be commenced, suspended or completed at any time. Any such purchases or retirement of debt will depend on prevailing market conditions, our liquidity requirements, contractual restrictions and other factors. We also evaluate possible strategic transactions on an ongoing basis and at any given time may be engaged in discussions or negotiations with respect to possible strategic transactions. The amounts involved in any share or debt repurchases or strategic transactions may be material.

We ended 2019 with a cash balance of \$270 million and marketable securities of \$57 million. A significant portion of our cash is generated and held outside of the United States. At September 30, 2019, we had cash and cash equivalents of \$40.0 million in the United States, \$83.0 million in Europe, \$122.0 million in Asia Pacific Rim (including India) and \$25.0 million in other non-U.S. countries. All of the marketable securities are held in Europe. We have substantial cash requirements in the United States, but we believe that the combination of our existing U.S. cash and cash equivalents, marketable securities, and future U.S. operating cash flows and cash available under our credit facility, will be sufficient to meet our ongoing U.S. operating expenses and known capital requirements.

Contractual Obligations

At September 30, 2019, our contractual obligations were as follows:

Contractual Obligations (in millions)	Payments due by period				
	Total	Less than 1 year	1-3 years	3-5 years	More than 5 years
Debt ⁽¹⁾	\$ 851.7	\$ 37.2	\$ 74.4	\$ 740.0	\$ —
Operating leases ⁽²⁾	312.8	31.9	58.7	36.2	186.0
Purchase obligations ⁽³⁾	101.8	67.6	34.0	0.2	—
Pension liabilities ⁽⁴⁾	25.1	2.7	6.1	6.7	9.6
Unrecognized tax benefits ⁽⁵⁾	11.5				
Total	\$ 1,302.9	\$ 139.4	\$ 173.2	\$ 783.1	\$ 195.7

- (1) Includes required principal repayments and interest and commitment fees on our 2024 6% Notes and our revolving credit facility based on the balance outstanding as of September 30, 2019 and the interest rates in effect as of September 30, 2019, 6.0% for our 2024 6% Notes and 3.44% for our revolving credit facility. The credit facility matures on September 13, 2023, when all remaining amounts outstanding will be due and payable in full. Principal and interest on any additional borrowing that may be required to refinance the credit facility upon its maturity are not included in the contractual obligations above.
- (2) The future minimum lease payments above include minimum future lease payments for excess facilities under non-cancellable operating leases. These leases qualify for operating lease accounting treatment and, as such, are not included on our balance sheet. See Note 10, *Commitments and Contingencies* of Notes to Consolidated Financial Statements in this Annual Report for additional information regarding our operating leases. On September 7, 2017, we entered into a lease for approximately 250,000 square feet located at 121 Seaport Boulevard, Boston, Massachusetts. The term of the lease is expected to run from January 1, 2019 through June 30, 2037. Base rent for the first year of the lease is \$11.0 million and will increase by \$1 per square foot leased per year thereafter (\$0.3 million per year). Base rent first becomes payable on July 1, 2020. In addition to the future minimum lease payments above, for a majority of leases we are required to pay a pro rata portions of building operating costs and real estate taxes (together, "Additional Rent"). Additional rent is variable in nature and is not included in the operating lease payments above.
- (3) Purchase obligations represent minimum commitments due to third parties, including royalty contracts, research and development contracts, telecommunication contracts, information technology maintenance contracts in support of internal-use software and hardware and other

marketing and consulting contracts. Contracts for which our commitment is variable, based on volumes, with no fixed minimum quantities, and contracts that can be canceled without payment penalties have been excluded. The purchase obligations included above are in addition to amounts included in current liabilities and prepaid expenses recorded on our September 30, 2019 consolidated balance sheet.

- (4) These obligations relate to our international pension plans and are not subject to fixed payment terms. Payments have been estimated based on the plans' current funded status, planned employer contributions and actuarial assumptions. In addition, we may, at our discretion, make additional voluntary contributions to the plans. See *Note 14. Pension Plans* of Notes to Consolidated Financial Statements in this Annual Report for further discussion.
- (5) As of September 30, 2019, we had recorded total unrecognized tax benefits of \$11.5 million. This liability is not subject to fixed payment terms and the amount and timing of payments, if any, which we will make related to this liability, are not known. See *Note 8. Income Taxes* of Notes to Consolidated Financial Statements in this Annual Report for additional information.

As of September 30, 2019, we had letters of credit and bank guarantees outstanding of approximately \$15.1 million (of which \$1.1 million was collateralized).

Off-Balance Sheet Arrangements

We have not created, and are not party to, any special-purpose or off-balance sheet entities for the purpose of raising capital, incurring debt or operating parts of our business that are not consolidated (to the extent of our ownership interest therein) into our financial statements. We have not entered into any transactions with unconsolidated entities whereby we have subordinated retained interests, derivative instruments or other contingent arrangements that expose us to material continuing risks, contingent liabilities, or any other obligation under a variable interest in an unconsolidated entity that provides financing, liquidity, market risk or credit risk support to us.

Recent Accounting Pronouncements

In accordance with recently issued accounting pronouncements, we will be required to comply with certain changes in accounting rules and regulations, some of which are expected to have a material impact on our consolidated financial statements. Refer to *Note 2. Summary of Significant Accounting Policies* to the Condensed Consolidated Financial Statements in this Form 10-K for all recently issued accounting pronouncements, which is incorporated herein by reference.

ITEM 7A. Quantitative and Qualitative Disclosures about Market Risk

We face exposure to financial market risks, including adverse movements in foreign currency exchange rates and changes in interest rates. These exposures may change over time as business practices evolve and could have a material adverse impact on our financial results.

Foreign currency exchange risk

Our earnings and cash flows are subject to fluctuations due to changes in foreign currency exchange rates. Our most significant foreign currency exposures relate to Western European countries, Japan, Israel, China and Canada. We enter into foreign currency forward contracts to manage our exposure to fluctuations in foreign exchange rates that arise from receivables and payables denominated in foreign currencies. We do not enter into or hold foreign currency derivative financial instruments for trading or speculative purposes nor do we enter into derivative financial instruments to hedge future cash flow or forecast transactions.

Our non-U.S. revenues generally are transacted through our non-U.S. subsidiaries and typically are denominated in their local currency. In addition, expenses that are incurred by our non-U.S. subsidiaries typically are denominated in their local currency. In 2019, approximately 60% of our revenue and 40% of our expenses were transacted in currencies other than the U.S. dollar. Historically two-thirds of our revenue and half of our expenses were transacted in currencies other than U.S. Dollars. Currency translation affects our reported results because we report our results of operations in U.S. Dollars. Historically, our most significant currency risk has been changes in the Euro and Japanese Yen relative to the U.S. Dollar. Based on current revenue and expense levels (excluding restructuring charges and stock-based compensation), a \$0.10 change in the USD to European exchange rates and a 10 Yen change in the Yen to USD exchange rate would impact operating income by approximately \$17 million and \$7 million, respectively.

Our exposure to foreign currency exchange rate fluctuations arises in part from intercompany transactions, with most intercompany transactions occurring between a U.S. dollar functional currency entity and a foreign currency denominated entity. Intercompany transactions typically are denominated in the local currency of the non-U.S. dollar functional currency subsidiary in order to centralize foreign currency risk. Also, both PTC (the parent company) and our non-U.S. subsidiaries may transact business with our customers and vendors in a currency other than their functional currency (transaction risk). In addition, we are exposed to foreign exchange rate fluctuations as the financial results and balances of our non-U.S. subsidiaries are translated into U.S. dollars (translation risk). If sales to customers outside of the United States increase, our exposure to fluctuations in foreign currency exchange rates will increase.

Our foreign currency risk management strategy is principally designed to mitigate the future potential financial impact of changes in the U.S. dollar value of balances denominated in foreign currency, resulting from changes in foreign currency exchange rates. Our foreign currency hedging program uses forward contracts to manage the foreign currency exposures that exist as part of our ongoing business operations. The contracts primarily are denominated in Canadian Dollars and European currencies, and have maturities of less than three months.

Generally, we do not designate foreign currency forward contracts as hedges for accounting purposes, and changes in the fair value of these instruments are recognized immediately in earnings. Because we enter into forward contracts only as an economic hedge, any gain or loss on the underlying foreign-denominated balance would be offset by the loss or gain on the forward contract. Gains and losses on forward contracts and foreign denominated receivables and payables are included in foreign currency net losses.

As of September 30, 2019 and 2018, we had outstanding forward contracts for derivatives not designated as hedging instruments with notional amounts equivalent to the following:

Currency Hedged (in thousands)	September 30,	
	2019	2018
Canadian / U.S. Dollar	\$ 9,408	\$ 7,334
Euro / U.S. Dollar	308,282	297,730
British Pound / U.S. Dollar	3,756	7,074
Israeli Sheqel / U.S. Dollar	10,272	9,778
Japanese Yen / U.S. Dollar	37,462	37,456
Swiss Franc / U.S. Dollar	12,001	11,944
Swedish Krona / U.S. Dollar	20,636	18,207
Chinese Yuan offshore / U.S. Dollar	43,387	116
Singapore Dollar / U.S. Dollar	34,585	1,314
Chinese Renminbi/U.S. Dollar	9,079	9,010
All other	9,487	5,993
Total	<u>\$ 498,355</u>	<u>\$ 405,956</u>

As of September 30, 2019 and 2018, we had outstanding forward contracts designated as cash flow hedges with notional amounts equivalent to the following:

Currency Hedged (in thousands)	September 30,	
	2019	2018
Euro / U.S. Dollar	\$ —	\$ 8,495
Japanese Yen / U.S. Dollar	—	2,193
SEK / U.S. Dollar	—	1,708
Total	<u>\$ —</u>	<u>\$ 12,396</u>

Debt

In addition to the \$500 million due under our 2024 6% Notes, as of September 30, 2019, we had \$173 million outstanding under our credit facility. As of November 15, 2019, we have \$628 million outstanding

under our credit facility due to the Onshape acquisition. Loans under the credit facility bear interest at variable rates which reset every 30 to 180 days depending on the rate and period selected by us. These loans are subject to interest rate risk as interest rates will be adjusted at each rollover date to the extent such amounts are not repaid. As of September 30, 2019, the annual rate on the credit facility loans was 3.44%. If there was a hypothetical 100 basis point change in interest rates, the annual net impact to earnings and cash flows would be \$1.7 million. This hypothetical change in cash flows and earnings has been calculated based on the borrowings outstanding at September 30, 2019 and a 100 basis point per annum change in interest rate applied over a one-year period.

Cash and cash equivalents

As of September 30, 2019, cash equivalents were invested in highly liquid investments with maturities of three months or less when purchased. We invest our cash with highly rated financial institutions in North America, Europe and Asia-Pacific and in diversified domestic and international money market mutual funds. At September 30, 2019, we had cash and cash equivalents of \$40.0 million in the United States, \$83.0 million in Europe, \$122.0 million in Asia Pacific Rim (including India), and \$25.0 million in other non-U.S. countries. Given the short maturities and investment grade quality of the portfolio holdings at September 30, 2019, a hypothetical 10% change in interest rates would not materially affect the fair value of our cash and cash equivalents.

Our invested cash is subject to interest rate fluctuations and, for non-U.S. operations, foreign currency risk. In a declining interest rate environment, we would experience a decrease in interest income. The opposite holds true in a rising interest rate environment. Over the past several years, the U.S. Federal Reserve Board, European Central Bank and Bank of England have changed certain benchmark interest rates, which have led to declines and increases in market interest rates. These changes in market interest rates have resulted in fluctuations in interest income earned on our cash and cash equivalents. Interest income will continue to fluctuate based on changes in market interest rates and levels of cash available for investment. Our consolidated cash balances were impacted favorably by \$2.6 million and \$7.8 million in 2019 and 2018, respectively and unfavorably by \$1.1 million in 2017, due to changes in foreign currencies relative to the U.S. dollar, particularly the Euro and the Japanese Yen.

ITEM 8. Financial Statements and Supplementary Data

The consolidated financial statements and notes to the consolidated financial statements are attached as APPENDIX A.

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

None.

ITEM 9A. Controls and Procedures

Evaluation of Disclosure Controls and Procedures

Our management maintains disclosure controls and procedures as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended (the "Exchange Act") that are designed to provide reasonable assurance that information required to be disclosed in our reports filed or submitted under the Exchange Act is processed, recorded, summarized and reported within the time periods specified in the SEC's rules and forms, and that such information is accumulated and communicated to our management, including our Chief Executive Officer and Chief Financial Officer (our principal executive officer and principal financial officer, respectively), as appropriate, to allow for timely decisions regarding required disclosure.

As required by SEC Rule 15d-15(b), we carried out an evaluation, under the supervision and with the participation of management, including our principal executive and principal financial officers, of the effectiveness of the design and operation of our disclosure controls and procedures as of the end of the period covered by this Annual Report. Based on this evaluation, we concluded that our disclosure controls and procedures were effective at the reasonable assurance level as of September 30, 2019.

Management's Annual Report on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting. Internal control over financial reporting is defined in Rules 13a-15(f) and 15d-15(f) of the Exchange Act as a process designed by, or under the supervision of, our principal executive and principal financial officers and effected by our 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 our assets;
- Provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that our receipts and expenditures are being made only in accordance with authorizations of our management and directors; and
- Provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of our assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. 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 assessed the effectiveness of our internal control over financial reporting as of September 30, 2019 using the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) in *Internal Control-Integrated Framework (2013)*. Based on this assessment and those criteria, our management concluded that, as of September 30, 2019, our internal control over financial reporting was effective.

The effectiveness of our internal control over financial reporting as of September 30, 2019 has been audited by PricewaterhouseCoopers LLP, an independent registered public accounting firm, as stated in their report, which appears under Item 8.

Change in Internal Control over Financial Reporting

There was no change in our internal control over financial reporting that occurred during the quarter ended September 30, 2019 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

ITEM 9B. Other Information

None.

PART III

ITEM 10. Directors, Executive Officers and Corporate Governance

The information required by this item with respect to our directors and executive officers may be found in the sections captioned "Proposal 1: Election of Directors," "Corporate Governance," "Our Executive Officers," and "Transactions With Related Persons" appearing in our 2020 Proxy Statement. Such information is incorporated into this Item 10 by reference.

Code of Ethics for Senior Executive Officers

We have adopted a Code of Ethics for Senior Executive Officers that applies to our Chief Executive Officer, President, Chief Financial Officer, and Controller, as well as others. The Code is embedded in our Code of Business Conduct and Ethics applicable to all employees. A copy of the Code of Business Conduct and Ethics is publicly available on our website at www.ptc.com. If we make any substantive amendments to, or grant any waiver from, including any implicit waiver, the Code of Ethics for Senior Executive Officers to or for our Chief Executive Officer, President, Chief Financial Officer or Controller, we will disclose the nature of such amendment or waiver in a current report on Form 8-K.

ITEM 11. Executive Compensation

Information with respect to director and executive compensation may be found under the headings "Director Compensation," "Compensation Discussion and Analysis," "Executive Compensation," and "Compensation Committee Report" appearing in our 2020 Proxy Statement. Such information is incorporated herein by reference.

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

Information required by this item may be found under the headings "Information about PTC Common Stock Ownership" in our 2020 Proxy Statement. Such information is incorporated herein by reference.

**EQUITY COMPENSATION PLAN INFORMATION
as of SEPTEMBER 30, 2019**

Plan Category	Number of securities to be issued upon exercise of outstanding options, warrants and rights	Weighted-average exercise price of outstanding options, warrants and rights	Number of securities remaining available for future issuance under equity compensation plans
Equity compensation plans approved by security holders:			
2000 Equity Incentive Plan (1)	3,230,724	— (1)	6,949,302
2016 Employee Stock Purchase Plan (2)	—	—	1,164,289 (2)
Total	3,230,724	—	8,113,591

(1) All of the shares issuable upon vesting are restricted stock units, which have no exercise price.

(2) This amount represents the total number of shares remaining available under the 2016 Employee Stock Purchase Plan, of which 165,909 shares are subject to purchase during the current offering period.

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

Information with respect to this item may be found under the headings "Independence of Our Directors," "Review of Transactions with Related Persons" and "Transactions with Related Persons" in our 2020 Proxy Statement. Such information is incorporated herein by reference.

ITEM 14. Principal Accounting Fees and Services

Information with respect to this item may be found under the headings "Engagement of Independent Auditor and Approval of Professional Services and Fees" and "PricewaterhouseCoopers LLP Professional Services and Fees" in our 2020 Proxy Statement. Such information is incorporated herein by reference.

PART IV

ITEM 15. Exhibits and Financial Statement Schedules

(a) Documents Filed as Part of Form 10-K

1. Financial Statements

<u>Report of Independent Registered Public Accounting Firm</u>	<u>F-1</u>
<u>Consolidated Balance Sheets as of September 30, 2019 and 2018</u>	<u>F-4</u>
<u>Consolidated Statements of Operations for the years ended September 30, 2019, 2018 and 2017</u>	<u>F-5</u>
<u>Consolidated Statements of Comprehensive Income (Loss) for the years ended September 30, 2019, 2018 and 2017</u>	<u>F-6</u>
<u>Consolidated Statements of Cash Flows for the years ended September 30, 2019, 2018 and 2017</u>	<u>F-7</u>
<u>Consolidated Statements of Stockholders' Equity for the years ended September 30, 2019, 2018 and 2017</u>	<u>F-8</u>
<u>Notes to Consolidated Financial Statements</u>	<u>F-9</u>
2. Financial Statement Schedules

Schedules have been omitted since they are either not required, not applicable, or the information is otherwise included in the Financial Statements per Item 15(a)1 above.
3. Exhibits

The list of exhibits in the Exhibit Index is incorporated herein by reference.

(b) Exhibits

We hereby file the exhibits listed in the attached Exhibit Index.

(c) Financial Statement Schedules

None.

ITEM 16. Form 10-K Summary

None

EXHIBIT INDEX

<u>Exhibit Number</u>	<u>Exhibit</u>
3.1	— Restated Articles of Organization of PTC Inc. adopted August 4, 2015 (filed as exhibit 3.1 to our Annual Report on Form 10-K for the fiscal year ended September 30, 2015 (File No. 0-18059) and incorporated herein by reference).
3.2	— By-Laws, as amended and restated, of PTC Inc. (filed as Exhibit 3.2 to our Quarterly Report on Form 10-Q for the fiscal quarter ended March 29, 2014 (File No. 0-18059) and incorporated herein by reference).
4.1	— Indenture, dated as of May 12, 2016, by and between the Company and The Bank of New York Mellon, as Trustee (filed as Exhibit 4.1 to our Current Report on Form 8-K filed on May 18, 2016 (File No. 0-18059) and incorporated herein by reference).
4.2	— First Supplemental Indenture, dated as of May 12, 2016, by and between the Company and The Bank of New York Mellon, as Trustee (filed as Exhibit 4.2 to our Current Report on Form 8-K filed on May 18, 2016 (File No. 0-18059) and incorporated herein by reference).
4.3	— 6.000% Senior Notes due 2024 (filed as Exhibit 4.3 to our Current Report on Form 8-K filed on May 18, 2016 (File No. 0-18059) and incorporated herein by reference).
4.4	— Description of Securities Registered under Section 12 of the Securities Exchange Act of 1934
10.1.1*	— 2000 Equity Incentive Plan (filed as Exhibit 10 to our Current Report on Form 8-K filed on March 8, 2019 (File No. 0-18059) and incorporated herein by reference).
10.1.2*	— Form of Restricted Stock Agreement (Non-Employee Director) (filed as Exhibit 10.2 to our Quarterly Report on Form 10-Q for the fiscal quarter ended April 4, 2009 (File No. 0-18059) and incorporated herein by reference).
10.1.3*	— Form of Restricted Stock Agreement (Employee) (filed as Exhibit 10.2 to our Quarterly Report on Form 10-Q for the fiscal quarter ended July 2, 2005 (File No. 0-18059) and incorporated herein by reference).
10.1.4	— Form of Restricted Stock Unit Certificate (Non-U.S.) (filed as Exhibit 10.4 to our Quarterly Report on Form 10-Q for the fiscal quarter ended July 2, 2005 (File No. 0-18059) and incorporated herein by reference).
10.1.5	— Form of Incentive Stock Option Certificate (filed as Exhibit 10.5 to our Quarterly Report on Form 10-Q for the fiscal quarter ended July 2, 2005 (File No. 0-18059) and incorporated herein by reference).
10.1.6*	— Form of Nonstatutory Stock Option Certificate (filed as Exhibit 10.6 to our Quarterly Report on Form 10-Q for the fiscal quarter ended July 2, 2005 (File No. 0-18059) and incorporated herein by reference).
10.1.7*	— Form of Stock Appreciation Right Certificate (filed as Exhibit 10.7 to our Quarterly Report on Form 10-Q for the fiscal quarter ended July 2, 2005 (File No. 0-18059) and incorporated herein by reference).
10.1.8*	— Form of Restricted Stock Unit Certificate (Non-Employee Director) (filed as Exhibit 10.1.1 to our Quarterly Report on Form 10-Q for the fiscal quarter ended March 30, 2013 (File No. 0-18059) and incorporated herein by reference).
10.1.9	— Form of Restricted Stock Unit Certificate (U.S.) (filed as Exhibit 10.1.9 to our Annual Report on Form 10-K for the fiscal year ended September 30, 2016 (File No. 0-18059) and incorporated herein by reference).
10.1.10	— Form of Restricted Stock Unit Certificate (U.S.) (filed as Exhibit 10.1.10 to our Annual Report on Form 10-K for the fiscal year ended September 30, 2016 (File No. 0-18059) and incorporated herein by reference).
10.1.11	— Form of Restricted Stock Unit Certificate (U.S.) (filed as Exhibit 10.1.11 to our Annual Report on Form 10-K for the fiscal year ended September 30, 2016 (File No. 0-18059) and incorporated herein by reference).
10.1.12	— Form of Restricted Stock Unit Certificate (U.S. EVP) (filed as Exhibit 10.1.12 to our Annual Report on Form 10-K for the fiscal year ended September 30, 2016 (File No. 0-18059) and incorporated herein by reference).

- 10.1.13* — [Form of Restricted Stock Unit Certificate \(U.S. Section 16\) \(filed as Exhibit 10.1.13 to our Annual Report on Form 10-K for the fiscal year ended September 30, 2016 \(File No. 0-18059\) and incorporated herein by reference\).](#)
- 10.1.14 — [Form of Restricted Stock Unit Certificate \(U.S. EVP\) \(filed as Exhibit 10.1.14 to our Annual Report on Form 10-K for the fiscal year ended September 30, 2016 \(File No. 0-18059\) and incorporated herein by reference\).](#)
- 10.1.15 — [Form of Restricted Stock Unit Certificate \(U.S.\) \(filed as Exhibit 10.1.15 to our Annual Report on Form 10-K for the fiscal year ended September 30, 2016 \(File No. 0-18059\) and incorporated herein by reference\).](#)
- 10.1.16* — [Form of Restricted Stock Unit Certificate \(U.S. Section 16\) \(filed as Exhibit 10.1.16 to our Annual Report on Form 10-K for the fiscal year ended September 30, 2016 \(File No. 0-18059\) and incorporated herein by reference\).](#)
- 10.1.17* — [Form of Restricted Stock Unit Certificate \(U.S. Section 16\) \(filed as Exhibit 10.1.17 to our Annual Report on Form 10-K for the fiscal year ended September 30, 2012 \(File No. 0-18059\) and incorporated herein by reference\).](#)
- 10.2* — [2016 Employee Stock Purchase Plan \(filed as Exhibit 10.3 to our Annual Report on Form 10-K for the fiscal year ended September 30, 2016 \(File No. 0-18059\) and incorporated herein by reference\).](#)
- 10.3* — [Amended and Restated Executive Agreement with James Heppelmann, President and Chief Executive Officer, dated May 7, 2010 \(filed as Exhibit 10.2 to our Quarterly Report on Form 10-Q for the fiscal quarter ended April 3, 2010 \(File No. 0-18059\) and incorporated herein by reference\).](#)
- 10.4* — [Amendment to Executive Agreement dated as of November 18, 2011 by and between PTC Inc. and James Heppelmann to Amended and Restated Executive Agreement dated as of May 7, 2010 by and between PTC and James Heppelmann \(filed as Exhibit 10.2 to our Current Report on Form 8-K dated November 15, 2011 \(File No. 0-18059\) and incorporated herein by reference\).](#)
- 10.5* — [Amendment to Executive Agreement by and between PTC Inc. and James Heppelmann dated May 13, 2013 \(filed as Exhibit 10.9 to our Annual Report on Form 10-K for the fiscal year ended September 30, 2013 \(File No. 0-18059\) and incorporated herein by reference\).](#)
- 10.6* — [Amendment to Executive Agreement by and between PTC Inc. and James Heppelmann dated August 4, 2015 \(filed as Exhibit 10.1 to our Current Report on Form 8-K dated August 10, 2015 \(File No. 0-18059\) and incorporated herein by reference\).](#)
- 10.7* — [Form of Amended and Restated Executive Agreement by and between PTC Inc. and Aaron von Staats \(filed as Exhibit 10.3 to our Quarterly Report on Form 10-Q for the fiscal quarter dated April 3, 2010 \(File No. 0-18059\) and incorporated herein by reference\).](#)
- 10.8* — [Form of Amendment to Amended and Restated Executive Agreement entered into as of November 18, 2011 by and between PTC Inc. and Aaron von Staats \(filed as Exhibit 10.3 to our Current Report on Form 8-K dated November 15, 2011 \(File No. 0-18059\) and incorporated herein by reference\).](#)
- 10.9* — [Executive Agreement dated April 16, 2014 between PTC Inc. and Matthew Cohen \(filed as Exhibit 10.1 to our Quarterly Report on Form 10-Q for the fiscal quarter ended March 29, 2014 \(File No. 0-18059\) and incorporated herein by reference\).](#)
- 10.10* — [Form of Amendment to Executive Agreement dated August 4, 2015 by and between PTC Inc. and each of Matthew Cohen and Aaron von Staats \(filed as Exhibit 10.2 to our Current Report on Form 8-K dated August 10, 2015 \(File No. 0-18059\) and incorporated herein by reference\).](#)
- 10.11 — [Executive Agreement dated May 15, 2017 between PTC Inc. and Kathleen Mitford \(filed as Exhibit 10.13 to our Annual Report on Form 10-K for the fiscal year ended September 30, 2018 \(File No. 0-18059\) and incorporated herein by reference\).](#)
- 10.12 — [Lease dated December 14, 1999 by and between PTC Inc. and Boston Properties Limited Partnership \(filed as Exhibit 10.21 to our Annual Report on Form 10-K for the fiscal year ended September 30, 2000 \(File No. 0-18059\) and incorporated herein by reference\).](#)
- 10.13 — [Third Amendment to Lease Agreement dated as of October 27, 2010 by and between Boston Properties Limited Partnership and PTC Inc. \(filed as Exhibit 10.1 to our Current Report on Form 8-K dated November 8, 2010 \(File No. 0-18059\) and incorporated herein by reference\).](#)

- 10.14 — [Amended and Restated Credit Agreement dated as of September 13, 2018 by and among PTC Inc., JPMorgan Chase Bank, N.A., as Administrative Agent, and the lenders party thereto \(filed as Exhibit 10 to our Current Report on Form 8-K dated September 12, 2018 \(File No. 0-18059\) and incorporated herein by reference\).](#)
- 10.15 — [Amendment No.1 dated as of November 13, 2019 to the Amended and Restated Credit Agreement dated as of September 13, 2018 by and among PTC Inc., JPMorgan Chase Bank, N.A., as Administrative Agent, and the lenders party thereto \(filed as Exhibit 10 to our Current Report on Form 8-K dated November 13, 2019 \(File No. 0-18059\) and incorporated herein by reference\).](#)
- 10.16 — [Office Lease Agreement dated as of September 7, 2017 by and between PTC Inc. and SCD L2 Seaport Square LLC \(filed as Exhibit 10 to our Current Report on Form 8-K filed on September 7, 2017 \(File No. 0-18059\) and incorporated herein by reference\).](#)
- 10.17 — [First Amendment to Lease dated as of October 5, 2017 by and between PTC Inc. and SCD L2 Seaport Square LLC \(filed as Exhibit 10.23 to our Annual Report on Form 10-K for the period ended September 30, 2017 \(File No. 0-18059\) and incorporated herein by reference\).](#)
- 10.18 — [Securities Purchase Agreement by and between PTC Inc. and Rockwell Automation, Inc., dated as of June 11, 2018 \(filed as Exhibit 10.1 to our Current Report on Form 8-K filed on June 11, 2018 \(File No. 0-18059\) and incorporated herein by reference\).](#)
- 10.19*** — [Second Amended and Restated Strategic Alliance Agreement by and between PTC Inc. and Rockwell Automation, Inc. dated as of November 14, 2019.](#)
- 10.20 — [Registration Rights Agreement by and between the Company and Rockwell Automation, Inc., dated July 19, 2018 \(filed as Exhibit 10.1 to our Current Report on Form 8-K filed on July 19, 2018 \(File No. 0-18059\) and incorporated herein by reference\).](#)
- 10.21 — [Executive Agreement dated May 24, 2019 between PTC Inc. and Kristian Talvitie \(filed as Exhibit 10.1 to PTC's Quarterly Report on Form 10-Q for the period ended June 29, 2019 \(File No. 0-18059\) and incorporated herein by reference\).](#)
- 21.1 — [Subsidiaries of PTC Inc.](#)
- 23.1 — [Consent of PricewaterhouseCoopers LLP, an independent registered public accounting firm.](#)
- 31.1 — [Certification of the Chief Executive Officer Pursuant to Exchange Act Rules 13\(a\)-14\(a\) and 15d-14\(a\).](#)
- 31.2 — [Certification of the Chief Financial Officer Pursuant to Exchange Act Rules 13\(a\)-14\(a\) and 15d-14\(a\).](#)
- 32** — [Certification of Periodic Financial Report Pursuant to 18 U.S.C. Section 1350.](#)
- 101 — The following materials from PTC Inc.'s Annual Report on Form 10-K for the year ended September 30, 2019, formatted in XBRL (eXtensible Business Reporting Language): (i) Consolidated Balance Sheets as of September 30, 2019 and 2018; (ii) Consolidated Statements of Operations for the years ended September 30, 2019, 2018 and 2017; (iii) Consolidated Statements of Comprehensive Income for the years ended September 30, 2019, 2018 and 2017; (iv) Consolidated Statements of Cash Flows for the years ended September 30, 2019, 2018 and 2017; (v) Consolidated Statements of Stockholders' Equity for the years ended September 30, 2019, 2018 and 2017; and (vi) Notes to Consolidated Financial Statements.
- 104 — The cover page of the Annual Report on Form 10-K formatted in Inline XBRL (included in Exhibit 101).

* Identifies a management contract or compensatory plan or arrangement in which an executive officer or director of PTC participates.

** Indicates that the exhibit is being furnished with this report and is not filed as a part of it.

*** Certain information has been excluded from this exhibit because it is not material and would likely cause competitive harm to the registrant if publicly disclosed.

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the Registrant and in the capacities indicated below, on the 15th day of November, 2019.

<u>Signature</u>	<u>Title</u>
(i) Principal Executive Officer:	
<u>/s/ JAMES HEPPELMANN</u> James Heppelmann	President and Chief Executive Officer
(ii) Principal Financial and Accounting Officer:	
<u>/s/ Kristian Talvitie</u> Kristian Talvitie	Executive Vice President and Chief Financial Officer
(iii) Board of Directors:	
<u>/s/ ROBERT SCHECHTER</u> Robert Schechter	Chairman of the Board of Directors
<u>/s/ JANICE CHAFFIN</u> Janice Chaffin	Director
<u>/s/ PHILLIP FERNANDEZ</u> Phillip Fernandez	Director
<u>/s/ DONALD GRIERSON</u> Donald Grierson	Director
<u>/s/ JAMES HEPPELMANN</u> James Heppelmann	Director
<u>/s/ KLAUS HOEHN</u> Klaus Hoehn	Director
<u>/s/ PAUL LACY</u> Paul Lacy	Director
<u>/s/ CORINNA LATHAN</u> Corinna Lathan	Director
<u>/s/ BLAKE MORET</u> Blake Moret	Director

Report of Independent Registered Public Accounting Firm

To the Board of Directors and Stockholders of PTC Inc.

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of PTC Inc. and its subsidiaries (the "Company") as of September 30, 2019 and 2018, and the related consolidated statements of operations, of comprehensive income (loss), of stockholders' equity, and of cash flows for each of the three years in the period ended September 30, 2019, including the related notes (collectively referred to as the "consolidated financial statements"). We also have audited the Company's internal control over financial reporting as of September 30, 2019, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of September 30, 2019 and 2018, and the results of its operations and its cash flows for each of the three years in the period ended September 30, 2019 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of September 30, 2019, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the COSO.

Change in Accounting Principle

As discussed in Note 2 to the consolidated financial statements, the Company changed the manner in which it accounts for revenues from contracts with customers in 2019.

Basis for Opinions

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

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

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

Definition and Limitations of Internal Control over Financial Reporting

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

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

Critical Audit Matters

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

Revenue from Contracts with Customers - Identification of Distinct Performance Obligations and Estimate of Standalone Selling Price

As described in Note 2 to the consolidated financial statements, the Company's sources of revenue include: (1) subscription, (2) perpetual license, (3) support for perpetual licenses and (4) professional services. Revenue is derived from the licensing of computer software products and from related support and/or professional services contracts. During the year ended September 30, 2019, the Company recognized revenue from contracts with customers of \$1,255.6 million. The Company's adoption of the accounting standard related to revenue recognition resulted in a decrease in accumulated deficit of \$363.2 million, net of tax. The Company's contracts with customers for subscriptions typically include commitments to transfer term-based, on-premise software licenses bundled with support. On-premise software is determined to be a distinct performance obligation from support. Judgment is required by management to allocate the transaction price to each performance obligation. Management uses the estimated standalone selling price method to allocate the transaction price for items that are not sold separately. The estimated standalone selling price is determined using all information reasonably available to management, including market conditions and other observable inputs. The corresponding revenues are recognized as the related performance obligations are satisfied.

The principal considerations for our determination that performing procedures relating to revenue recognition, specifically related to management's identification of distinct performance obligations and their estimate of standalone selling price, is a critical audit matter are there was significant judgment by management in both the identification of distinct performance obligations, specifically the determination that the on-premise software is determined to be a distinct performance obligation from support, and in estimating the standalone selling price using market pricing conditions and other observable inputs, such as historical pricing practices, for each distinct performance obligation. This in turn led to a high degree of auditor judgment, subjectivity and effort in performing procedures and evaluating audit evidence related to management's identification of distinct performance obligations within contracts with customers and the judgments made by management used to estimate the standalone selling price used to allocate the transaction price to the distinct performance obligations. Due to this complexity, there

was a significant level of auditor judgment and effort in evaluating the Company's adoption of the accounting standard related to revenue recognition including the completeness and accuracy of management's cumulative adoption adjustments to accumulated deficit and deferred revenue.

Addressing the matter involved performing procedures and evaluating audit evidence in connection with forming our overall opinion on the consolidated financial statements. These procedures included testing the effectiveness of controls relating to the revenue recognition process, including controls over management's adoption of the accounting standard related to revenue recognition, identification of distinct performance obligations and estimate of standalone selling prices used to allocate transaction price to distinct performance obligations in its contracts with customers. These procedures also included, among others, (i) evaluating the Company's revenue recognition accounting policy resulting from its adoption of the accounting standard related to revenue recognition and testing the completeness and accuracy of management's cumulative adoption adjustments; (ii) testing management's identification of distinct performance obligations in its contracts with customers; (iii) testing management's process for estimating standalone selling price which included testing the completeness and accuracy of input data used and evaluating the reasonableness of significant assumptions used by management, principally market and pricing conditions and other observable inputs such as historical pricing practices; and (iv) evaluation of the accuracy of management's allocation of transaction price to the performance obligations contained within a sample of contracts with customers.

/s/ PricewaterhouseCoopers LLP
Boston, Massachusetts
November 15, 2019

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

PTC Inc.
CONSOLIDATED BALANCE SHEETS
(in thousands, except per share data)

	September 30,	
	2019	2018
ASSETS		
Current assets:		
Cash and cash equivalents	\$ 269,579	\$ 259,946
Short-term marketable securities	27,891	25,836
Accounts receivable, net of allowance for doubtful accounts of \$744 and \$607 at September 30, 2019 and 2018, respectively	372,743	129,297
Prepaid expenses	52,701	48,997
Other current assets	59,707	169,708
Total current assets	782,621	633,784
Property and equipment, net	105,531	80,613
Goodwill	1,238,179	1,182,457
Acquired intangible assets, net	169,949	200,202
Long-term marketable securities	29,544	30,115
Deferred tax assets	198,634	165,566
Other assets	140,130	36,285
Total assets	<u>\$ 2,664,588</u>	<u>\$ 2,329,022</u>
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	\$ 42,442	\$ 53,473
Accrued expenses and other current liabilities	104,028	74,388
Accrued compensation and benefits	88,769	101,784
Accrued income taxes	17,407	18,044
Deferred revenue	385,509	487,590
Total current liabilities	638,155	735,279
Long-term debt / Revolving credit facility	669,134	643,268
Deferred tax liabilities	41,683	5,589
Deferred revenue	11,123	11,852
Other liabilities	102,495	58,445
Total liabilities	1,462,590	1,454,433
Commitments and contingencies (Note 10)		
Stockholders' equity:		
Preferred stock, \$0.01 par value; 5,000 shares authorized; none issued	—	—
Common stock, \$0.01 par value; 500,000 shares authorized; 114,899 and 117,981 shares issued and outstanding at September 30, 2019 and 2018, respectively	1,149	1,180
Additional paid-in capital	1,502,949	1,558,403
Accumulated deficit	(191,390)	(599,409)
Accumulated other comprehensive loss	(110,710)	(85,585)
Total stockholders' equity	1,201,998	874,589
Total liabilities and stockholders' equity	<u>\$ 2,664,588</u>	<u>\$ 2,329,022</u>

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

PTC Inc.
CONSOLIDATED STATEMENTS OF OPERATIONS
(in thousands, except per share data)

	Year ended September 30,		
	2019	2018	2017
Revenue:			
License	\$ 324,400	\$ 529,265	\$ 356,326
Support and cloud services	763,700	559,222	630,990
Total software revenue	1,088,100	1,088,487	987,316
Professional services	167,531	153,337	176,723
Total revenue	1,255,631	1,241,824	1,164,039
Cost of revenue:			
Cost of license revenue	51,936	47,737	66,841
Cost of support and cloud services revenue	133,478	135,106	110,931
Total cost of software revenue	185,414	182,843	177,772
Cost of professional service revenue	139,964	143,659	150,730
Total cost of revenue	325,378	326,502	328,502
Gross margin	930,253	915,322	835,537
Operating expenses:			
Sales and marketing	417,449	414,764	372,702
Research and development	246,888	249,786	236,028
General and administrative	127,919	143,045	144,991
Amortization of acquired intangible assets	23,841	31,350	32,108
Restructuring and other charges, net	51,114	3,764	7,942
Total operating expenses	867,211	842,709	793,771
Operating income	63,042	72,613	41,766
Interest expense	(43,047)	(41,673)	(42,400)
Other income (expense), net	305	(2,284)	(772)
Income before income taxes	20,300	28,656	(1,406)
Provision (benefit) for income taxes	47,760	(23,331)	(7,645)
Net income (loss)	\$ (27,460)	\$ 51,987	\$ 6,239
Earnings (loss) per share—Basic	\$ (0.23)	\$ 0.45	\$ 0.05
Earnings (loss) per share—Diluted	\$ (0.23)	\$ 0.44	\$ 0.05
Weighted average shares outstanding—Basic	117,724	116,390	115,523
Weighted average shares outstanding—Diluted	117,724	118,158	117,356

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

PTC Inc.
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME (LOSS)
(in thousands)

	Year ended September 30,		
	2019	2018	2017
Net income (loss)	\$ (27,460)	\$ 51,987	\$ 6,239
Other comprehensive income (loss), net of tax:			
Hedge gain (loss) arising during the period, net of tax of \$1.7 million, \$0.2 million and \$0.1 million in 2019, 2018 and 2017, respectively.	5,251	1,445	(758)
Net hedge gain (loss) reclassified into earnings, net of tax of \$0.1 million in 2019, 2018 and 2017, respectively.	(549)	483	459
Realized and unrealized gain (loss) on hedging instruments	4,702	1,928	(299)
Foreign currency translation adjustment, net of tax of \$0 for all periods	(24,755)	(11,767)	16,593
Unrealized gain (loss) on marketable securities, net of tax of \$0 for all periods	530	(269)	(22)
Amortization of net actuarial pension loss included in net income, net of tax of \$0.7 million in 2019, 2018, respectively, and \$1.0 million in 2017	1,691	1,629	2,392
Pension net gain (loss) arising during the period net of tax of \$3.6 million, \$1.5 million, and \$3.6 million in 2019, 2018, and 2017, respectively	(8,743)	(3,787)	8,636
Change in unamortized pension loss during the period related to changes in foreign currency	1,450	588	(1,254)
Other comprehensive income (loss)	(25,125)	(11,678)	26,046
Comprehensive income (loss)	\$ (52,585)	\$ 40,309	\$ 32,285

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

PTC Inc.
CONSOLIDATED STATEMENTS OF CASH FLOWS
(in thousands)

	Year ended September 30,		
	2019	2018	2017
Cash flows from operating activities:			
Net income (loss)	\$ (27,460)	\$ 51,987	\$ 6,239
Adjustments to reconcile net income (loss) to net cash provided by operating activities:			
Stock-based compensation	86,400	82,939	76,708
Depreciation and amortization	77,824	87,408	86,742
Provision (benefit) from deferred income taxes	1,708	(56,556)	(28,289)
Other non-cash costs, net	(4,148)	534	2,272
Changes in operating assets and liabilities, excluding the effects of acquisitions:			
Accounts receivable	29,446	20,396	12,832
Accounts payable and accrued expenses	16,200	5,251	20,315
Accrued compensation and benefits	(12,098)	(6,988)	(34,846)
Deferred revenue	45,875	56,141	5,808
Accrued income taxes, net of income tax receivable	232	10,323	(798)
Other current assets and prepaid expenses	(2,829)	(10,642)	690
Other noncurrent assets and liabilities	73,995	6,959	(12,470)
Net cash provided by operating activities	<u>285,145</u>	<u>247,752</u>	<u>135,203</u>
Cash flows from investing activities:			
Additions to property and equipment	(64,411)	(36,041)	(25,444)
Purchases of short- and long-term marketable securities	(33,027)	(24,311)	(19,726)
Proceeds from maturities of short- and long-term marketable securities	31,976	18,140	18,785
Acquisitions of businesses, net of cash acquired	(86,737)	(3,000)	(4,960)
Purchases of investments	(7,500)	(1,000)	—
Settlement of net investment hedges	9,675	—	—
Proceeds from sales of investments	—	—	15,218
Purchase of intangible asset	—	(3,000)	—
Net cash used by investing activities	<u>(150,024)</u>	<u>(49,212)</u>	<u>(16,127)</u>
Cash flows from financing activities:			
Borrowings under credit facility	205,000	250,000	150,000
Repayments of borrowings under credit facility	(180,000)	(320,000)	(190,000)
Repurchases of common stock	(114,994)	(1,100,000)	(50,991)
Proceeds from issuance of common stock	12,975	1,015,654	10,778
Payments of withholding taxes in connection with vesting of stock-based awards	(44,366)	(45,374)	(26,654)
Credit facility origination costs	—	(2,851)	(184)
Contingent consideration	(1,575)	(8,275)	(11,054)
Net cash used by financing activities	<u>(122,960)</u>	<u>(210,846)</u>	<u>(118,105)</u>
Effect of exchange rate changes on cash, cash equivalents and restricted cash	(2,565)	(7,810)	1,066
Net increase (decrease) in cash, cash equivalents and restricted cash	9,596	(20,116)	2,037
Cash, cash equivalents and restricted cash, beginning of year	261,093	281,209	279,172
Cash, cash equivalents and restricted cash, end of year	<u>\$ 270,689</u>	<u>\$ 261,093</u>	<u>\$ 281,209</u>
Supplemental disclosure of non-cash financing activities:			
Fair value of contingent consideration recorded for acquisition	<u>\$ —</u>	<u>\$ 2,100</u>	<u>\$ —</u>

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

PTC Inc.
CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY
(in thousands)

	Common Stock		Additional Paid-in Capital	Accumulated Deficit	Accumulated Other Comprehensive Loss	Total Stockholders' Equity
	Shares	Amount				
Balance as of September 30, 2016	114,968	\$ 1,150	\$ 1,598,548	\$ (657,079)	\$ (99,953)	\$ 842,666
Common stock issued for employee stock-based awards	1,586	15	(15)	—	—	—
Shares surrendered by employees to pay taxes related to stock-based awards	(544)	(5)	(26,649)	—	—	(26,654)
Compensation expense from stock-based awards	—	—	76,708	—	—	76,708
Common stock issued for employee stock purchase plan	269	3	10,775	—	—	10,778
Excess tax benefits from stock-based awards	—	—	644	—	—	644
Net income	—	—	—	6,239	—	6,239
Repurchases of common stock	(946)	(10)	(50,981)	—	—	(50,991)
Unrealized loss on cash flow hedges, net of tax	—	—	—	—	(299)	(299)
Foreign currency translation adjustment	—	—	—	—	16,593	16,593
Unrealized loss on marketable securities, net of tax	—	—	—	—	(22)	(22)
Change in pension benefits, net of tax	—	—	—	—	9,774	9,774
Balance as of September 30, 2017	115,333	\$ 1,153	\$ 1,609,030	\$ (650,840)	\$ (73,907)	\$ 885,436
ASU 2016-09 Adoption	—	—	681	(556)	—	125
Common stock issued for employee stock-based awards	1,830	18	(18)	—	—	—
Shares surrendered by employees to pay taxes related to stock-based awards	(664)	(6)	(45,368)	—	—	(45,374)
Common stock issued	10,582	106	995,394	—	—	995,500
Common stock issued for employee stock purchase plan	292	2	15,652	—	—	15,654
Compensation expense from stock-based awards	—	—	82,939	—	—	82,939
Net income	—	—	—	51,987	—	51,987
Repurchases of common stock	(9,392)	(93)	(1,099,907)	—	—	(1,100,000)
Unrealized gain on cash flow hedges, net of tax	—	—	—	—	1,928	1,928
Foreign currency translation adjustment	—	—	—	—	(11,767)	(11,767)
Unrealized loss on marketable securities, net of tax	—	—	—	—	(269)	(269)
Change in pension benefits, net of tax	—	—	—	—	(1,570)	(1,570)
Balance as of September 30, 2018	117,981	\$ 1,180	\$ 1,558,403	\$ (599,409)	\$ (85,585)	\$ 874,589
ASU 2016-16 Adoption	—	—	—	72,261	—	72,261
ASC 606 Adoption	—	—	—	363,218	—	363,218
Common stock issued for employee stock-based awards	1,495	15	(15)	—	—	—
Shares surrendered by employees to pay taxes related to stock-based awards	(504)	(5)	(44,361)	—	—	(44,366)
Common stock issued	—	—	(140)	—	—	(140)
Common stock issued for employee stock purchase plan	275	3	17,612	—	—	17,615
Compensation expense from stock-based awards	—	—	86,400	—	—	86,400
Net loss	—	—	—	(27,460)	—	(27,460)
Repurchases of common stock	(4,348)	(44)	(114,950)	—	—	(114,994)
Unrealized loss on cash flow hedges, net of tax	—	—	—	—	(385)	(385)
Unrealized gain on net investment hedges, net of tax	—	—	—	—	5,087	5,087
Foreign currency translation adjustment	—	—	—	—	(24,755)	(24,755)
Unrealized gain on marketable securities, net of tax	—	—	—	—	530	530
Change in pension benefits, net of tax	—	—	—	—	(5,602)	(5,602)
Balance as of September 30, 2019	114,899	\$ 1,149	\$ 1,502,949	\$ (191,390)	\$ (110,710)	\$ 1,201,998

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

PTC Inc.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

1. Description of Business and Basis of Presentation

Business

PTC Inc. was incorporated in 1985 and is headquartered in Boston, Massachusetts. PTC is a global software and services company that delivers a technology platform and solutions to help companies design, manufacture, operate, and service things for a smart, connected world.

Basis of Presentation

Our fiscal year-end is September 30. The consolidated financial statements include PTC Inc. (the parent company) and its wholly owned subsidiaries, including those operating outside the U.S. All intercompany balances and transactions have been eliminated in the consolidated financial statements.

We prepare our financial statements under generally accepted accounting principles in the U.S. that require management to make estimates and assumptions that affect the amounts reported and the related disclosures. Actual results could differ from these estimates.

Changes in Presentation and Reclassifications

On October 1, 2018, we adopted ASU No. 2014-09, Revenue from Contracts with Customers: Topic 606 (ASC 606). Results for reporting periods beginning on or after October 1, 2018 are presented under ASC 606, while prior period amounts are not adjusted and continue to be reported in accordance with the guidance provided by ASC 985-605, *Software-Revenue Recognition* and revenues for non-software deliverables in accordance with ASC 605-25, *Revenue Recognition, Multiple-Element Arrangements* (ASC 605). In connection with the adoption of ASC 606, we changed our presentation of the statement of operations to reflect revenue and associated costs as license, support and cloud services, and professional services. For the prior year period, all components of subscription licenses (including support) are included in license revenue. Prior to our adoption of ASC 606, revenues from subscription licenses and support thereon were not separated and were previously included in subscription revenue in our consolidated statement of operations since we did not have VSOE of fair value for support on subscription sales. In addition, revenue and costs associated with our cloud services, which are immaterial and were previously reported in subscription revenue, are classified as support and cloud services for all periods presented.

Effective at the beginning of fiscal 2019, in accordance with the adoption of ASU 2017-07, Compensation-Retirement Benefits (Topic 715): Improving the Presentation of Net Periodic Pension Cost and Net Periodic Postretirement Benefit Cost, all non-service net periodic pension costs are now presented in Other income (expense), net on the Consolidated Statement of Operations. The prior period non-service net periodic pension cost amounts have been reclassified for comparability.

Effective at the beginning of fiscal 2019, in accordance with the adoption of ASU 2016-18, Statement of Cash Flows (Topic 230): Restricted Cash, restricted cash is now included with cash and cash equivalents on the Consolidated Statements of Cash Flows. The prior period restricted cash amounts have been reclassified for comparability. As of September 30, 2019 and September 30, 2018, \$1.1 million of restricted cash was included in other current assets.

Effective at the beginning of fiscal 2018, in accordance with the adoption of ASU 2016-09, Compensation - Stock Compensation (Topic 718): Improvements to Employee Share-Based Payment Accounting, excess tax benefits are now classified as an operating activity on the statement of cash flows rather than as a financing activity. The prior period excess tax benefits have been reclassified for comparability.

2. Summary of Significant Accounting Policies

Foreign Currency Translation

For our non-U.S. operations where the functional currency is the local currency, we translate assets and liabilities at exchange rates in effect at the balance sheet date and record translation adjustments in stockholders' equity. For our non-U.S. operations where the U.S. dollar is the functional currency, we remeasure monetary assets and liabilities using exchange rates in effect at the balance sheet date and non-monetary assets and liabilities at historical rates and record resulting exchange gains or losses in foreign currency net losses in the Consolidated Statements of Operations. We translate income

statement amounts at average rates for the period. Transaction gains and losses are recorded in foreign currency net losses in the Consolidated Statements of Operations.

Revenue Recognition

Nature of Products and Services

Our sources of revenue include: (1) subscription, (2) perpetual license, (3) support for perpetual licenses and (4) professional services. Revenue is derived from the licensing of computer software products and from related support and/or professional services contracts. Effective October 1, 2018, we record revenues in accordance with the guidance provided by ASC 606, Revenue from Contracts with Customers. In accordance with ASC 606, revenue is recognized when a customer obtains control of promised products or services. The amount of revenue recognized reflects the consideration that we expect to be entitled to receive in exchange for these products or services. To achieve the core principle of this standard, we apply the following five steps:

- (1) Identify the contract with the customer,
- (2) identify the performance obligations in the contract,
- (3) determine the transaction price,
- (4) allocation the transaction price to performance obligations in the contract,
- (5) recognize revenue when or as we satisfy a performance obligation.

We enter into contracts that include combinations of products, support and professional services, which are accounted for as separate performance obligations with differing revenue recognition patterns referenced below.

Performance Obligation	When Performance Obligation is Typically Satisfied
Term-based subscriptions	
On-premise software licenses	Point in Time: Upon the later of when the software is made available or the subscription term commences
Support and cloud-based offerings	Over Time: Ratably over the contractual term; commencing upon the later of when the software is made available or the subscription term commences
Perpetual software licenses	Point in Time: when the software is made available
Support for perpetual software licenses	Over Time: Ratably over the contractual term
Professional services	Over time: As services are provided

Through 2018, we recorded revenues for software related deliverables in accordance with the guidance provided by ASC 985-605, *Software-Revenue Recognition* and revenues for non-software deliverables in accordance with ASC 605-25, *Revenue Recognition, Multiple-Element Arrangements*. Under those standards, revenue is recorded when the following criteria are met: (1) persuasive evidence of an arrangement exists, (2) delivery has occurred (generally, FOB shipping point or electronic distribution), (3) the fee is fixed or determinable, and (4) collection is probable. We exercise judgment and use estimates in connection with determining the amounts of software license and services revenues to be recognized in each accounting period.

Judgments and Estimates

Our contracts with customers for subscriptions typically include commitments to transfer term-based, on-premise software licenses bundled with support and/or cloud services. On-premise software is determined to be a distinct performance obligation from support which is sold for the same term of the subscription. For subscription arrangements which include cloud services, we assess whether the cloud component is highly interrelated with on-premise term-based software licenses. Other than a limited population of subscriptions, the cloud component is not currently deemed to be interrelated with the on-premise term software and, as a result, cloud services are accounted for as a distinct performance obligation from the software and support components of the subscription.

Judgment is required to allocate the transaction price to each performance obligation. We use the estimated standalone selling price method to allocate the transaction price for items that are not sold separately. The estimated standalone selling price is determined using all information reasonably available to us, including market conditions and other observable inputs. The corresponding revenues are recognized as the related performance obligations are satisfied. We determined that 50% to 55% of the estimated standalone selling price for subscriptions that contain distinct license and support

performance obligations are attributable to software licenses and 45% to 50%, depending upon the product offering, is attributable to support for those licenses.

Our multi-year, non-cancellable on-premise subscription contracts provide customers with an annual right to exchange software within the original subscription with other software. Although the exchange right is limited to software products within a similar product grouping, the exchange right is not limited to products with substantially similar features and functionality as those originally delivered. We determined that this right to exchange previously delivered software for different software represents variable consideration to be accounted for as a liability. We have identified a standard portfolio of contracts with common characteristics and applied the expected value method of determining variable consideration associated with this right. Additionally, where there are isolated situations that are outside of the standard portfolio of contracts due to contract size, longer contract duration, or other unique contractual terms, we use the most likely amount method to determine the amount of variable consideration. In both circumstances, the variable consideration included in the transaction price is constrained to the extent it is probable that a significant reversal in the amount of cumulative revenue recognized will not occur when the uncertainty associated with the variable consideration is subsequently resolved. As of September 30, 2019, the total refund liability was \$22.9 million, primarily associated with the annual right to exchange on-premise subscription software.

Practical Expedients

We elected certain practical expedients with the adoption of the new revenue standard. We do not account for significant financing components if the period between revenue recognition and when the customer pays for the products or services is one year or less. Additionally, we recognize revenue equal to the amount we have a right to invoice, when the amount corresponds directly with the value to the customer of our performance date.

Cash Equivalents

Our cash equivalents are invested in money market accounts and time deposits of financial institutions. We have established guidelines relative to credit ratings, diversification and maturities that are intended to maintain safety and liquidity. Cash equivalents include highly liquid investments with maturity periods of three months or less when purchased.

Marketable Securities

Our investment portfolio consists of certificates of deposit, commercial paper, corporate notes/bonds and government securities that have a maximum maturity of three years. The longer the duration of these securities, the more susceptible they are to changes in market interest rates and bond yields. All unrealized losses are due to changes in market interest rates, bond yields and/or credit ratings.

We review our investments to identify and evaluate investments that have an indication of possible impairment. We concluded that, at September 30, 2019, the unrealized losses were temporary.

Non-Marketable Equity Investments

We account for non-marketable equity investments at cost, less any impairment, plus or minus adjustments resulting from observable price changes in orderly transactions for identical or similar investments of the same issuer. We monitor non-marketable equity investments for events that could indicate that the investments are impaired, such as deterioration in the investee's financial condition and business forecasts, and lower valuations in recent or proposed financings. Changes in fair value of non-marketable equity investments are recorded in Other income (expense), net on the Consolidated Statements of Operations. The carrying value of our non-marketable equity investments is recorded in Other assets on the Consolidated Balance Sheets and totaled \$9.4 million and \$1.7 million as of September 30, 2019 and 2018, respectively. In 2017, we sold a cost method investment in a private company for \$13.7 million for a gain of approximately \$3.7 million.

Concentration of Credit Risk and Fair Value of Financial Instruments

The amounts reflected in the Consolidated Balance Sheets for cash and cash equivalents, accounts receivable and accounts payable approximate their fair value due to their short maturities. Financial instruments that potentially subject us to concentration of credit risk consist primarily of investments, trade accounts receivable and foreign currency derivative instruments. Our cash, cash equivalents, and foreign currency derivatives are placed with financial institutions with high credit standings. Our credit risk for derivatives is also mitigated due to the short-term nature of the contracts. Our customer base consists of large numbers of geographically diverse customers dispersed across many industries. No individual

customer comprised more than 10% of our trade accounts receivable as of September 30, 2019 or 2018 or comprised more than 10% of our revenue for the years ended September 30, 2019, 2018 or 2017.

Fair Value Measurements

Fair value is defined as the price that would be received from selling an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. When determining the fair value measurements for assets and liabilities required to be recorded at fair value, we consider the principal or most advantageous market in which we would transact and consider assumptions that market participants would use when pricing the asset or liability, such as inherent risk, transfer restrictions, and risk of nonperformance. Generally accepted accounting principles prescribe a fair value hierarchy that requires an entity to maximize the use of observable inputs and minimize the use of unobservable inputs when measuring fair value. A financial instrument's categorization within the fair value hierarchy is based upon the lowest level of input that is significant to the fair value measurement. Three levels of inputs that may be used to measure fair value:

- Level 1: quoted prices (unadjusted) in active markets for identical assets or liabilities;
- Level 2: inputs other than Level 1 that are observable, either directly or indirectly, such as quoted prices in active markets for similar assets or liabilities, quoted prices for identical or similar assets or liabilities in markets that are not active, or other inputs that are observable or can be corroborated by observable market data for substantially the full term of the assets or liabilities; or
- Level 3: unobservable inputs that are supported by little or no market activity and that are significant to the fair value of the assets or liabilities.

A financial instrument's level within the fair value hierarchy is based on the lowest level of any input that is significant to the fair value measurement.

Allowance for Doubtful Accounts

We maintain allowances for doubtful accounts for estimated losses resulting from the inability of our customers to make required payments. In determining the adequacy of the allowance for doubtful accounts, management specifically analyzes individual accounts receivable, historical bad debts, customer concentrations, customer credit-worthiness, current economic conditions, and accounts receivable aging trends. Our allowance for doubtful accounts on trade accounts receivable was \$0.7 million as of September 30, 2019, \$0.6 million as of September 30, 2018, \$1.1 million as of September 30, 2017 and \$1.0 million as of September 30, 2016. Uncollectible trade accounts receivable written-off, net of recoveries, were \$0.2 million, \$1.0 million and \$1.5 million in 2019, 2018 and 2017, respectively. Bad debt expense was \$0.3 million, \$0.5 million and \$1.5 million in 2019, 2018 and 2017, respectively, and is included in general and administrative expenses in the accompanying Consolidated Statements of Operations.

Derivatives

Generally accepted accounting principles require all derivatives, whether designated in a hedging relationship or not, to be recorded on the balance sheet at fair value. Our earnings and cash flows are subject to fluctuations due to changes in foreign currency exchange rates. Our most significant foreign currency exposures relate to Western European countries, Japan, China and Canada. Our foreign currency risk management strategy is principally designed to mitigate the future potential financial impact of changes in the U.S. dollar value of anticipated transactions and balances denominated in foreign currency, resulting from changes in foreign currency exchange rates. We enter into derivative transactions, specifically foreign currency forward contracts, to manage the exposures to foreign currency exchange risk to reduce earnings volatility. We do not enter into derivatives transactions for trading or speculative purposes. For a description of our non-designated hedge and cash flow hedge activities see *Note 17. Derivative Financial Instruments*.

Non-Designated Hedges

We hedge our net foreign currency monetary assets and liabilities primarily resulting from foreign currency denominated receivables and payables with foreign exchange forward contracts to reduce the risk that our earnings and cash flows will be adversely affected by changes in foreign currency exchange rates. These contracts have maturities of up to approximately three months. Generally, we do not designate these foreign currency forward contracts as hedges for accounting purposes and changes in the fair value of these instruments are recognized immediately in earnings. Gains or losses on the underlying foreign-denominated balance are offset by the loss or gain on the forward contract and are included in foreign currency losses, net.

Cash Flow Hedges

Our foreign exchange risk management program objective is to identify foreign exchange exposures and implement appropriate hedging strategies to minimize earnings fluctuations resulting from foreign exchange rate movements.

In 2017, 2018 and the first quarter of 2019 we designated certain foreign exchange forward contracts as cash flow hedges of Euro, Yen and SEK denominated intercompany forecast revenue transactions (supported by third party sales). No cash flow hedges were entered after the first quarter of 2019. All foreign exchange forward contracts were carried at fair value on the Consolidated Balance Sheets and had maximum duration of up to 15 months.

Cash flow hedge relationships were designated at inception, and effectiveness was assessed prospectively and retrospectively using monthly regression analysis. As the forward contracts were highly effective in offsetting changes to future cash flows on the hedged transactions, we record the effective portion of changes in these cash flow hedges in accumulated other comprehensive income and subsequently reclassified into earnings in the same period during which the hedged transactions were recognized in earnings. Changes in the fair value of foreign exchange forward contracts due to changes in time value were included in the assessment of effectiveness. Our derivatives were not subject to any credit contingent features. We managed credit risk with counter-parties by trading among several counter-parties and we reviewed our counter-parties' credit at least quarterly.

Net Investment Hedges

We translate balance sheet accounts of subsidiaries with foreign functional currencies into the U.S. Dollars using the exchange rate at each balance sheet date. Resulting translation adjustments are reported as a component of accumulated other comprehensive loss on the Consolidated Balance Sheet. We designate certain foreign exchange forward contracts as net investment hedges against exposure on translation of balance sheet accounts of Euro functional subsidiaries. Net investment hedges partially offset the impact of foreign currency translation adjustment recorded in accumulated other comprehensive loss on the Consolidated Balance Sheet. All foreign exchange forward contracts are carried at fair value on the Consolidated Balance Sheet and the maximum duration of foreign exchange forward contracts is approximately three months.

Net investment hedge relationships are designated at inception, and effectiveness is assessed retrospectively on a quarterly basis using the net equity position of Euro functional subsidiaries. As the forward contracts are highly effective in offsetting exchange rate exposure, we record changes in these net investment hedges in accumulated other comprehensive loss and subsequently reclassify them to foreign currency translation adjustment in accumulated other comprehensive loss at the time of forward contract maturity. Changes in the fair value of foreign exchange forward contracts due to changes in time value are excluded from the assessment of effectiveness. Our derivatives are not subject to any credit contingent features. We manage credit risk with counter-parties by trading among several counter-parties, and we review our counter-parties' credit at least quarterly.

Property and Equipment

Property and equipment are recorded at cost and depreciated using the straight-line method over their estimated useful lives. Computer hardware and software are typically amortized over three to five years, and furniture and fixtures over three to eight years. Leasehold improvements are amortized over the shorter of their useful lives or the remaining terms of the related leases. Property and equipment under capital leases are amortized over the lesser of the lease terms or their estimated useful lives. Maintenance and repairs are charged to expense when incurred; additions and improvements are capitalized. When an item is sold or retired, the cost and related accumulated depreciation is relieved, and the resulting gain or loss, if any, is recognized in income.

Software Development Costs

We incur costs to develop computer software to be licensed or otherwise marketed to customers. Research and development costs are expensed as incurred, except for costs of internally developed or externally purchased software that qualify for capitalization. Development costs for software to be sold externally incurred subsequent to the establishment of technological feasibility, but prior to the general release of the product, are capitalized and, upon general release, are amortized using the greater of either the straight-line method over the expected life of the related products or based upon the pattern in which economic benefits related to such assets are realized. The straight-line method is used if it

approximates the same amount of expense as that calculated using the ratio that current period gross product revenues bear to total anticipated gross product revenues. No development costs for software to be sold externally were capitalized in 2019, 2018 or 2017. In 2018, we acquired capitalized software of \$0.8 million. These assets are included in acquired intangible assets in the accompanying Consolidated Balance Sheets.

Goodwill, Acquired Intangible Assets and Long-lived Assets

Goodwill is the amount by which the purchase price in a business acquisition exceeds the fair values of net identifiable assets on the date of purchase.

Goodwill is evaluated for impairment annually, as of the end of the third quarter, or more frequently if events or changes in circumstances indicate that the asset might be impaired. Factors we consider important, on an overall company basis and reportable-segment basis, when applicable, that could trigger an impairment review include significant under-performance relative to historical or projected future operating results, significant changes in our use of the acquired assets or the strategy for our overall business, significant negative industry or economic trends, a significant decline in our stock price for a sustained period and a reduction of our market capitalization relative to net book value.

Our annual goodwill impairment test is based on either a qualitative (Step 0) or quantitative (Step 1) assessment and is designed to determine whether we believe it is more likely than not that the fair values of our reporting units exceed their carrying values. A Step 0 assessment includes a review of qualitative factors including company specific (financial performance and long-range plans), industry, and macroeconomic factors, and a consideration of the fair value of each reporting unit at the last valuation date. A Step 1 assessment is a quantitative analysis that compares the fair value of the reporting unit to its carrying value. If the reporting unit's carrying value exceeds its fair value, we record an impairment loss equal to the difference between the carrying value of goodwill and its implied fair value. We estimate the fair values of our reporting units using discounted cash flow valuation models. Those models require estimates of future revenues, profits, capital expenditures, working capital, terminal values based on revenue multiples, and discount rates for each reporting unit. We estimate these amounts by evaluating historical trends, current budgets, operating plans and industry data.

We completed our annual goodwill impairment review as of June 29, 2019 based on a Step 0 assessment and concluded that no impairment charge was required as of that date.

Long-lived assets primarily include property and equipment and acquired intangible assets with finite lives (including purchased software, customer lists and trademarks). Purchased software is amortized over periods up to 11 years, customer lists are amortized over periods up to 12 years and trademarks are amortized over periods up to 12 years. We review long-lived assets for impairment when events or changes in business circumstances indicate that the carrying amount of the assets may not be fully recoverable or that the useful lives of those assets are no longer appropriate. An impairment test is based on a comparison of the undiscounted cash flows to the recorded value of the asset or asset group. If impairment is indicated, the asset is written down to its estimated fair value based on a discounted cash flow analysis.

Advertising Expenses

Advertising costs are expensed as incurred. Total advertising expenses incurred were \$3.6 million, \$2.9 million and \$2.5 million in 2019, 2018 and 2017, respectively and are included in sales and marketing expenses in the accompanying Consolidated Statements of Operations.

Income Taxes

Our income tax expense includes U.S. and international income taxes. Certain items of income and expense are not reported in tax returns and financial statements in the same year. The tax effects of these differences are reported as deferred tax assets and liabilities. Deferred tax assets are recognized for the estimated future tax effects of deductible temporary differences and tax operating loss and credit carryforwards. Changes in deferred tax assets and liabilities are recorded in the provision for income taxes. We assess the likelihood that our deferred tax assets will be recovered from future taxable income and, to the extent we believe that it is more likely than not that all or a portion of deferred tax assets will not be realized, we establish a valuation allowance. To the extent we establish a valuation allowance or increase this allowance in a period, we include an expense within the tax provision in the Consolidated Statements of Operations.

Comprehensive Income (Loss)

Comprehensive income (loss) consists of net income (loss) and other comprehensive income (loss), which includes foreign currency translation adjustments, changes in unrecognized actuarial gains and losses (net of tax) related to pension benefits, unrealized gains and losses on hedging instruments and unrealized gains and losses on marketable securities. For the purposes of comprehensive income disclosures, we do not record tax provisions or benefits for the net changes in the foreign currency translation adjustment, as we intend to reinvest permanently undistributed earnings of our foreign subsidiaries. Accumulated other comprehensive loss is reported as a component of stockholders' equity and, as of September 30, 2019 and 2018, was comprised of cumulative translation adjustment losses of \$91.2 million and \$66.4 million, respectively, unrecognized actuarial losses related to pension benefits of \$34.9 million (\$24.8 million net of tax) and \$27.0 million (\$19.2 million net of tax), respectively, unrecognized gain on marketable securities of \$0.1 million and unrecognized loss of \$0.4 million, respectively. Cash flow hedges were discontinued in 2019 and in 2018 unrecognized gain on cash flow hedging instruments was \$0.4 million (\$0.4 million net of tax). In 2019 we started a net investment hedge program and had accumulated net gain of \$6.8 million (\$5.1 million net of tax).

Earnings (loss) per Share (EPS)

Basic EPS is calculated by dividing net income by the weighted average number of shares outstanding during the period. Unvested restricted shares, although legally issued and outstanding, are not considered outstanding for purposes of calculating basic earnings per share. Diluted EPS is calculated by dividing net income by the weighted average number of shares outstanding plus the dilutive effect, if any, of outstanding stock options, restricted shares and restricted stock units using the treasury stock method. The calculation of the dilutive effect of outstanding equity awards under the treasury stock method includes consideration of proceeds from the assumed exercise of stock options, unrecognized compensation expense and any tax benefits as additional proceeds. Due to the net loss generated in the year ended September 30, 2019, approximately 1.0 million restricted stock units have been excluded from the computation of diluted EPS in that year as the effect would have been anti-dilutive.

The following table presents the calculation for both basic and diluted EPS:

(in thousands, except per share data)

	Year ended September 30,		
	2019	2018	2017
Net income (loss)	\$ (27,460)	\$ 51,987	\$ 6,239
Weighted average shares outstanding	117,724	116,390	115,523
Dilutive effect of employee stock options, restricted shares and restricted stock units	—	1,768	1,833
Diluted weighted average shares outstanding	117,724	118,158	117,356
Basic earnings (loss) per share	\$ (0.23)	\$ 0.45	\$ 0.05
Diluted earnings (loss) per share	\$ (0.23)	\$ 0.44	\$ 0.05

Stock-Based Compensation

We measure the compensation cost of employee services received in exchange for an award of equity instruments based on the grant-date fair value of the award. That cost is recognized over the period during which an employee is required to provide service in exchange for the award. See *Note 12. Equity Incentive Plan* for a description of the types of stock-based awards granted, the compensation expense related to such awards and detail of equity-based awards outstanding. See *Note 8. Income Taxes* for detail of the tax benefit related to stock-based compensation recognized in the Consolidated Statements of Operations.

Recently Adopted Accounting Pronouncements

Revenue Recognition

On October 1, 2018, we adopted ASC 606, which supersedes substantially all existing revenue recognition guidance under U.S. GAAP. We adopted ASC 606 using the modified retrospective method, under which the cumulative effect of initially applying ASC 606 was recorded as a reduction to accumulated deficit with no restatement of comparative periods.

The core principle of ASC 606 is to recognize revenue when promised goods or services are transferred to a customer in an amount that reflects the consideration that is expected to be received for those goods or services. Under the new guidance, an entity is required to evaluate revenue recognition

through a five-step process: (1) identifying a contract with a customer; (2) identifying the performance obligations in the contract; (3) determining the transaction price; (4) allocating the transaction price to the performance obligations in the contract; and (5) recognizing revenue when (or as) the entity satisfies a performance obligation. The standard also requires disclosure of the nature, amount, timing and uncertainty of revenue and cash flows arising from contracts with customers. In applying the principles of ASC 606, more judgment and estimates are required within the revenue recognition process than is required under previous U.S. GAAP, including identifying performance obligations, estimating the amount of variable consideration to include in the transaction price, and estimating the value of each performance obligation to allocate the total transaction price to each separate performance obligation.

The most significant impact of ASC 606 relates to accounting for our subscription arrangements that include term-based on-premise software licenses bundled with support. Under previous GAAP (ASC 605, through September 30, 2018), revenue attributable to these subscription licenses was recognized ratably over the term of the arrangement because VSOE does not exist for the undelivered support element as it is not sold separately. Under the new standard, the requirement to have VSOE for undelivered elements to enable the separation of revenue for the delivered software licenses is eliminated. Accordingly, under the new standard we recognize as revenue a portion of the subscription fee upon delivery of the software license. Revenue recognition related to our perpetual licenses and related support contracts, professional services and cloud offerings is substantially unchanged, with support and cloud revenue being recorded ratably over the contract term. Due to the complexity of certain of our contracts, the actual revenue recognition treatment required under the new standard may be dependent on contract-specific terms and, therefore, may vary in some instances.

Certain of our multi-year subscription contracts with start dates on or after October 1, 2018 contain a limited annual cancellation right. For such cancellable subscription contracts, we consider each annual period a discrete contract. We recognize the license portion at the beginning of each one-year contract period and the support portion ratably over each one-year contractual period. Early in the fourth quarter of 2019, we discontinued offering the cancellation right for substantially all new contracts.

Under the modified retrospective method, we evaluated each contract that was ongoing on October 1, 2018 as if that contract had been accounted for under ASC 606 from contract inception. Some license revenue related to subscription arrangements that would have been recognized in future periods under current GAAP was recast under ASC 606 as if the revenue had been recognized in prior periods. Under this transition method, we did not adjust historical reported revenue amounts. Instead, the revenue that would have been recognized under this method prior to the adoption date was recorded as an adjustment to accumulated deficit and will not be recognized as revenue in future periods as previously expected. Because license revenue associated with subscription contracts is recognized up front instead of over time under ASC 606, a material portion of our deferred revenue was adjusted to accumulated deficit upon adoption.

Another significant provision under ASC 606 includes the capitalization and amortization of costs associated with obtaining a contract, such as sales commissions. Prior to October 1, 2018, we expensed commissions in the period incurred. Under ASC 606, direct and incremental costs to acquire a contract are capitalized and amortized using a systematic basis over the pattern of transfer of the goods and services to which the asset relates.

Refer to *Note 3. Revenue from Contracts with Customers* for further detail about the impact of the adoption of ASC 606 and further disclosures.

Income Taxes

In October 2016, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update ASU 2016-16, *Income Taxes (Topic 740): Intra-Entity Transfers of Assets Other Than Inventory*. The purpose of ASU 2016-16 is to simplify the income tax accounting of an intra-entity transfer of an asset other than inventory and to record its effect when the transfer occurs. We adopted this standard beginning in the first quarter of 2019 using the modified retrospective method with a cumulative effect adjustment to accumulated deficit of \$72.3 million, with a corresponding increase of \$75.3 million to deferred tax assets, a \$6.0 million decrease to income tax assets and a \$3.0 million decrease to income tax liabilities. The adjustment primarily relates to deductible amortization of intangible assets in Ireland. Post adoption, our effective tax rate no longer includes the benefit of this amortization.

Pension Accounting

In March 2017, the FASB issued ASU 2017-07, Compensation-Retirement Benefits (Topic 715): Improving the Presentation of Net Periodic Pension Cost and Net Periodic Postretirement Benefit Cost, which provides guidance on the capitalization, presentation and disclosure of net benefit costs related to post-retirement benefit plans. We adopted the new guidance in the first quarter of 2019 on a full retrospective basis, which resulted in the retrospective reclassification of \$0.6 million and \$0.9 million of non-service net periodic pension cost for the years ended September 30, 2018 and 2017, respectively, from line items within cost of revenue and operating expenses into Other income (expense), net on the Consolidated Statement of Operations.

Equity Investments

In January 2016, the FASB issued ASU 2016-01, Recognition and Measurement of Financial Assets and Financial Liabilities, which provides guidance for the recognition, measurement, presentation, and disclosure of financial assets and liabilities and requires equity securities to be measured at fair value, unless the measurement alternative method has been elected for equity investments without readily determinable fair values. Adoption of this guidance in the first quarter of fiscal 2019 did not have a material impact on our consolidated financial statements.

Restricted Cash

In November 2016, the FASB issued ASU 2016-18, Statement of Cash Flows (Topic 230): Restricted Cash. The new guidance requires that a statement of cash flows explain the change during the period in the total of cash, cash equivalents and amounts generally described as restricted cash or restricted cash equivalents. Therefore, amounts generally described as restricted cash and restricted cash equivalents should be included with cash and cash equivalents when reconciling the beginning-of-period and end-of-period total amounts shown on the Statement of Cash Flows. Adoption of this guidance in the first quarter of fiscal 2019 did not have a material impact on our consolidated financial statements.

Pending Accounting Pronouncements

Leases

In February 2016, the FASB issued ASU No. 2016-02, Leases (Topic 842), which will replace the existing guidance in ASC 840, Leases. The updated standard aims to increase transparency and comparability among organizations by requiring lessees to recognize lease assets and lease liabilities on the balance sheet and to disclose important information about leasing arrangements. We will adopt ASU 2016-02 effective October 1, 2019 (the effective date).

Financial information for the comparative periods will not be recast. We intend to elect the available practical expedients, including carrying forward the classification of our existing leases and our assessment of their remaining lease terms. Our operating lease commitments will be subject to the new standard and recognized as operating lease liabilities and right-of-use assets upon our adoption of the standard.

ASU 2016-02 will materially increase our total assets and total liabilities that we report relative to such amounts prior to adoption. We expect to recognize operating lease liabilities between \$233 million to \$238 million and right-of-use assets between \$162 million to \$167 million. The expected operating lease liabilities are calculated based on the present value of the remaining minimum lease payments for existing operating leases as of September 30, 2019. The expected right-of-use assets reflect adjustments for derecognition of deferred leasing incentives.

Derivative Financial Instruments

In August 2017, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update (ASU) No. 2017-12, "Derivatives and Hedging (Topic 815) Targeted Improvements to Accounting for Hedging Activities", which amends and simplifies existing guidance in order to allow companies to more accurately present the economic effects of risk management activities in the financial statements. The guidance is effective for annual reporting periods beginning after December 15, 2018 (our fiscal 2020) including interim reporting periods within those annual reporting periods, and early adoption is permitted. We are currently evaluating the impact of the new guidance on our consolidated financial statements.

3. Revenue from Contracts with Customers

Upon adoption of ASC 606, we recorded a decrease in accumulated deficit of \$432.2 million (\$363.2 million, net of tax) due to the cumulative effect of the ASC 606 adoption, with the impact primarily

derived from revenue related to on-premise subscription software licenses, net of tax due to the cumulative effect of the ASC 606 adoption, with an impact from revenue adjustments of \$366.8 million primarily derived from acceleration of revenue related to on-premise subscription software licenses. The revenue related adjustment was reflected on the adjusted opening balance sheet as an increase to unbilled receivables of \$218.5 million, decrease to deferred revenue of \$143.2 million and an increase to other assets of \$5.1 million.

Contract Assets and Contract Liabilities

(in thousands)

	As Reported	As Adjusted
	September 30, 2019	October 1, 2018
Contract asset	\$ 21,038	\$ 25,037
Deferred revenue	\$ 396,632	\$ 356,263

As of September 30, 2019, our contract assets are expected to be transferred to receivables within the next 12 months and therefore are included in other current assets. Approximately \$17.8 million of the October 1, 2018 contract asset balance was transferred to receivables during the year ended September 30, 2019 as a result of the right to payment becoming unconditional. The majority of both the contract asset balance and the amounts transferred to receivables relates to two large professional services contracts with invoicing terms based on performance milestones. Additions to contract assets of approximately \$13.8 million related to revenue recognized in the period, net of billings. There were no impairments of contract assets during the year ended September 30, 2019.

During the year ended September 30, 2019, \$333.7 million of revenue that was included in the deferred revenue opening balance was recognized, respectively. There were additional deferrals of \$374.1 million, which were primarily related to new billings. Adjusted opening balance of total short- and long-term receivables as of October 1, 2018 under ASC 606 was \$503.7 million, compared to total short- and long-term receivables as of September 30, 2019 under ASC 606 of \$412.5 million.

Costs to Obtain or Fulfill a Contract

The new revenue recognition standard requires the capitalization of certain incremental costs of obtaining a contract, which impacts the period in which we record our commission expense. Prior to our adoption of the new revenue standard, we recognized commissions expense as incurred. Under the new revenue recognition standard, we are required to recognize these expenses over the period of benefit associated with these costs. This results in a deferral of certain commission expenses each period. Upon adoption, we reduced our accumulated deficit by \$70.0 million and recognized an offsetting asset for deferred commission related to contracts that were not completed prior to October 1, 2018.

We recognize an asset for the incremental costs of obtaining a contract with a customer if the benefit of those costs is expected to be longer than one year. These deferred costs are amortized proportionately related to revenue over five years, which is generally longer than the term of the initial contract because of anticipated renewals as commissions for renewals are not commensurate with commissions related to our initial contracts. As of September 30, 2019, deferred costs of \$27.7 million were included in other current assets and \$64.8 million were included in other assets (non-current).

As the revenue recognition pattern has changed under ASC 606, the recognition of costs to fulfill contracts has also changed to match this pattern of recognition. As of October 1, 2018, this resulted in a \$2.8 million increase in our accumulated deficit with recognition of an offsetting current liability.

Remaining Performance Obligations

Our contracts with customers include amounts allocated to performance obligations that will be satisfied at a later date. The amounts include additional performance obligations that are not yet recorded in the consolidated balance sheets. As of September 30, 2019, amounts allocated to these additional contractual obligations are \$1,021 million, of which we expect to recognize approximately 90% over the next 24 months, with the remaining amount thereafter.

Disaggregation of Revenue

Revenue (in thousands)	Year Ended September 30,			
	As Reported ASC 606	ASC 605	As Reported ASC 605	As Reported ASC 605
	2019	2019	2018	2017
Subscription license	\$ 253,698			
Subscription support & cloud services	348,452			
Total subscription	602,150	\$ 667,597	\$ 482,027	\$ 279,246
Perpetual support	415,248	411,030	496,826	574,680
Total recurring revenue	1,017,398	1,078,627	978,853	853,926
Perpetual license	70,702	72,191	109,634	133,390
Total software revenue	1,088,100	1,150,818	1,088,487	987,316
Professional services	167,531	160,676	153,337	176,723
Total revenue	\$ 1,255,631	\$ 1,311,494	\$ 1,241,824	\$ 1,164,039

For further disaggregation of revenue by geographic region and product group see Note 18. *Segment and Geographic Information.*

Transition Disclosures

In accordance with the modified retrospective method transition requirements, we will present the financial statement line items impacted and adjusted to compare to presentation under ASC 605 for each of the interim and annual periods during the first year of adoption of ASC 606.

Subsequent to the adoption of ASC 606 and the issuance of our unaudited Condensed Consolidated Financial Statements for the three-months ended December 29, 2018, six-months ended March 30, 2019 and nine-months ended June 29, 2019, PTC's management identified errors in the application of ASC 606 for the calculation of the decrease in accumulated deficit upon adoption, as well as adoption balances for contract assets and deferred revenue as of October 1, 2018. The impact to our accumulated deficit was \$0.3 million (\$4.2 million, net of tax). The identified errors appeared only in the Notes to Condensed Consolidated Financial Statements and not in any of the individual Consolidated Financial Statements. Based on an analysis of the relevant quantitative and qualitative factors, we determined the impact was not material to any prior interim period. Therefore, management concluded that amendments of previously filed reports are not required.

We corrected the errors as of the adoption date by revising the following amounts presented in the Notes to Condensed Consolidated Financial Statements: 1) contract assets as of October 1, 2018 has been changed from \$26.2 million to \$25.0 million; 2) deferred revenue as of October 1, 2018 has been changed from \$357.5 million to \$356.3 million; 3) the decrease in accumulated deficit has been changed from \$431.9 million (\$367.4 million, net of tax) to \$432.2 million (\$363.2 million, net of tax).

The following tables present our Balance Sheets and Statements of Operations as reported under ASC 606 for the current period with comparative periods reported under ASC 605:

(in thousands)

	September 30,		
	As Reported ASC 606	ASC 605	As Reported ASC 605
	2019	2019	2018
ASSETS			
Current assets:			
Cash and cash equivalents	\$ 269,579	\$ 269,579	\$ 259,946
Short-term marketable securities	27,891	27,891	25,836
Accounts receivable ⁽¹⁾	372,743	107,921	129,297
Prepaid expenses	52,701	54,384	48,997
Other current assets ⁽²⁾	59,707	199,513	169,708
Total current assets	<u>782,621</u>	<u>659,288</u>	<u>633,784</u>
Property and equipment, net	105,531	105,531	80,613
Goodwill	1,238,179	1,238,179	1,182,457
Acquired intangible assets, net	169,949	169,949	200,202
Long-term marketable securities	29,544	29,544	30,115
Deferred tax assets ⁽³⁾	198,634	233,026	165,566
Other assets ⁽⁴⁾	140,130	36,391	36,285
Total assets	<u>\$ 2,664,588</u>	<u>\$ 2,471,908</u>	<u>\$ 2,329,022</u>
LIABILITIES AND STOCKHOLDERS' EQUITY			
Current liabilities:			
Accounts payable	\$ 42,442	\$ 42,442	\$ 53,473
Accrued expenses and other current liabilities ⁽⁵⁾	104,028	78,007	74,388
Accrued compensation and benefits	88,769	88,769	101,784
Accrued income taxes ⁽³⁾	17,407	21,336	18,044
Deferred revenue ⁽⁶⁾	385,509	569,171	487,590
Total current liabilities	<u>638,155</u>	<u>799,725</u>	<u>735,279</u>
Long-term debt	669,134	669,134	643,268
Deferred tax liabilities ⁽³⁾	41,683	14,644	5,589
Deferred revenue ⁽⁶⁾	11,123	9,577	11,852
Other liabilities	102,495	102,495	58,445
Total liabilities	<u>1,462,590</u>	<u>1,595,575</u>	<u>1,454,433</u>
Stockholders' equity:			
Preferred stock	—	—	—
Common stock	1,149	1,149	1,180
Additional paid-in capital	1,502,949	1,502,949	1,558,403
Accumulated deficit	(191,390)	(524,169)	(599,409)
Accumulated other comprehensive loss	(110,710)	(103,596)	(85,585)
Total stockholders' equity	<u>1,201,998</u>	<u>876,333</u>	<u>874,589</u>
Total liabilities and stockholders' equity	<u>\$ 2,664,588</u>	<u>\$ 2,471,908</u>	<u>\$ 2,329,022</u>

The changes in balance sheet accounts due to the adoption of ASC 606 are due primarily to the following:

- (1) Up front license recognition under our subscription contracts and billed but uncollected support and subscription receivables that had corresponding deferred revenue, which were included in other current assets prior to our adoption of ASC 606.
- (2) Support and subscription receivables previously included in other current assets described in note (1) above, offset by contract assets and capitalized commission costs. Under ASC 605, unearned billed deferred revenue, which is not yet paid is included in other current assets. Billed, but uncollected support and subscription amounts included in other current assets as of September 30, 2019 and 2018 were \$185.7 million and \$153.6 million, respectively.
- (3) The tax effect of the accumulated deficit impact related to the acceleration of revenue and deferral of costs (primarily commissions).
- (4) The long-term portion of unbilled receivables due to the acceleration of license revenue on multi-year subscription contracts and the long-term portion of capitalized commission costs.
- (5) Refund liability, primarily associated with the annual right to exchange on-premise subscription software described above in Judgments and Estimates.

- (6) The decrease in deferred revenue recorded to accumulated deficit upon adoption of ASC 606 primarily related to on-premise subscription software licenses.

(in thousands)

	September 30,			
	As Reported ASC 606	ASC 605	As Reported ASC 605	As Reported ASC 605
	2019	2019	2018	2017
Revenue:				
License ⁽¹⁾	\$ 324,400	\$ 666,770	\$ 529,265	\$ 356,326
Support and cloud services ⁽¹⁾	763,700	484,048	559,222	630,990
Total software revenue	1,088,100	1,150,818	1,088,487	987,316
Professional services	167,531	160,676	153,337	176,723
Total revenue	1,255,631	1,311,494	1,241,824	1,164,039
Cost of revenue:				
Cost of license revenue	51,936	50,231	47,737	66,841
Cost of support and cloud services revenue	133,478	132,987	135,106	110,931
Total cost of software revenue	185,414	183,218	182,843	177,772
Cost of professional service revenue	139,964	134,936	143,659	150,730
Total cost of revenue: ⁽²⁾	325,378	318,154	326,502	328,502
Gross margin	930,253	993,340	915,322	835,537
Operating expenses:				
Sales and marketing ⁽³⁾	417,449	441,958	414,764	372,702
Research and development	246,888	246,888	249,786	236,028
General and administrative	127,919	127,919	143,045	144,991
Amortization of acquired intangible assets	23,841	23,841	31,350	32,108
Restructuring and other charges, net	51,114	51,114	3,764	7,942
Total operating expenses	867,211	891,720	842,709	793,771
Operating income	63,042	101,620	72,613	41,766
Interest expense	(43,047)	(43,047)	(41,673)	(42,400)
Other income (expense), net	305	131	(2,284)	(772)
Income before income taxes	20,300	58,704	28,656	(1,406)
Provision (benefit) for income taxes ⁽⁴⁾	47,760	55,725	(23,331)	(7,645)
Net income (loss)	\$ (27,460)	\$ 2,979	\$ 51,987	\$ 6,239

- (1) The reduction in license revenue and increase in support revenue is a result of the support component of subscription licenses which is included in license revenue under ASC 605. For the year ended September 30, 2019, license revenue decreased by approximately \$215.0 million as a result of the revenue recorded to accumulated deficit. This was partially offset by approximately \$153.5 million as a result of revenue recognized in future fiscal periods.
- (2) Cost of revenue under ASC 606 is higher than under ASC 605 due to the treatment of deferred professional services costs under the new accounting guidance, partially offset by the timing of revenue recognition under ASC 606 resulting in lower associated royalty costs.
- (3) Sales and marketing costs are lower under ASC 606 due to the amortization of commissions costs capitalized upon adoption of ASC 606, offset by the deferral of ongoing commission expenses under the new accounting guidance.
- (4) The benefit for income taxes under ASC 606 includes indirect effects of the adoption.

4. Restructuring and Other Charges

Restructuring Charges (Credits)

Restructuring and other charges, net includes restructuring charges (credits) and headquarters relocation charges.

In 2019, we recorded restructuring and other charges of \$51.1 million, of which \$48.6 million is attributable to workforce realignment and facility closures (including \$0.2 million related to prior facility restructuring actions) and \$2.5 million is attributable to headquarters relocation charges. We made cash payments related to restructuring charges of \$24.7 million (\$23.6 million related to the 2019 restructuring and \$1.1 million related to the 2016 restructuring).

In January 2019, we relocated our worldwide headquarters to the Boston Seaport District. Our prior headquarters lease will not expire until November 2022, and we are seeking to sublease that space. As a result, we will bear overlapping rent obligations for those premises and, in 2019, we recorded restructuring

charges of approximately \$32.7 million, based on the net present value of remaining lease commitments net of estimated sublease income. Restructuring charges and estimated cash outflows could increase if we are unable to sublease our prior headquarters as we expect. Other costs associated with the move were recorded as incurred.

In October 2018, we initiated a restructuring plan to realign our workforce to shift investment to support Industrial Internet of Things and Augmented Reality strategic high growth opportunities. As this was a realignment of resources rather than a cost-savings initiative, it did not result in significant cost savings. The restructuring plan was completed in the first quarter of 2019 and resulted in restructuring charges of \$15.7 million for termination benefits associated with approximately 240 employees, substantially all of which has been paid.

In 2018, we recorded restructuring credits of \$1.0 million (\$0.2 million related to the 2016 restructuring and \$0.8 million related to the 2015 restructuring). We made cash payments related to restructuring charges of \$2.8 million (\$2.6 million related to the 2016 restructuring and \$0.2 million related to the 2015 restructuring). At September 30, 2018, accrued restructuring totaled \$2.4 million related to the 2016 restructuring.

In 2017, we recorded restructuring charges of \$7.9 million (\$8.2 million of which related to the 2016 restructuring offset by \$0.3 million related to the 2015 restructuring). We made cash payments related to restructuring charges of \$37.1 million (\$36.4 million of which related to the 2016 restructuring and \$0.7 million related to the 2015 restructuring).

The following table summarizes restructuring charges reserve activity for the three years ended September 30, 2019:

<i>(in thousands)</i>	Employee Severance and Related Benefits	Facility Closures and Other Costs	Consolidated Total
Balance, September 30, 2016	\$ 35,177	\$ 1,431	\$ 36,608
Charges to operations	2,373	5,569	7,942
Cash disbursements	(35,069)	(2,005)	(37,074)
Other non-cash charges	—	(704)	(704)
Foreign currency impact	(745)	217	(528)
Balance, September 30, 2017	1,736	4,508	6,244
Charges (credits) to operations	(509)	(494)	(1,003)
Cash disbursements	(1,247)	(1,509)	(2,756)
Foreign currency impact	20	(90)	(70)
Balance, September 30, 2018	—	2,415	2,415
Charges (credits) to operations	15,704	32,908	48,612
Cash disbursements	(15,402)	(9,319)	(24,721)
Other non-cash charges	—	4,812	4,812
Foreign currency impact	(4)	(28)	(32)
Balance, September 30, 2019	<u>\$ 298</u>	<u>\$ 30,788</u>	<u>\$ 31,086</u>

Of the accrual for facility closures and related costs, as of September 30, 2019, \$11.9 million is included in accrued expenses and other current liabilities and \$18.9 million is included in other liabilities in the Consolidated Balance Sheets. The accrual for employee severance and related benefits is included in accrued compensation and benefits in the Consolidated Balance Sheets.

Of the accrual for facility closures and related costs, as of September 30, 2018, \$1.5 million is included in accrued expenses and other current liabilities and \$0.9 million is included in other liabilities in the Consolidated Balance Sheets.

In determining the amount of the facilities accrual, we are required to estimate such factors as future vacancy rates, the time required to sublet properties and sublease rates. These estimates are reviewed quarterly based on known real estate market conditions and the credit-worthiness of subtenants and may result in revisions to established facility reserves. The accrual is based on the net present value of remaining lease commitments net of estimated sublease income. We had \$30.8 million accrued as of September 30, 2019 related to excess facilities (compared to \$2.4 million at September 30, 2018),

representing discounted lease commitments with agreements expiring at various dates through 2023 of approximately \$38.4 million, net of committed sublease income of \$3.9 million and uncommitted, estimated sublease income of \$3.7 million.

Other - Headquarters Relocation Charges

Headquarters relocation charges represent other expenses associated with exiting our prior Needham headquarters facility and relocating to our new worldwide headquarters in the Boston Seaport District. In 2019 and 2018 we recorded \$1.9 million and \$4.8 million, respectively, of accelerated depreciation expense related to shortening the estimated useful lives of leasehold improvements related to the Needham location. Headquarters relocation charges for 2019 also include \$0.6 million of rental expense for the Needham facility that overlapped with rental expense for the new Seaport headquarters.

5. Property and Equipment

Property and equipment consisted of the following:

	September 30,	
	2019	2018
<i>(in thousands)</i>		
Computer hardware and software	\$ 313,967	\$ 324,765
Furniture and fixtures	28,445	20,737
Leasehold improvements	97,657	47,272
Gross property and equipment	440,069	392,774
Accumulated depreciation and amortization	(334,538)	(312,161)
Net property and equipment	105,531	80,613

Depreciation expense was \$26.7 million, \$29.4 million and \$28.0 million in 2019, 2018 and 2017, respectively.

6. Acquisitions

Acquisition-related costs were \$3.1 million, \$0.5 million and \$1.6 million in 2019, 2018 and 2017, respectively. Acquisition-related costs include direct costs of completing an acquisition (e.g., investment banker fees and professional fees, including legal and valuation services) and expenses related to acquisition integration activities (e.g., professional fees, severance, and retention bonuses). In addition, subsequent adjustments to our initial estimated amounts of contingent consideration, primarily net present value changes, are included within acquisition-related charges. These costs are classified in general and administrative expenses in the accompanying Consolidated Statements of Operations. For all acquisitions made in 2019, our results of operations, if presented on a pro forma basis, would not differ materially from our reported results.

Frustum

On November 19, 2018, we acquired Frustum Inc. for \$69.5 million (net of cash acquired of \$0.7 million). We financed the acquisition with borrowings under our credit facility. Frustum is engaged in next-generation computer-aided design, including generative design, an approach that leverages artificial intelligence to generate design options. At the time of the acquisition, Frustum had approximately 12 employees and historical annualized revenues were not material. The acquisition of Frustum did not add material revenue in 2019.

The acquisition of Frustum has been accounted for as a business combination. Assets acquired and liabilities assumed have been recorded at their estimated fair values as of the acquisition date. The fair values of intangible assets were based on valuations using a discounted cash flow model which requires the use of significant estimates and assumptions, including estimating future revenues and costs. The excess of the purchase price over the tangible assets, identifiable intangible assets and assumed liabilities was recorded as goodwill.

The purchase price allocation resulted in \$53.7 million of goodwill, \$17.9 million of purchased software and \$2.1 million of other net liabilities. The acquired technology is being amortized over a useful life of 15 years based on the expected benefit pattern of the assets. The acquired goodwill was allocated to our software products segment and will not be deductible for income tax purposes. The resulting amount of goodwill reflects the expected value that will be created by integrating Frustum generative design technology into our CAD solutions.

Other Acquisitions

In the third quarter of 2019, we completed two acquisitions for \$17.3 million (net of cash acquired of \$0.3 million). At the time of acquisitions, the combined companies had approximately 95 employees and historical annualized revenues were not material. These acquisitions did not add material revenue in 2019.

The acquisitions were accounted for as business combinations. Assets acquired and liabilities assumed have been recorded at their estimated fair values as of the acquisition dates. The fair values of intangible assets were based on valuations using a discounted cash flow model which requires the use of significant estimates and assumptions, including estimating future revenues and costs. The excess of the purchase price over the tangible assets, identifiable intangible assets and assumed liabilities was recorded as goodwill.

The purchase price allocation resulted in \$12.6 million of goodwill, \$3.4 million of customer relationships and \$1.3 million of other net assets. The acquired goodwill was allocated to our services segment and will not be deductible for income tax purposes.

7. Goodwill and Acquired Intangible Assets

In 2017, we had three operating and reportable segments: (1) Solutions Group, (2) IoT Group and (3) Professional Services. Effective with the beginning of the first quarter of 2018, we changed our operating and reportable segments from three to two: (1) Software Products and (2) Professional Services. We assess goodwill for impairment at the reporting unit level. Our reporting units are determined based on the components of our operating segments that constitute a business for which discrete financial information is available and for which operating results are regularly reviewed by segment management. Our reporting units are the same as our operating segments.

As of September 30, 2019, goodwill and acquired intangible assets in the aggregate attributable to our Software Products and Professional Services segment was \$1,362.4 million and \$45.7 million, respectively. As of September 30, 2018, goodwill and acquired intangible assets in the aggregate attributable to our Software Products and Professional Services segment was \$1,352.4 million and \$30.2 million, respectively.

Goodwill is tested for impairment annually, or on an interim basis if an event occurs or circumstances change that would, more likely than not, reduce the fair value of the reporting segment below its carrying value. We completed our annual goodwill impairment review as of June 30, 2019 and concluded that no impairment charge was required as of that date. We completed our annual goodwill impairment review as of June 29, 2019 based on a qualitative assessment. Our qualitative assessment included company specific (financial performance and long-range plans), industry, and macroeconomic factors, and consideration of the fair value of each reporting unit relative to its carrying value at July 2, 2016, the last valuation date. Based on our qualitative assessment, we believe it is more likely than not that the fair values of our reporting units exceed their carrying values and no further impairment testing is required. Through September 30, 2019, there have not been any triggering events or changes in circumstances that indicate that the carrying values of goodwill or acquired intangible assets may not be recoverable.

Goodwill and acquired intangible assets consisted of the following:

(in thousands)	September 30, 2019			September 30, 2018		
	Gross Carrying Amount	Accumulated Amortization	Net Book Value	Gross Carrying Amount	Accumulated Amortization	Net Book Value
Goodwill (not amortized)			\$ 1,238,179			\$ 1,182,457
Intangible assets with finite lives (amortized) (1):						
Purchased software	\$ 377,359	\$ 278,144	\$ 99,215	\$ 362,679	\$ 254,059	\$ 108,620
Capitalized software	22,877	22,877	—	22,877	22,877	—
Customer lists and relationships	355,931	288,828	67,103	357,586	270,272	87,314
Trademarks and trade names	18,891	15,260	3,631	19,054	14,786	4,268
Other	3,910	3,910	—	4,003	4,003	—
	<u>\$ 778,968</u>	<u>\$ 609,019</u>	<u>\$ 169,949</u>	<u>\$ 766,199</u>	<u>\$ 565,997</u>	<u>\$ 200,202</u>
Total goodwill and acquired intangible assets			<u>\$ 1,408,128</u>			<u>\$ 1,382,659</u>

(1) The weighted-average useful lives of purchased software, customer lists and relationships, and trademarks and trade names with a remaining net book value are 9 years, 10 years, and 11 years, respectively.

The changes in the carrying amounts of goodwill from October 1, 2018 to September 30, 2019 are due to the impact of acquisitions and to foreign currency translation adjustments related to those asset balances that are recorded in non-U.S. currencies.

Changes in goodwill presented by reportable segment were as follows:

(in thousands)	Software Products	Professional Services	Total
Balance, September 30, 2017	\$ 1,152,917	\$ 29,855	\$ 1,182,772
Acquisition	4,350	—	4,350
Foreign currency translation adjustments	(4,547)	(118)	(4,665)
Balance, September 30, 2018	\$ 1,152,720	\$ 29,737	\$ 1,182,457
Frustum acquisition	53,673	—	53,673
Other acquisitions	—	12,645	12,645
Foreign currency translation adjustments	(10,329)	(267)	(10,596)
Balance, September 30, 2019	<u>\$ 1,196,064</u>	<u>\$ 42,115</u>	<u>\$ 1,238,179</u>

The aggregate amortization expense for intangible assets with finite lives recorded for the years ended September 30, 2019, 2018 and 2017 was reflected in our Consolidated Statements of Operations as follows:

(in thousands)	Year ended September 30,		
	2019	2018	2017
Amortization of acquired intangible assets	\$ 23,841	\$ 31,350	\$ 32,108
Cost of software revenue	27,307	26,706	26,621
Total amortization expense	<u>\$ 51,148</u>	<u>\$ 58,056</u>	<u>\$ 58,729</u>

The estimated aggregate future amortization expense for intangible assets with finite lives remaining as of September 30, 2019 is \$49.0 million for 2020, \$43.8 million for 2021, \$30.8 million for 2022, \$19.0 million for 2023, \$8.4 million for 2024 and \$18.9 million thereafter.

8. Income Taxes

Our income (loss) before income taxes consisted of the following:

(in thousands)

Year ended September 30,

	2019	2018	2017
Domestic	\$ (112,077)	\$ (114,591)	\$ (140,150)
Foreign	132,377	143,247	138,744
Total income (loss) before income taxes	\$ 20,300	\$ 28,656	\$ (1,406)

Our (benefit) provision for income taxes consisted of the following:

(in thousands)

Year ended September 30,

	2019	2018	2017
Current:			
Federal	\$ 13,130	\$ 3,009	\$ 2,423
State	(945)	2,003	340
Foreign	33,867	28,213	17,881
	46,052	33,225	20,644
Deferred:			
Federal	22,911	(12,594)	4,911
State	1,759	(445)	877
Foreign	(22,962)	(43,517)	(34,077)
	1,708	(56,556)	(28,289)
Total provision (benefit) for income taxes	\$ 47,760	\$ (23,331)	\$ (7,645)

Taxes computed at the statutory federal income tax rates are reconciled to the provision (benefit) for income taxes as follows:

(in thousands)

Year ended September 30,

	2019		2018		2017	
Statutory federal income tax rate	\$ 4,263	21 %	\$ 7,021	25 %	\$ (492)	(35)%
Change in valuation allowance	66,417	327 %	(181,047)	(632)%	17,334	1,233 %
Transition impact of U.S. Tax Act	—	— %	126,122	440 %	—	— %
Federal rate change	—	— %	69,648	243 %	—	— %
State income taxes, net of federal tax benefit	607	3 %	2,401	8 %	627	45 %
Federal research and development credits	(3,731)	(18)%	(3,058)	(11)%	(2,182)	(155)%
Uncertain tax positions	2,611	13 %	(4,646)	(16)%	(3,840)	(273)%
Foreign rate differences	(26,952)	(133)%	(38,743)	(135)%	(27,932)	(1,987)%
Foreign tax on U.S. provision	6,547	32 %	2,736	10 %	2,737	195 %
Excess tax benefits from restricted stock	(5,940)	(29)%	(11,641)	(41)%	—	— %
Audits and settlements	51	— %	2,352	8 %	—	— %
U.S. permanent items	2,483	12 %	5,408	19 %	6,030	429 %
BEAT	1,759	9 %	—	— %	—	— %
GILTI, net of foreign tax credits	6,170	31 %	—	— %	—	— %
Foreign-Derived Intangible Income (FDII)	(6,409)	(32)%	—	— %	—	— %
Other, net	(116)	(1)%	116	1 %	73	4 %
Benefit for income taxes	\$ 47,760	235 %	\$ (23,331)	(81)%	\$ (7,645)	(544)%

In 2019, our tax rate is higher than the statutory federal income tax rate of 21% due in large part, to the scheduling of the reversal of existing temporary differences resulting in deferred tax liabilities that cannot be offset against deferred tax assets requiring an increase to the U.S. valuation allowance, U.S. tax reform (as described below) and foreign withholding taxes, an obligation of the U.S. parent. This is offset by our corporate structure in which our foreign taxes are at a net effective tax rate lower than the U.S. rate, the excess tax benefit related to stock-based compensation and the indirect effects of the adoption of ASC 606. A significant amount of our foreign earnings is generated by our subsidiaries organized in Ireland. In 2019 the foreign rate differential predominantly relates to these Irish earnings.

In 2018, our effective tax rate was lower than the statutory federal income tax rate due to U.S. tax

reform, as described below. In 2018, and 2017, our effective tax rate was materially impacted by our corporate structure in which our foreign taxes are at an effective tax rate lower than the U.S. A significant amount of our foreign earnings is generated by our subsidiaries organized in Ireland. In 2018 and 2017, the foreign rate differential predominantly relates to these Irish earnings. Additionally, we have a full valuation allowance against deferred tax assets in the U.S., primarily related to net operating losses, tax credit carryforwards, capitalized research and development and deferred revenue. As a result, we have not recorded a benefit related to ongoing U.S. losses. Our foreign rate differential in 2018, and 2017 includes the continuing rate benefit from a business realignment completed on September 30, 2014 in which intellectual property was transferred between two wholly-owned foreign subsidiaries. The realignment allows us to more efficiently manage the distribution of our products to European customers. In 2018, this realignment resulted in a tax benefit of approximately \$24 million and in 2017, a benefit of approximately \$28 million. In 2017, the change in valuation allowance primarily relates to U.S. losses not benefited, partially offset by the release of valuation allowances in foreign subsidiaries of \$9.0 million. We recorded foreign withholding taxes, an obligation of the U.S. parent of \$2.7 million in 2018 and \$2.0 million in 2017.

On December 22, 2017, the United States enacted tax reform legislation through the Tax Cuts and Jobs Act, (the "Tax Act"), which significantly changed existing U.S. tax laws by a reduction of the corporate tax rate, the implementation of a new system of taxation for non-U.S. earnings, the imposition of a one-time tax on the deemed repatriation of undistributed earnings of non-U.S. subsidiaries, and the expansion of the limitations on the deductibility of executive compensation and interest expense. As we have a September 30 fiscal year-end, a blended U.S. statutory federal rate of approximately 24.5% applies for our fiscal year ended September 30, 2018 and 21% for subsequent fiscal years. The Tax Act also provides that net operating losses generated in years ending after December 31, 2017 (our fiscal 2018) will be carried forward indefinitely and can no longer be carried back, and that net operating losses generated in years beginning after December 31, 2017 can only reduce taxable income by up to 80% when utilized in a future period. The Tax Act includes a provision to tax global intangible low-tax income (GILTI) of foreign subsidiaries, a deduction for Foreign-Derived Intangible Income (FDII), and the base erosion anti-abuse tax (BEAT) measure that taxes certain payments between a U.S. corporation and its foreign subsidiaries. The GILTI, FDII and BEAT provisions were effective for us beginning October 1, 2018. Our accounting policy is to treat tax on GILTI as a current period cost included in tax expense in the year incurred.

In 2018, we provided no federal income taxes payable as a result of the deemed repatriation of undistributed earnings as the tax was offset by a combination of current year losses and existing attributes which had a full valuation allowance recorded against the related deferred tax assets. In 2018, we recorded a state income taxes payable on the deemed repatriation of \$1.7 million. We also recorded a deferred tax benefit of \$14.1 million for the impact of the Tax Act on our net U.S. deferred income tax balances. This was primarily attributable to the reduction of the federal tax rate on the net deferred tax liability in the U.S., and the ability to realize net operating losses from the reversal of existing deferred tax assets which can now be carried forward indefinitely and can therefore be netted against deferred tax liabilities for indefinite lived intangible assets.

The U.S. Securities and Exchange Commission issued rules that allow for a period of up to one year after the enactment date of the Tax Act to finalize the recording of the related tax impacts. We finalized recording the impacts of the Tax Act in the quarter ended December 29, 2018 and did not record any significant adjustments.

At September 30, 2019 and 2018, income taxes payable and income tax accruals recorded on the accompanying Consolidated Balance Sheets were \$23.4 million (\$17.4 million in accrued income taxes, \$0.4 million in other current liabilities and \$5.6 million in other liabilities) and \$24.2 million (\$18.0 million in accrued income taxes, \$1.8 million in other current liabilities and \$4.4 million in other liabilities), respectively. At September 30, 2019 and 2018, prepaid taxes recorded in prepaid expenses on the accompanying Consolidated Balance Sheets were \$5.3 million and \$4.8 million, respectively. We made net income tax payments of \$38.9 million, \$22.6 million and \$35.4 million in 2019, 2018 and 2017, respectively.

The significant temporary differences that created deferred tax assets and liabilities are shown below:

(in thousands)

	September 30,	
	2019	2018
Deferred tax assets:		
Net operating loss carryforwards	\$ 26,462	\$ 31,329
Foreign tax credits	—	2,201
Capitalized research and development	34,560	20,999
Pension benefits	14,838	12,296
Prepaid expenses	41,739	30,614
Deferred revenue	9,899	33,886
Stock-based compensation	12,306	11,622
Other reserves not currently deductible	20,986	13,588
Amortization of intangible assets	168,376	96,841
Research and development and other tax credits	49,995	55,760
Fixed assets	45,450	4,364
Capital loss carryforward	31,248	33,024
Deferred interest	10,864	13,057
Other	1,623	1,152
Gross deferred tax assets	468,346	360,733
Valuation allowance	(177,663)	(141,950)
Total deferred tax assets	290,683	218,783
Deferred tax liabilities:		
Acquired intangible assets not deductible	(42,554)	(41,139)
Pension prepayments	(2,532)	(2,362)
Deferred revenue	(19,312)	(6,978)
Unbilled accounts receivable	(31,005)	—
Deferred income	(19,040)	(6,641)
Prepaid commissions	(17,423)	—
Other	(1,866)	(1,686)
Total deferred tax liabilities	(133,732)	(58,806)
Net deferred tax assets	\$ 156,951	\$ 159,977

In October 2016, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update (ASU) 2016-16, Income Taxes (Topic 740): Intra-Entity Transfers of Assets Other Than Inventory. The purpose of ASU 2016-16 is to simplify the income tax accounting of an intra-entity transfer of an asset other than inventory and to record its effect when the transfer occurs. We adopted this standard beginning in the first quarter of 2019 using the modified retrospective method with a cumulative effect adjustment to accumulated deficit of \$72.3 million, with a corresponding increase of \$75.3 million to deferred tax assets, a \$6.0 million decrease to income tax assets and a \$3.0 million decrease to income tax liabilities. The adjustment primarily relates to deductible amortization of intangible assets in Ireland. Post adoption, our effective tax rate no longer includes the benefit of this amortization.

We have concluded, based on the weight of available evidence, that a full valuation allowance continues to be required against our U.S. net deferred tax assets as they are not more likely than not to be realized in the future. We will continue to reassess our valuation allowance requirements each financial reporting period. However, we believe that there is a reasonable possibility that within the next 12 months, sufficient positive evidence may become available to allow us to reach a conclusion that a significant portion of the valuation allowance will no longer be needed. Release of the valuation allowance would result in the recognition of certain deferred tax assets and a decrease to income tax expense for the period the release is recorded. However, the exact timing and amount of the valuation allowance release are subject to change on the basis of the level of profitability that we are able to actually achieve.

For U.S. tax return purposes, net operating loss (NOL) carryforwards and tax credits are generally available to be carried forward to future years, subject to certain limitations. At September 30, 2019, we had U.S. federal NOL carryforwards from acquisitions of \$8.8 million that expire in 2023 to 2029. The

utilization of these NOL carryforwards is limited as a result of the change in ownership rules under Internal Revenue Code Section 382.

As of September 30, 2019, we had Federal R&D credit carryforwards of \$26.2 million, which expire beginning in 2028 and ending in 2039, and Massachusetts R&D credit carryforwards of \$22.1 million, which expire beginning in 2020 and ending in 2034. A full valuation allowance is recorded against the carryforwards.

We also have NOL carryforwards in non-U.S. jurisdictions totaling \$64.4 million, the majority of which do not expire, and non-U.S. tax credit carryforwards of \$3.2 million that expire beginning in 2029 and ending in 2035. Additionally, we have interest and amortization carryforwards of \$86.9 million and \$825.9 million, respectively, in a foreign jurisdiction. There are limitations imposed on the utilization of such attributes that could restrict the recognition of any tax benefits.

As of September 30, 2019, we have a valuation allowance of \$146.1 million against net deferred tax assets in the U.S. and a valuation allowance of \$31.6 million against net deferred tax assets in certain foreign jurisdictions. The valuation allowance recorded against net deferred tax assets of certain foreign jurisdictions is established primarily for our net operating loss carryforwards, the majority of which do not expire. However, there are limitations imposed on the utilization of such net operating losses that could restrict the recognition of any tax benefits.

The changes to the valuation allowance were primarily due to the following:

	Year ended September 30,		
	2019	2018	2017
Valuation allowance beginning of year	\$ 142.0	\$ 279.7	\$ 235.5
Net release of valuation allowance ⁽¹⁾	(1.8)	(2.8)	(9.1)
Net increase (decrease) in deferred tax assets with a full valuation allowance ⁽²⁾	37.5	(134.9)	53.3
Valuation allowance end of year	\$ 177.7	\$ 142.0	\$ 279.7

(1) In 2019, 2018 and 2017, this is attributable to the release in foreign jurisdictions.

(2) In 2019, this is due in large part to a change in method of accounting for federal income tax purposes resulting in deferred tax liabilities that cannot be offset against available tax attributes in the scheduling of the reversal of existing temporary differences, and by the adoption of ASC606. In 2018, this is primarily attributable to U.S. tax reform: the utilization of tax attributes used to offset the transition tax, the revaluation of the U.S. net deferred tax assets and liabilities, the ability to realize net operating losses from the reversal of existing deferred tax assets which can now be carried forward indefinitely and can therefore be netted against deferred tax liabilities for indefinite lived intangible.

Our policy is to record estimated interest and penalties related to the underpayment of income taxes as a component of our income tax provision. In 2019 we recorded interest expense of \$0.1 million and, in 2018 and 2017, we reduced interest expense by \$0.6 million and \$0.9 million, respectively. In 2019, 2018 and 2017, we had no tax penalty expense in our income tax provision. As of both September 30, 2019 and 2018, we had accrued \$0.5 million of net estimated interest expense related to income tax accruals. We had no accrued tax penalties as of September 30, 2019, 2018 or 2017.

Unrecognized tax benefits <i>(in millions)</i>	Year ended September 30,		
	2019	2018	2017
Unrecognized tax benefit beginning of year	\$ 9.8	\$ 14.8	\$ 15.5
Tax positions related to current year:			
Additions	1.5	1.5	0.9
Tax positions related to prior years:			
Additions	1.4	—	1.0
Reductions	—	(4.7)	(1.6)
Settlements	(1.2)	—	(1.0)
Statute expirations	—	(1.8)	—
Unrecognized tax benefit end of year	\$ 11.5	\$ 9.8	\$ 14.8

If all of our unrecognized tax benefits as of September 30, 2019 were to become recognizable in the future, we would record a benefit to the income tax provision of \$11.5 million (which would be partially offset by an increase in the U.S. valuation allowance of \$5.4 million). Although we believe our tax estimates are appropriate, the final determination of tax audits and any related litigation could result in favorable or unfavorable changes in our estimates. We believe it is reasonably possible that within the next 12 months the amount of unrecognized tax benefits related to the resolution of multi-jurisdictional tax positions could be reduced by up to \$0.5 million as audits close and statutes of limitations expire.

In the fourth quarter of 2016, we received an assessment of approximately \$12 million from the tax authorities in Korea. The assessment relates to various tax issues, primarily foreign withholding taxes. We have appealed and intend to vigorously defend our positions. We believe that upon completion of a multi-level appeal process it is more likely than not that our positions will be sustained. Accordingly, we have not recorded a tax reserve for this matter. We paid this assessment in the first quarter of 2017 and have recorded the amount in other assets, pending resolution of the appeal process. If the South Korean tax authorities were to prevail the potential additional exposure through 2019 would be approximately \$13 million.

In the normal course of business, PTC and its subsidiaries are examined by various taxing authorities, including the IRS in the U.S. We regularly assess the likelihood of additional assessments by tax authorities and provide for these matters as appropriate. We are currently under audit by tax authorities in several jurisdictions. Audits by tax authorities typically involve examination of the deductibility of certain permanent items, transfer pricing, limitations on net operating losses and tax credits. Although we believe our tax estimates are appropriate, the final determination of tax audits and any related litigation could result in material changes in our estimates. As of September 30, 2019, we remained subject to examination in the following major tax jurisdictions for the tax years indicated:

<u>Major Tax Jurisdiction</u>	<u>Open Years</u>
United States	2015 through 2019
Germany	2011 through 2019
France	2016 through 2019
Japan	2014 through 2019
Ireland	2015 through 2019

Additionally, net operating loss and tax credit carryforwards from certain earlier periods in these jurisdictions may be subject to examination to the extent they are utilized in later periods.

We incurred expenses related to stock-based compensation in 2019, 2018 and 2017 of \$86.4 million, \$82.9 million and \$76.7 million, respectively. Accounting for the tax effects of stock-based awards requires that we establish a deferred tax asset as the compensation is recognized for financial reporting prior to recognizing the tax deductions. The tax benefit recognized in the Consolidated Statements of Operations related to stock-based compensation totaled \$16.6 million, \$28.3 million and \$1.3 million in 2019, 2018 and 2017, respectively. Upon the settlement of the stock-based awards (i.e., exercise or vesting), the actual tax deduction is compared with the cumulative financial reporting compensation cost and any excess tax deduction is considered a windfall tax benefit and is recorded to the tax provision. In 2019 and 2018, windfall tax benefits of \$6.7 million and \$13.2 million were recorded to the tax provision. Prior to the adoption of ASU 2016-09, windfall tax benefits were recorded to APIC when they resulted in a reduction in taxes payable. In 2017 we recorded windfall tax benefits of \$0.6 million to APIC.

In the first quarter of 2018, as a result of the adoption of ASU 2016-09, we recognized previously unrecognized tax benefits of \$37.0 million as increases in deferred tax assets for tax loss carryovers and tax credits, primarily in the U.S. A corresponding increase to the valuation allowance of \$36.9 million was recorded to the extent that it was not more likely than not that these benefits would be realized.

In July 2015, the U.S. Tax Court issued an opinion in *Altera Corp. v. Commissioner* related to the treatment of stock-based compensation expense in an intercompany cost-sharing arrangement. The opinion invalidated part of a treasury regulation requiring stock-based compensation to be included in any qualified intercompany cost-sharing arrangement. The Company previously recorded a tax benefit based on the opinion in the case, which was offset by a corresponding increase in the valuation allowance against U.S. deferred tax assets. On June 7, 2019, the U.S. Court of Appeals for the Ninth Circuit reversed the U.S. Tax Court's decision. On July 22, 2019, Altera Corp. filed a petition for an en banc rehearing before the U.S. Court of Appeals for the Ninth Circuit, which was denied on November

12, 2019. Altera Corp. has 90 days from this date to petition the U.S. Supreme Court for review of the decision. Due to the fact that the Altera decision is not yet final, as well as uncertainty surrounding the status of the current regulations and questions related to jurisdiction given the Company does not reside in the Ninth Circuit, we have determined no adjustment is required to the consolidated financial statements as a result of this ruling. The Company will continue to monitor ongoing developments and potential impacts to its consolidated financial statements.

Prior to the passage of the U.S. Tax Act, the Company asserted that substantially all of the undistributed earnings of its foreign subsidiaries were considered indefinitely invested and accordingly, no deferred taxes were provided. Pursuant to the provisions of the U.S. Tax Act, these earnings were subjected to U.S. federal taxation via a one-time transition tax, and there is therefore no longer a material cumulative basis difference associated with the undistributed earnings. We maintain our assertion of our intention to permanently reinvest these earnings outside the U.S. unless repatriation can be done substantially tax-free, with the exception of a foreign holding company formed in 2018 and our Taiwan subsidiary. If we decide to repatriate any additional non-U.S. earnings in the future, we may be required to establish a deferred tax liability on such earnings. The amount of unrecognized deferred tax liability on the undistributed earnings would not be material.

9. Debt

As of September 30, 2019 and 2018, we had the following long-term borrowing obligations:

(in thousands)

	September 30,	
	2019	2018
6.000% Senior notes due 2024	\$ 500,000	\$ 500,000
Revolving credit facility	173,125	148,125
Total debt	673,125	648,125
Unamortized debt issuance costs for the Senior notes ⁽¹⁾	(3,991)	(4,857)
Total debt, net of issuance costs ⁽²⁾	\$ 669,134	\$ 643,268

(1) Unamortized debt issuance costs related to the credit facility were \$3.1 million and \$3.8 million as of September 30, 2019 and September 30, 2018, respectively, and were included in other assets.

(2) As of September 30, 2019 and 2018, all debt was included in long-term debt.

Senior Unsecured Notes

In May 2016, we issued \$500 million in aggregate principal amount of 6.0% senior, unsecured long-term debt at par value, due in 2024. We used the net proceeds from the sale of the notes to repay a portion of our outstanding revolving loan under our current credit facility. Interest is payable semi-annually on November 15 and May 15. The debt indenture includes covenants that limit our ability to, among other things, incur additional debt, grant liens on our properties or capital stock, enter into sale and leaseback transactions or asset sales, and make capital distributions. We were in compliance with all of the covenants as of September 30, 2019.

We may redeem the senior notes at any time in whole or from time to time in part at specified redemption prices. In certain circumstances constituting a change of control, we will be required to make an offer to repurchase the senior notes at a purchase price equal to 101% of the aggregate principal amount of the notes, plus accrued and unpaid interest. Our ability to repurchase the senior notes in such event may be limited by law, by the indenture associated with the senior notes, by our then-available financial resources or by the terms of other agreements to which we may be party at such time. If we fail to repurchase the senior notes as required by the indenture, it would constitute an event of default under the indenture which, in turn, may also constitute an event of default under other obligations.

As of September 30, 2019, the total estimated fair value of the Notes was approximately \$526.3 million, which is based on quoted prices for the notes on that date.

Credit Agreement

We maintain a multi-currency credit facility with a syndicate of sixteen banks for which JPMorgan Chase Bank, N.A. acts as Administrative Agent. We use the credit facility for general corporate purposes, including acquisitions of businesses, share repurchases and working capital requirements. As of September 30, 2019, the fair value of our credit facility approximates its book value.

In November 2019, we amended and restated the credit facility to increase the revolving loan commitment from \$700 million to \$1 billion and amend other provisions. The revolving loan commitment

does not require amortization of principal and may be repaid in whole or in part prior to the scheduled maturity date at our option without penalty or premium. The credit facility matures on September 13, 2023, when all remaining amounts outstanding will be due and payable in full.

PTC and certain eligible foreign subsidiaries are eligible borrowers under the credit facility. Any borrowings by PTC Inc. under the credit facility would be guaranteed by PTC Inc.'s material domestic subsidiaries that become parties to the subsidiary guaranty, if any. As of the filing of this Form 10-K, there are no subsidiary guarantors of the obligations under the credit facility. Any borrowings by eligible foreign subsidiary borrowers would be guaranteed by PTC Inc. and any subsidiary guarantors. As of the filing of this Form 10-K, no funds were borrowed by an eligible foreign subsidiary borrower. In addition, owned property (including equity interests) of PTC and certain of its material domestic subsidiaries' owned property is subject to first priority perfected liens in favor of the lenders under this credit facility. 100% of the voting equity interests of certain of PTC's domestic subsidiaries and 65% of its material first-tier foreign subsidiaries are pledged as collateral for the obligations under the credit facility.

Loans under the credit facility bear interest at variable rates which reset every 30 to 180 days depending on the rate and period selected by PTC as described below. As of September 30, 2019, the annual rate for borrowing outstanding was 3.44%. Interest rates on borrowings outstanding under the credit facility range from 1.25% to 1.75% above an adjusted LIBO rate for Euro currency borrowings or would range from 0.25% to 0.75% above the defined base rate (the greater of the Prime Rate, the NYFRB rate plus 0.5%, or an adjusted LIBO rate plus 1%) for base rate borrowings, in each case based upon PTC's total leverage ratio. Additionally, PTC may borrow certain foreign currencies at rates set in the same range above the respective London interbank offered interest rates for those currencies, based on PTC's total leverage ratio. A quarterly commitment fee on the undrawn portion of the credit facility is required, ranging from 0.175% to 0.30% per annum, based upon PTC's total leverage ratio.

The credit facility limits PTC's and its subsidiaries' ability to, among other things: incur liens or guarantee obligations; pay dividends (other than to PTC) and make other distributions; make investments and enter into joint ventures; dispose of assets; and engage in transactions with affiliates, except on an arms-length basis. Under the credit facility, PTC and its material domestic subsidiaries may not invest cash or property in, or loan to, PTC's foreign subsidiaries in aggregate amounts exceeding \$100 million for any purpose and an additional \$200 million for acquisitions of businesses. In addition, under the credit facility, PTC and its subsidiaries must maintain the following financial ratios:

- a total leverage ratio, defined as consolidated funded indebtedness to consolidated trailing four quarters EBITDA, not to exceed 4.50 to 1.00 as of the last day of any fiscal quarter;
- a senior secured leverage ratio, defined as senior consolidated total indebtedness (which excludes unsecured indebtedness) to the consolidated trailing four quarters EBITDA, not to exceed 3.00 to 1.00 as of the last day of any fiscal quarter; and
- an interest coverage ratio, defined as the ratio of consolidated trailing four quarters EBITDA to consolidated trailing our quarters of cash basis interest expense, of not less than 3.00 to 1.00 as of the last day of any fiscal quarter.

As of September 30, 2019, our total leverage ratio was 1.73 to 1.00, our senior secured leverage ratio was 0.47 to 1.00 and our interest coverage ratio was 9.76 to 1.00 and we were in compliance with all financial and operating covenants of the credit facility.

Any failure to comply with the financial or operating covenants of the credit facility would prevent PTC from being able to borrow additional funds, and would constitute a default, permitting the lenders to, among other things, accelerate the amounts outstanding, including all accrued interest and unpaid fees, under the credit facility and to terminate the credit facility. A change in control of PTC, as defined in the agreement, also constitutes an event of default, permitting the lenders to accelerate the indebtedness and terminate the credit facility.

We incurred \$2.9 million in financing costs in connection with the September 2018 credit facility amendment and restatement. These origination costs are recorded as deferred debt issuance costs and are included in other assets. We incurred \$6.9 million in financing costs in connection with the Senior Notes in 2016. These origination costs are recorded as a direct reduction from the carrying amount of the related debt liability. Financing costs are expensed over the remaining term of the obligations.

In 2019, 2018 and 2017, we paid \$40.8 million, \$39.8 million and \$38.9 million, respectively, of interest on our debt. The average interest rate on borrowings outstanding during 2019, 2018 and 2017 was approximately 5.4%, 5.2% and 4.9%, respectively.

10. Commitments and Contingencies

Leasing Arrangements

We lease office facilities under operating leases expiring at various dates through 2037. Certain leases require us to pay for taxes, insurance, maintenance and other operating expenses in addition to rent. Lease expense was \$39.3 million, \$36.9 million and \$35.8 million in 2019, 2018 and 2017, respectively. At September 30, 2019, our future minimum lease payments under noncancellable operating leases are as follows (in thousands):

<u>Year ending September 30.</u>	
2020	\$ 31,868
2021	33,094
2022	25,624
2023	19,279
2024	16,909
Thereafter	186,037
Total minimum lease payments	<u>\$ 312,811</u>

Amounts above include future minimum lease payments for our corporate headquarters facility located in Boston, Massachusetts. On September 7, 2017, we entered into a lease agreement with SCD L2 Seaport Square LLC for approximately 250,000 square feet located at 121 Seaport Boulevard, Boston, Massachusetts. Upon completion of construction of the new facility, we moved our headquarters from Needham to Boston. The term of the lease runs from January 1, 2019 through June 30, 2037. Base rent for the first year of the lease is \$11.0 million and will increase by \$1 per square foot leased per year thereafter (\$0.3 million per year). Base rent, which first becomes payable on July 1, 2020 is included in the operating lease obligations above. In addition to the base rent, PTC is required to pay its pro rata portions of building operating costs and real estate taxes (together, "Additional Rent"). Additional rent, equal to approximately 63% of total building operating costs and real estate taxes, is estimated to be approximately \$7.1 million for the first year we begin paying rent and is not included in the operating lease payments above. The lease provides for up to approximately \$25 million in landlord funding for leasehold improvements (\$100 per square foot). We capitalized these leasehold improvements as the assets were placed in service and amortized them to expense over the shorter of the lease term or their expected useful life. The \$25 million of funding by the landlord is not included in the table above and reduces rent expense over the lease term.

As of September 30, 2019 and 2018, we had letters of credit and bank guarantees outstanding of \$15.1 million (of which \$1.1 million was collateralized) and \$15.5 million (of which \$1.1 million was collateralized), respectively, primarily related to our corporate headquarters lease.

Legal and Regulatory Matters

Korean Tax Audit

In July 2016, we received an assessment from the tax authorities in Korea related to an ongoing tax audit of approximately \$12 million. We estimate potential additional exposure of \$13 million through 2019. See Note 8. *Income Taxes* for additional information.

Legal Proceedings

We are subject to various legal proceedings and claims that arise in the ordinary course of business. We do not believe that resolving the legal proceedings and claims that we are currently subject to will have a material adverse impact on our financial condition, results of operations or cash flows. However, the results of legal proceedings cannot be predicted with certainty. Should any of these legal proceedings and claims be resolved against us, the operating results for a particular reporting period could be adversely affected.

Accruals

With respect to legal proceedings and claims, we record an accrual for a contingency when it is probable that a liability has been incurred and the amount of the loss can be reasonably estimated. For legal proceedings and claims for which the likelihood that a liability has been incurred is more than remote but less than probable, we estimate the range of possible outcomes. As of September 30, 2019, we estimate approximately \$0.5 million to \$1.6 million in legal proceedings and claims, of which we had accrued \$0.5 million.

Guarantees and Indemnification Obligations

We enter into standard indemnification agreements in the ordinary course of our business. Pursuant to such agreements with our business partners or customers, we indemnify, hold harmless, and agree to reimburse the indemnified party for losses suffered or incurred by the indemnified party, generally in connection with patent, copyright or other intellectual property infringement claims by any third party with respect to our products, as well as claims relating to property damage or personal injury resulting from the performance of services by us or our subcontractors. The maximum potential amount of future payments we could be required to make under these indemnification agreements is unlimited. Historically, our costs to defend lawsuits or settle claims relating to such indemnity agreements have been minimal and we accordingly believe the estimated fair value of liabilities under these agreements is immaterial.

We warrant that our software products will perform in all material respects in accordance with our standard published specifications in effect at the time of delivery of the licensed products for a specified period of time. Additionally, we generally warrant that our consulting services will be performed consistent with generally accepted industry standards. In most cases, liability for these warranties is capped. If necessary, we would provide for the estimated cost of product and service warranties based on specific warranty claims and claim history; however, we have not incurred significant cost under our product or services warranties. As a result, we believe the estimated fair value of these liabilities is immaterial.

11. Stockholders' Equity

Preferred Stock

We may issue up to 5.0 million shares of our preferred stock in one or more series. 0.5 million of these shares are designated as Series A Junior Participating Preferred Stock. Our Board of Directors is authorized to fix the rights and terms for any series of preferred stock without additional shareholder approval.

Common Stock

Our Articles of Organization authorize us to issue up to 500 million shares of our common stock. Our Board of Directors has authorized us to repurchase up to \$1,500 million of our common stock for the October 1, 2017 through September 30, 2020 period. We use cash from operations and borrowings under our credit facility to make such repurchases. All shares of our common stock repurchased are automatically restored to the status of authorized and unissued.

In 2019, we repurchased 1.4 million shares for \$115 million. In addition, in 2019 and 2018, we repurchased 3.0 million and 8.2 million shares, respectively, under an accelerated share repurchase ("ASR") agreement. On July 20, 2018, we entered into an accelerated share repurchase ("ASR") agreement with a major financial institution ("Bank"). The ASR allowed us to buy a large number of shares immediately at a purchase price determined by an average market price over a period of time. Under the ASR, we agreed to purchase \$1 billion of our common stock, in total, with an initial delivery to us in July 2018 of 8.2 million shares ("Initial Shares"), which represented the number of shares at the current market price equal to 80% of the total fixed purchase price of \$1 billion. The remainder of the total purchase price of \$200 million reflected the value of the stock held by the Bank pending final settlement and, accordingly, was recorded as a reduction to additional paid-in capital in 2018. In addition, we initiated and completed an ASR repurchase of 1.2 million shares for \$100 million in the third quarter of 2018. In 2017, we repurchased 0.9 million shares at cost of \$51.0 million.

As part of a strategic alliance, in the fourth quarter of 2018, Rockwell Automation made a \$1 billion equity investment in PTC, by acquiring 10,582,010 shares at a price of \$94.50 per share.

12. Equity Incentive Plan

Our 2000 Equity Incentive Plan (2000 Plan) provides for grants of nonqualified and incentive stock options, common stock, restricted stock, restricted stock units and stock appreciation rights to employees, directors, officers and consultants. We award restricted stock units as the principal equity incentive

awards, including certain performance-based awards that are earned based on achieving performance criteria established by the Compensation Committee of our Board of Directors on or prior to the grant date. Each restricted stock unit represents the contingent right to receive one share of our common stock.

The fair value of restricted stock units granted in 2019, 2018 and 2017 was based on the fair market value of our stock on the date of grant. The weighted average fair value per share of restricted stock units granted in 2019, 2018 and 2017 was \$82.77, \$76.17 and \$51.27, respectively. In 2019, 2018 and 2017, the weighted average fair value per share of restricted stock was increased by \$4.62, \$4.35 and \$2.27, respectively, by the additional shares earned for the 2016 and 2017 total shareholder return (TSR) grants upon measurement on the vest date in 2018.

Beginning in the first quarter of 2018, we account for forfeitures as they occur, rather than estimate expected forfeitures.

The following table shows total stock-based compensation expense recorded from our stock-based awards as reflected in our Consolidated Statements of Operations:

	Year ended September 30,		
	2019	2018	2017
(in thousands)			
Cost of license revenue	\$ 509	\$ 144	\$ (148)
Cost of support and cloud services revenue	5,004	4,302	6,643
Cost of professional services revenue	6,426	7,079	6,116
Sales and marketing	32,026	24,893	15,373
Research and development	22,019	13,488	13,968
General and administrative	20,416	33,033	34,756
Total stock-based compensation expense	\$ 86,400	\$ 82,939	\$ 76,708

Stock-based compensation expense in 2019, 2018 and 2017 includes \$6.2 million, \$4.3 million, and \$3.2 million respectively, related to our employee stock purchase plan (ESPP).

As of September 30, 2019, total unrecognized compensation cost related to unvested restricted stock units expected to vest was approximately \$159.2 million and the weighted average remaining recognition period for unvested awards was 22 months.

As of September 30, 2019, 6.9 million shares of common stock were available for grant under the 2000 Plan and 3.2 million shares of common stock were reserved for issuance upon the exercise of stock options and vesting of restricted stock units granted and outstanding.

Our ESPP, initiated in the fourth quarter of 2016, allows eligible employees to contribute up to 10% of their base salary, up to a maximum of \$25,000 per year and subject to any other plan limitations, toward the purchase of our common stock at a discounted price. The purchase price of the shares on each purchase date is equal to 85% of the lower of the fair market value of our common stock on the first and last trading days of each offering period. The ESPP is qualified under Section 423 of the Internal Revenue Code. We estimate the fair value of each purchase right under the ESPP on the date of grant using the Black-Scholes option valuation model and use the straight-line attribution approach to record the expense over the six-month offering period.

Restricted stock unit activity for the year ended September 30, 2019 (in thousands except grant date fair value data)	Shares	Weighted Average Grant Date Fair Value	Aggregate Intrinsic Value as of September 30, 2019
Balance of outstanding restricted stock units October 1, 2018	3,284	\$ 65.93	
Granted (1)	1,836	\$ 82.77	
Vested	(1,494)	\$ 55.11	
Forfeited or not earned	(394)	\$ 66.20	
Balance of outstanding restricted stock units September 30, 2019	3,232	\$ 80.52	\$ 220,358

(1) Restricted stock granted includes approximately 141,000 shares from prior period TSR awards that were earned upon achievement of the performance criteria and vested in November 2019.

(Number of Units in thousands)

Restricted stock unit grants	Restricted Stock Units	
	Performance-based RSUs ⁽¹⁾	Service-based RSUs ⁽²⁾
Year ended September 30, 2019	376	1,319

- (1) Substantially all the performance-based RSUs were granted to our executive officers. Approximately 160,000 shares are eligible to vest based upon annual performance measures, measured over a three-year period. RSUs not earned for a period may be earned in the third period. To the extent earned, those performance-based RSUs will vest in three substantially equal installments on November 15, 2019, 2020 and 2021, or the date the Compensation Committee determines the extent to which the applicable performance criteria have been achieved for each performance period. An additional 213,000 performance-based RSUs are eligible to be earned based upon a 2019 performance measure, which RSUs will be forfeited to the extent the performance measure is not achieved. These RSUs would have vest, to the extent earned, in three substantially equal installments on November 15, 2019, 2020 and 2021. These RSUs were not earned and were forfeited.
- (2) The service-based RSUs were granted to employees, our executive officers and our directors. Substantially all service-based RSUs will vest in three substantially equal annual installments on or about the anniversary of the date of grant.

(in thousands)

Value of stock option and stock-based award activity	Year ended September 30,		
	2019	2018	2017
Total fair value of restricted stock unit awards vested	\$ 131,659	\$ 127,525	\$ 78,573

In 2019, shares issued upon vesting of restricted stock units were net of 0.5 million shares retained by us to cover employee tax withholdings of \$44.4 million. In 2018, shares issued upon vesting of restricted stock units were net of 0.7 million shares retained by us to cover employee tax withholdings of \$45.4 million. In 2017, shares issued upon vesting of restricted stock and restricted stock units were net of 0.5 million shares retained by us to cover employee tax withholdings of \$26.7 million.

13. Employee Benefit Plan

We offer a savings plan to eligible U.S. employees. The plan is intended to qualify under Section 401(k) of the Internal Revenue Code. Participating employees may defer a portion of their pre-tax compensation, as defined, but not more than statutory limits. We contribute 50% of the amount contributed by the employee, up to a maximum of 3% of the employee's earnings. Our matching contributions vest at a rate of 25% per year of service, with full vesting after 4 years of service. We made matching contributions of \$6.0 million, \$5.8 million, and \$5.6 million in 2019, 2018 and 2017, respectively.

14. Pension Plans

We maintain several international defined benefit pension plans primarily covering certain employees of Computervision, which we acquired in 1998, and CoCreate, which we acquired in 2008, and covering employees in Japan. Benefits are based upon length of service and average compensation with vesting after one to five years of service. The pension cost was actuarially computed using assumptions applicable to each subsidiary plan and economic environment. We adjust our pension liability related to our plans due to changes in actuarial assumptions and performance of plan investments, as shown below. Effective in 1998, benefits under one of the international plans were frozen indefinitely.

The following table presents the actuarial assumptions used in accounting for the pension plans:

	2019	2018	2017
Weighted average assumptions used to determine benefit obligations at September 30 measurement date:			
Discount rate	0.9 %	1.9 %	1.8 %
Rate of increase in future compensation	2.8 %	3.0 %	2.8 %
Weighted average assumptions used to determine net periodic pension cost for fiscal years ended September 30:			
Discount rate	1.9 %	1.8 %	1.3 %
Rate of increase in future compensation	3.0 %	2.8 %	2.8 %
Rate of return on plan assets	5.4 %	5.4 %	5.4 %

In selecting the expected long-term rate of return on assets, we considered the current investment portfolio and the investment return goals in the plans' investment policy statements. We, with input from the plans' professional investment managers and actuaries, also considered the average rate of earnings expected on the funds invested or to be invested to provide plan benefits. This process included determining expected returns for the various asset classes that comprise the plans' target asset allocation. This basis for selecting the long-term asset return assumptions is consistent with the prior year. Using generally accepted diversification techniques, the plans' assets, in aggregate and at the individual portfolio level, are invested so that the total portfolio risk exposure and risk-adjusted returns best meet the plans' long-term liabilities to employees. Plan asset allocations are reviewed periodically and rebalanced to achieve target allocation among the asset categories when necessary.

As of September 30, 2019, the weighted long-term rate of return assumption is 5.4%. These rates of return, together with the assumptions used to determine the benefit obligations as of September 30, 2019 in the table above, will be used to determine our 2020 net periodic pension cost, which we expect to be approximately \$1.9 million.

The actuarially computed components of net periodic pension cost recognized in our Consolidated Statements of Operations for each year are shown below:

(in thousands)

	Year ended September 30,		
	2019	2018	2017
Interest cost of projected benefit obligation	\$ 1,199	\$ 1,260	\$ 815
Service cost	1,372	1,535	1,696
Expected return on plan assets	(3,728)	(4,180)	(3,327)
Amortization of prior service cost	(5)	(5)	(5)
Recognized actuarial loss	2,390	2,293	3,385
Settlement loss	(30)	9	—
Net periodic pension cost	<u>\$ 1,198</u>	<u>\$ 912</u>	<u>\$ 2,564</u>

The following tables display the change in benefit obligation and the change in the plan assets and funded status of the plans as well as the amounts recognized in our Consolidated Balance Sheets:

(in thousands)

	Year ended September 30,	
	2019	2018
Change in benefit obligation:		
Projected benefit obligation—beginning of year	\$ 87,864	\$ 87,168
Service cost	1,372	1,535
Interest cost	1,199	1,260
Actuarial loss	12,059	2,157
Foreign exchange impact	(4,674)	(1,669)
Participant contributions	154	212
Benefits paid	(1,836)	(1,637)
Settlements	(1,155)	(1,162)
Projected benefit obligation—end of year	<u>\$ 94,983</u>	<u>\$ 87,864</u>
Change in plan assets and funded status:		
Plan assets at fair value—beginning of year	\$ 70,141	\$ 70,494
Actual return on plan assets	3,512	1,025
Employer contributions	2,576	2,459
Participant contributions	154	212
Foreign exchange impact	(3,513)	(1,250)
Settlements	(1,155)	(1,162)
Benefits paid	(1,836)	(1,637)
Plan assets at fair value—end of year	<u>69,879</u>	<u>70,141</u>
Projected benefit obligation—end of year	<u>94,983</u>	<u>87,864</u>
Underfunded status	<u>\$ (25,104)</u>	<u>\$ (17,723)</u>
Accumulated benefit obligation—end of year	<u>\$ 92,280</u>	<u>\$ 85,103</u>
Amounts recognized in the balance sheet:		
Non-current liability	\$ (24,868)	\$ (17,502)
Current liability	\$ (236)	\$ (221)
Amounts in accumulated other comprehensive loss:		
Unrecognized actuarial loss	\$ 34,920	\$ 27,027

We expect to recognize approximately \$3.8 million of the unrecognized actuarial loss as of September 30, 2019 as a component of net periodic pension cost in 2020.

The following table shows change in accumulated other comprehensive loss:

(in thousands)

	Year ended September 30,	
	2019	2018
Accumulated other comprehensive loss- beginning of year	\$ 27,027	\$ 24,738
Recognized during year - net actuarial (losses)	(2,385)	(2,288)
Occurring during year - settlement loss	30	(9)
Occurring during year - net actuarial losses (gains)	12,274	5,312
Foreign exchange impact	(2,026)	(726)
Accumulated other comprehensive loss- end of year	<u>\$ 34,920</u>	<u>\$ 27,027</u>

The following table shows the percentage of total plan assets for each major category of plan assets:

Asset category:	September 30,	
	2019	2018
Equity securities	32 %	35 %
Fixed-income securities	46 %	46 %
Commodities	2 %	1 %
Insurance company funds	12 %	12 %
Cash	8 %	6 %
	<u>100 %</u>	<u>100 %</u>

We periodically review the pension plans' investments in the various asset classes. For the CoCreate plan in Germany assets are actively allocated between equity and fixed income securities to achieve target return. For the other international plans assets are allocated 100% to fixed income securities. The fixed income securities for the other international plans primarily include investments held with insurance companies with fixed returns. The plans' investment managers are provided specific guidelines under which they are to invest the assets assigned to them. In general, investment managers are expected to remain fully invested in their asset class with further limitations on risk as related to investments in a single security, portfolio turnover and credit quality.

The German CoCreate plan's investment policy prohibits the use of derivatives associated with leverage and speculation or investments in securities issued by PTC, except through index-related strategies and/or commingled funds. An investment committee oversees management of the pension plans' assets. Plan assets consist primarily of investments in mutual funds invested in equity and fixed income securities.

In 2019, 2018 and 2017 our actual return on plan assets was \$3.5 million, \$1.0 million and \$6.3 million, respectively.

Based on actuarial valuations and additional voluntary contributions, we contributed \$2.6 million, \$2.5 million, and \$2.0 million in 2019, 2018 and 2017, respectively, to the plans.

As of September 30, 2019, benefit payments expected to be paid over the next ten years are outlined in the following table:

<i>(in thousands)</i>	<u>Future Benefit Payments</u>
Year ending September 30,	
2020	\$ 2,918
2021	3,008
2022	3,648
2023	3,519
2024	4,401
2025 to 2029	22,173

Fair Value of Plan Assets

The International Plan assets are comprised primarily of investments in a trust and an insurance company. The underlying investments in the trust are primarily publicly-traded European DJ EuroStoxx50 equities and European governmental fixed income securities. They are classified as Level 1 because the underlying units of the trust are traded in open public markets. The fair value of the underlying investments in equity securities and fixed income are based upon publicly-traded exchange prices.

<i>(in thousands)</i>	<u>September 30, 2019</u>			
Plan assets:	<u>Level 1</u>	<u>Level 2</u>	<u>Level 3</u>	<u>Total</u>
Fixed income securities:				
Government	\$ 26,996	\$ —	\$ —	\$ 26,996
European corporate investment grade	4,816	—	—	4,816
European large capitalization stocks	22,648	—	—	22,648
Commodities	1,086	—	—	1,086
Insurance company funds ⁽¹⁾	—	8,494	—	8,494
Cash	5,839	—	—	5,839
	<u>\$ 61,385</u>	<u>\$ 8,494</u>	<u>\$ —</u>	<u>\$ 69,879</u>

(in thousands)

September 30, 2018

Plan assets:	September 30, 2018			
	Level 1	Level 2	Level 3	Total
Fixed income securities:				
Government	\$ 29,754	\$ —	\$ —	\$ 29,754
European corporate investment grade	2,499	—	—	2,499
European large capitalization stocks	24,502	—	—	24,502
Commodities	724	—	—	724
Insurance company funds ⁽¹⁾	—	8,413	—	8,413
Cash	4,249	—	—	4,249
	<u>\$ 61,728</u>	<u>\$ 8,413</u>	<u>\$ —</u>	<u>\$ 70,141</u>

(1) These investments are comprised primarily of funds invested with an insurance company in Japan with a guaranteed rate of return. The insurance company invests these assets primarily in government and corporate bonds.

15. Fair Value Measurements

Money market funds, time deposits and corporate notes/bonds are classified within Level 1 of the fair value hierarchy because they are valued based on quoted market prices in active markets.

Certificates of deposit, commercial paper and certain U.S. government agency securities are classified within Level 2 of the fair value hierarchy. These instruments are valued based on quoted prices in markets that are not active or based on other observable inputs consisting of market yields, reported trades and broker/dealer quotes.

The principal market in which we execute our foreign currency contracts is the institutional market in an over-the-counter environment with a relatively high level of price transparency. The market participants are usually large financial institutions. Our foreign currency contracts' valuation inputs are based on quoted prices and quoted pricing intervals from public data sources and do not involve management judgment. These contracts are typically classified within Level 2 of the fair value hierarchy.

The fair value of our contingent consideration arrangements is determined based on our evaluation as to the probability and amount of any earn-out that will be achieved based on expected future performances by the acquired entities. These arrangements are classified within Level 3 of the fair value hierarchy.

Our significant financial assets and liabilities measured at fair value on a recurring basis as of September 30, 2019 and 2018 were as follows:

(in thousands)

September 30, 2019

Financial assets:	September 30, 2019			
	Level 1	Level 2	Level 3	Total
Cash equivalents ⁽¹⁾	\$ 108,020	\$ —	\$ —	\$ 108,020
Marketable securities:				
Commercial paper	—	999	—	999
Corporate notes/bonds	56,436	—	—	56,436
Forward contracts	—	3,064	—	3,064
	<u>\$ 164,456</u>	<u>\$ 4,063</u>	<u>\$ —</u>	<u>\$ 168,519</u>
Financial liabilities:				
Forward contracts	—	2,771	—	2,771
	<u>\$ —</u>	<u>\$ 2,771</u>	<u>\$ —</u>	<u>\$ 2,771</u>

(in thousands)

September 30, 2018

	Level 1	Level 2	Level 3	Total
Financial assets:				
Cash equivalents ⁽¹⁾	\$ 93,058	\$ —	\$ —	\$ 93,058
Marketable securities:				
Certificates of deposit	—	219	—	219
Corporate notes/bonds	54,737	—	—	54,737
U.S. government agency securities	—	995	—	995
Forward contracts	—	2,889	—	2,889
	<u>\$ 147,795</u>	<u>\$ 4,103</u>	<u>\$ —</u>	<u>\$ 151,898</u>
Financial liabilities:				
Contingent consideration related acquisitions	\$ —	\$ —	\$ 1,575	\$ 1,575
Forward contracts	—	3,419	—	3,419
	<u>\$ —</u>	<u>\$ 3,419</u>	<u>\$ 1,575</u>	<u>\$ 4,994</u>

(1) Money market funds and time deposits.

Changes in the fair value of Level 3 contingent consideration liability associated with our acquisitions was as follows:

(in thousands)

Contingent Consideration

	Kepware	Other	Total
Balance at September 30, 2017	\$ 8,400	\$ —	\$ 8,400
Contingent consideration at acquisition	—	2,100	2,100
Payment of contingent consideration	(8,400)	(525)	(8,925)
Balance at September 30, 2018	\$ —	\$ 1,575	\$ 1,575
Payment of contingent consideration	—	(1,575)	(1,575)
Balance at September 30, 2019	<u>\$ —</u>	<u>\$ —</u>	<u>\$ —</u>

Payments made against the original fair value of the liabilities recorded at the acquisition date (\$1.6 million, \$8.3 million and \$11.0 million, in 2019, 2018 and 2018, respectively) are included in financing activities in the Consolidated Statement of Cash Flows. Payments related to changes in fair value after the respective acquisition dates are recorded in operating activities.

In connection with our acquisition of Kepware, the former shareholders were eligible to receive additional consideration of up to \$18.0 million, which was contingent on the achievement of certain Financial Performance, Product Integration and Business Integration targets (as defined in the Stock Purchase Agreement) within 24 months from April 1, 2016. The estimated undiscounted range of outcomes for the contingent consideration was \$16.9 million to \$18.0 million at the acquisition date. As of September 30, 2018, we had made \$18.0 million in payments and had no liability remaining.

16. Marketable Securities

The amortized cost and fair value of marketable securities as of September 30, 2019 and 2018 were as follows:

(in thousands)

September 30, 2019

	Amortized cost	Gross unrealized gains	Gross unrealized losses	Fair value
Commercial paper	999	—	—	999
Corporate notes/bonds	56,318	146	(28)	56,436
	<u>\$ 57,317</u>	<u>\$ 146</u>	<u>\$ (28)</u>	<u>\$ 57,435</u>

(in thousands)

	September 30, 2018			
	Amortized cost	Gross unrealized gains	Gross unrealized losses	Fair value
Certificates of deposit	\$ 220	\$ —	\$ (1)	\$ 219
Corporate notes/bonds	55,140	—	(403)	54,737
U.S. government agency securities	1,004	—	(9)	995
	<u>\$ 56,364</u>	<u>\$ —</u>	<u>\$ (413)</u>	<u>\$ 55,951</u>

The following tables summarize the fair value and gross unrealized losses aggregated by category and the length of time that individual securities have been in a continuous unrealized loss position as of September 30, 2019 and 2018.

(in thousands)

	September 30, 2019					
	Less than twelve months		Greater than twelve months		Total	
	Fair Value	Gross unrealized loss	Fair Value	Gross unrealized loss	Fair Value	Gross unrealized loss
Corporate notes/bonds	\$ 12,419	\$ (14)	\$ 16,369	\$ (14)	\$ 28,788	\$ (28)

(in thousands)

	September 30, 2018					
	Less than twelve months		Greater than twelve months		Total	
	Fair Value	Gross unrealized loss	Fair Value	Gross unrealized loss	Fair Value	Gross unrealized loss
Certificates of deposit	\$ 219	\$ (1)	\$ —	\$ —	\$ 219	\$ (1)
Corporate notes/bonds	24,067	(70)	30,670	(333)	54,737	(403)
US government agency securities	—	—	995	(9)	995	(9)
	<u>\$ 24,286</u>	<u>\$ (71)</u>	<u>\$ 31,665</u>	<u>\$ (342)</u>	<u>\$ 55,951</u>	<u>\$ (413)</u>

The following table presents our available-for-sale marketable securities by contractual maturity date, as of September 30, 2019 and 2018.

(in thousands)

	September 30, 2019		September 30, 2018	
	Amortized cost	Fair value	Amortized cost	Fair value
Due in one year or less	\$ 27,725	\$ 27,735	\$ 25,792	\$ 25,670
Due after one year through three years	29,592	29,700	30,572	30,281
	<u>\$ 57,317</u>	<u>\$ 57,435</u>	<u>\$ 56,364</u>	<u>\$ 55,951</u>

17. Derivative Financial Instruments

Non-Designated Hedges

As of September 30, 2019 and 2018, we had outstanding forward contracts for derivatives not designated as hedging instruments with notional amounts equivalent to the following:

(in thousands)

Currency Hedged	September 30,	
	2019	2018
Canadian / U.S. Dollar	\$ 9,408	\$ 7,334
Euro / U.S. Dollar	308,282	297,730
British Pound / U.S. Dollar	3,756	7,074
Israeli Sheqel / U.S. Dollar	10,272	9,778
Japanese Yen / U.S. Dollar	37,462	37,456
Swiss Franc / U.S. Dollar	12,001	11,944
Swedish Krona / U.S. Dollar	20,636	18,207
Chinese Yuan offshore / U.S. Dollar	43,387	116
Singapore Dollar / U.S. Dollar	34,585	1,314
Chinese Renminbi / U.S. Dollar	9,079	9,010
All other	9,487	5,993
Total	\$ 498,355	\$ 405,956

The following table shows the effect of our non-designated hedges in the Consolidated Statements of Operations for the years ended September 30, 2019, 2018 and 2017 (in thousands):

Derivatives Not Designated as Hedging Instruments	Location of Gain or (Loss) Recognized in Income	Net realized and unrealized gain or (loss) (excluding the underlying foreign currency exposure being hedged)		
		Year ended September 30,		
		2019	2018	2017
Forward Contracts	Other income (expense), net	\$ (6,716)	\$ (9,720)	\$ 870

Cash Flow Hedges

We stopped entering into cash flow hedges in the first quarter of 2019. As of September 30, 2018, we had outstanding forward contracts designated as cash flow hedges with notional amounts equivalent to the following:

(in thousands)

Currency Hedged	September 30,	
	2019	2018
Euro / U.S. Dollar	\$ —	\$ 8,495
Japanese Yen / U.S. Dollar	—	2,193
SEK / U.S. Dollar	—	1,708
Total	\$ —	\$ 12,396

The following table shows the effect of our derivative instruments designated as cash flow hedges in the Consolidated Statements of Operations for the years ended September 30, 2019 and 2018 (in thousands):

Derivatives Designated as Hedging Instruments	Gain or (Loss) Recognized in OCI-Effective Portion			Location of Gain or (Loss) Reclassified from OCI into Income-Effective Portion	Gain or (Loss) Reclassified from OCI into Income-Effective Portion			Location of Gain or (Loss) Recognized-Ineffective Portion	Gain or (Loss) Recognized-Ineffective Portion		
	Year ended September 30,				Year ended September 30,				Year ended September 30,		
	2019	2018	2017		2019	2018	2017		2019	2018	2017
Forward Contracts	\$ 187	\$1,652	\$ (866)	Software Revenue	\$ 627	\$ (552)	\$ (524)	Other Income (Expense)	\$ —	\$ 21	\$ (49)

In the event the underlying forecast transaction does not occur, or it becomes probable that it will not occur, the related hedge gains and losses on the cash flow hedge would be immediately reclassified to "Other income (expense), net" on the Consolidated Statements of Operations. For the years ended September 30, 2019, 2018 and 2017 there were no such gains or losses.

Net Investment Hedges

As of September 30, 2019 and 2018, we had outstanding forward contracts designated as net investment hedges with notional amounts equivalent to the following:

Currency Hedged (in thousands)	2019	2018
Euro / U.S. Dollar	\$ 183,396	\$ —
Total	\$ 183,396	\$ —

The following table shows the effect of our derivative instruments designated as net investment hedges in the Consolidated Statements of Operations for the years ended September 30, 2019 and 2018 (in thousands):

Derivatives Designated as Hedging Instruments	Gain or (Loss) Recognized in OCI-Effective Portion			Location of Gain or (Loss) Reclassified from OCI-Effective Portion	Gain or (Loss) Reclassified from OCI-Effective Portion			Location of Gain or (Loss) Excluded from Effectiveness Testing	Gain or (Loss) Recognized-Excluded Portion		
	Year ended September 30,										
	2019	2018	2017		2019	2018	2017		2019	2018	2017
Forward Contracts	\$ (2,925)	\$ —	\$ —	Accumulated other comprehensive loss	\$ (7,630)	\$ —	\$ —	Other income (expense), net	\$ 4,598	\$ —	\$ —

As of September 30, 2019, we estimate that all amounts reported in accumulated other comprehensive loss will be applied against exposed balance sheet accounts upon translation within the next three months.

The following table shows our derivative instruments measured at gross fair value as reflected in the Consolidated Balance Sheets:

(in thousands)

September 30,

	Fair Value of Derivatives Designated As Hedging Instruments		Fair Value of Derivatives Not Designated As Hedging Instruments	
	2019	2018	2019	2018
	Derivative assets ^(a) :			
Forward Contracts	\$ 1,674	\$ 440	\$ 1,390	\$ 2,449
Derivative liabilities ^(b) :				
Forward Contracts	\$ —	\$ —	\$ 2,771	\$ 3,419

(a) As of September 30, 2019, \$3.1 million current derivative assets are recorded in other current assets, in the Consolidated Balance Sheets. As of September 30, 2018, \$2.9 million current derivative assets are recorded in other current assets, in the Consolidated Balance Sheets.

(b) As of September 30, 2019, \$2.8 million current derivative liabilities are recorded in accrued expenses and other current liabilities in the Consolidated Balance Sheets. As of September 30, 2018, \$3.4 million current derivative liabilities are recorded in accrued expenses and other current liabilities in the Consolidated Balance Sheets.

Offsetting Derivative Assets and Liabilities

We have entered into master netting arrangements which allow net settlements under certain conditions. Although netting is permitted, it is currently our policy and practice to record all derivative assets and liabilities on a gross basis in the Consolidated Balance Sheets.

The following table sets forth the offsetting of derivative assets as of September 30, 2019:

(in thousands)	Gross Amounts Offset in the Consolidated Balance Sheets			Gross Amounts Not Offset in the Consolidated Balance Sheets		
	Gross Amount of Recognized Assets	Gross Amounts Offset in the Consolidated Balance Sheets	Net Amounts of Assets Presented in the Consolidated Balance Sheets	Financial Instruments	Cash Collateral Received	Net Amount
September 30, 2019						
Forward Contracts	\$ 3,064	\$ —	\$ 3,064	\$ (2,771)	\$ —	\$ 293

The following table sets forth the offsetting of derivative liabilities as of September 30, 2019:

(in thousands)	Gross Amounts Offset in the Consolidated Balance Sheets			Gross Amounts Not Offset in the Consolidated Balance Sheets		
	Gross Amount of Recognized Liabilities	Gross Amounts Offset in the Consolidated Balance Sheets	Net Amounts of Liabilities Presented in the Consolidated Balance Sheets	Financial Instruments	Cash Collateral Pledged	Net Amount
September 30, 2019						
Forward Contracts	\$ 2,771	\$ —	\$ 2,771	\$ (2,771)	\$ —	\$ —

Net gains and losses on foreign currency exposures, including realized and unrealized gains and losses on forward contracts, included in foreign currency net losses, were net losses of \$3.2 million, \$7.0 million and \$5.7 million for 2019, 2018 and 2017, respectively. Net realized and unrealized gains and losses on forward contracts included in foreign currency net losses were a net loss of \$8.4 million in 2019 and \$7.5 million in 2018, and a net gain of \$1.8 million in 2017.

18. Segment and Geographic Information

We operate within a single industry segment -- computer software and related services. Operating segments as defined under GAAP are components of an enterprise about which separate financial information is available that is evaluated regularly by the chief operating decision maker, or decision-making group, in deciding how to allocate resources and in assessing performance. Our chief operating decision maker is our President and Chief Executive Officer. We have two operating and reportable segments: (1) Software Products, which includes license, subscription and related support revenue (including updates and technical support) for all our products; and (2) Professional Services, which includes consulting, implementation and training services. We do not allocate sales & marketing or general and administrative expense to our operating segments as these activities are managed on a consolidated basis. Additionally, segment profit does not include stock-based compensation, amortization of intangible assets, restructuring charges and certain other identified costs that we do not allocate to the segments for purposes of evaluating their operational performance.

The revenue and profit attributable to our operating segments are summarized below. We do not produce asset information by reportable segment; therefore, it is not reported.

(in thousands)

Year ended September 30,

	As reported ASC 606	ASC 605	As reported ASC 605	As reported ASC 605
	2019	2019	2018	2017
Software Products				
Revenue	\$ 1,088,100	\$ 1,150,818	\$ 1,088,487	\$ 987,316
Operating Costs ⁽¹⁾	377,464	375,268	387,989	366,716
Profit	710,636	775,550	700,498	620,600
Professional Services				
Revenue	167,531	160,676	153,337	176,723
Operating costs ⁽²⁾	133,846	128,818	136,964	145,051
Profit (loss)	33,685	31,858	16,373	31,672
Total segment revenue	1,255,631	1,311,494	1,241,824	1,164,039
Total segment costs	511,310	504,086	524,953	511,767
Total segment profit (loss)	744,321	807,408	716,871	652,272
Unallocated operating expenses:				
Sales and marketing expenses	385,423	409,932	389,871	357,329
General and administrative expenses	104,393	104,393	108,159	108,363
Intangibles amortization	51,147	51,147	58,056	58,729
Restructuring and other charges, net	51,114	51,114	3,764	7,942
Stock-based compensation	86,400	86,400	82,939	76,708
Other unallocated operating expenses ⁽³⁾	2,802	2,802	1,469	1,435
Total operating income	63,042	101,620	72,613	41,766
Interest expense	(43,047)	(43,047)	(41,673)	(42,400)
Other (expense) income, net	305	131	(2,284)	(772)
Income (loss) before income taxes	\$ 20,300	\$ 58,704	\$ 28,656	\$ (1,406)

(1) Operating costs for the Software Products segment includes all cost of software revenue and research and development costs, excluding stock-based compensation and intangible amortization. Operating costs for the Software Products segment includes depreciation of \$4.6 million, \$5.1 million and \$5.0 million in 2019, 2018 and 2017, respectively.

(2) Operating costs for the Professional Services segment includes all cost of professional services revenue, excluding stock-based compensation, intangible amortization, and fair value adjustments for deferred services costs. The Professional Services segment includes depreciation of \$1.4 million, \$1.6 million and \$1.8 million in 2019, 2018 and 2017, respectively.

(3) Other unallocated operating expenses include acquisition-related and other transactional costs, certain legal accrual expenses, pension plan termination-related costs and fair value adjustments for deferred services costs. Unallocated departments include depreciation of \$20.6 million, \$22.7 million and \$21.2 million in 2019, 2018 and 2017, respectively.

We report revenue by the following two product groups:

(in thousands)

	Year ended September 30,			
	As reported ASC 606	ASC 605	As reported ASC 605	As reported ASC 605
	2019	2019	2018	2017
Solutions	\$ 1,099,811	\$ 1,135,891	\$ 1,102,546	\$ 1,060,692
IoT	155,820	175,603	139,278	103,348
Total revenue	<u>\$ 1,255,631</u>	<u>\$ 1,311,494</u>	<u>\$ 1,241,824</u>	<u>\$ 1,164,039</u>

We license products to customers worldwide. Our sales and marketing operations outside the United States are conducted principally through our international sales subsidiaries throughout Europe and the Asia-Pacific regions. Intercompany sales and transfers between geographic areas are accounted for at prices that are designed to be representative of unaffiliated party transactions. Our international revenue is presented based on the location of our customer. Revenue for the geographic regions in which we operate is presented below.

(in thousands)

Revenue:	Year ended September 30,			
	As reported ASC 606	ASC 605	As reported ASC 605	As reported ASC 605
	2019	2019	2018	2017
Americas ⁽¹⁾	\$ 537,548	\$ 565,362	\$ 511,237	\$ 500,879
Europe ⁽²⁾	464,666	494,864	485,851	435,183
Asia Pacific	\$ 253,417	\$ 251,268	\$ 244,736	\$ 227,977
Total revenue	<u>\$ 1,255,631</u>	<u>\$ 1,311,494</u>	<u>\$ 1,241,824</u>	<u>\$ 1,164,039</u>

- (1) Includes revenue in the United States totaling \$514.4 million (ASC 606) and \$541.7 million (ASC 605), \$487.3 million and \$475.5 million for 2019, 2018 and 2017, respectively.
- (2) Includes revenue in Germany totaling \$185.4 million (ASC 606) and \$197.2 million (ASC 605), \$193.3 million and \$164.7 million for 2019, 2018 and 2017, respectively.
- (3) Substantially all of the Americas long-lived tangible assets are located in the United States.

19. Subsequent Events

Acquisition

On November 1, 2019, we acquired Onshape, creators of the first Software as a Service (SaaS) product development platform that unites robust CAD with powerful data management and collaboration tools, for approximately \$470 million, net of cash acquired. The acquisition is expected to accelerate our ability to attract new customers with a SaaS-based product offering and position the company to capitalize on an industry transition to SaaS.

Borrowings and Credit Facility

We borrowed \$455 million under our existing credit facility to acquire Onshape, bringing our total outstanding indebtedness to approximately \$1.1 billion. Subsequently, we amended the credit facility to increase the revolving loan commitment from \$700 million to \$1 billion and make other administrative amendments.

Equity Grants

In November 2019, we granted shares valued at approximately \$16.8 million to our employees, including our executives (\$3.3 million), in payment of amounts earned under our annual Corporate Incentive Plan.

In November 2019, we granted time-based restricted stock units (RSUs) valued at approximately \$49.2 million to employees. The time-based RSUs will generally vest in three substantially equal annual installments on November 15, 2020, 2021 and 2022.

SELECTED CONSOLIDATED FINANCIAL DATA

You should read the following selected consolidated financial data in conjunction with Item 7. “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and our consolidated financial statements and the related notes appearing elsewhere in this Annual Report.

The Consolidated Statements of Operations data for the years ended September 30, 2019, 2018, and 2017 and the Consolidated Balance Sheets data as of September 30, 2019 and 2018 are derived from our audited consolidated financial statements appearing elsewhere in this Annual Report. The Consolidated Statements of Operations data for the years ended September 30, 2016 and 2015 and the Consolidated Balance Sheets data as of September 30, 2017, 2016 and 2015 are derived from our audited consolidated financial statements that are not included in this Annual Report. The historical results are not necessarily indicative of results in any future period.

FIVE-YEAR SUMMARY OF SELECTED FINANCIAL DATA ⁽¹⁾

(in thousands, except per share data)

	2019	2019	2018	2017	2016	2015
	As reported ASC 606	ASC 605	As reported ASC 605	As reported ASC 605	As reported ASC 605	As reported ASC 605
Revenue	\$ 1,255,631	\$ 1,311,494	\$ 1,241,824	\$ 1,164,039	\$ 1,140,533	\$ 1,255,242
Gross margin	930,253	993,340	915,322	835,537	814,868	920,508
Operating income (loss) ⁽²⁾	63,042	101,620	72,613	41,766	(37,014)	41,616
Net income (loss) ^{(2) (3)}	(27,460)	2,979	51,987	6,239	(54,465)	47,557
Earnings (loss) per share—Basic ^{(2) (3)}	(0.23)	0.03	0.45	0.05	(0.48)	0.41
Earnings (loss) per share—Diluted ^{(2) (3)}	(0.23)	0.03	0.44	0.05	(0.48)	0.41
Total assets	2,664,588	2,471,908	2,329,022	2,360,384	2,345,729	2,209,913
Working capital (deficit)	144,466	(140,437)	(101,495)	(12,353)	(11,930)	87,419
Long-term liabilities	824,435	795,850	719,154	796,039	848,544	732,482
Stockholders' equity	1,201,998	876,333	874,589	885,436	842,666	860,171

- (1) The consolidated financial position and results of operations data reflect our acquisitions of Kepware on January 12, 2016 for \$99.4 million in cash, Vuforia on November 3, 2015 for \$64.8 million in cash, ColdLight on May 7, 2015 for \$98.6 million in cash, Axeda on August 11, 2014 for \$165.9 million in cash, ThingWorx on December 30, 2013 for \$111.5 million in cash as well as certain other less significant businesses during these periods. Results of operations for the acquired businesses have been included in the Consolidated Statements of Operations since their acquisition dates.
- (2) Operating income and net income in 2016 includes pre-tax restructuring charges of \$76.3 million. Operating income and net income in 2015 includes a pre-tax U.S. pension settlement loss of \$66.3 million, a \$28.2 million charge related to a legal accrual and pre-tax restructuring charges of \$43.4 million.
- (3) In 2015, net income includes an \$18.7 million tax benefit related to settlement of our U.S. pension plan.

QUARTERLY FINANCIAL INFORMATION (UNAUDITED)

(in thousands except per share data)

	September 30, 2019		June 29, 2019		March 30, 2019		December 29, 2018	
	As reported ASC 606	ASC 605	As reported ASC 606	ASC 605	As reported ASC 606	ASC 605	As reported ASC 606	ASC 605
Revenue	\$ 335,004	\$ 334,828	\$ 295,486	\$ 322,410	\$ 290,451	\$ 315,499	\$ 334,689	\$ 338,757
Gross margin	249,587	251,070	212,781	241,177	210,547	237,532	257,337	263,561
Operating income	46,551	37,640	9,305	32,370	(22,858)	(1,572)	30,044	33,182
Net income	9,826	(15,944)	(14,758)	11,705	(45,513)	(12,030)	20,985	19,248
Earnings per share:								
Basic	\$ 0.09	\$ (0.14)	\$ (0.13)	\$ 0.10	\$ (0.37)	\$ (0.10)	\$ 0.18	\$ 0.16
Diluted	\$ 0.08	\$ (0.14)	\$ (0.13)	\$ 0.10	\$ (0.37)	\$ (0.10)	\$ 0.18	\$ 0.16

(in thousands except per share data)

	September 30, 2018		June 30, 2018		March 31, 2018		December 30, 2017	
	As reported ASC 606	ASC 605	As reported ASC 606	ASC 605	As reported ASC 606	ASC 605	As reported ASC 606	ASC 605
Revenue	\$ 312,521	\$ 312,521	\$ 314,777	\$ 314,777	\$ 307,833	\$ 307,833	\$ 306,644	\$ 306,644
Gross margin	234,395	234,395	233,144	233,144	224,175	224,175	223,609	223,609
Operating income	11,541	11,541	21,547	21,547	22,210	22,210	17,316	17,316
Net income (loss)	13,191	13,191	16,997	16,997	7,922	7,922	13,877	13,877
Earnings (loss) per share:								
Basic	\$ 0.11	\$ 0.11	\$ 0.15	\$ 0.15	\$ 0.07	\$ 0.07	\$ 0.12	\$ 0.12
Diluted	\$ 0.11	\$ 0.11	\$ 0.14	\$ 0.14	\$ 0.07	\$ 0.07	\$ 0.12	\$ 0.12

Directors

Robert Schechter
Chairman of the Board
Chairman and Chief Executive Officer (Retired), NMS
Communications Corporation, a software company

Janice Chaffin
Group President, Consumer Business Unit (Retired), Symantec
Corporation, an enterprise software company

Phillip Fernandez
Venture Partner (Retired), Shasta Ventures, a venture capital
firm

Donald Grierson
Chief Executive Officer (Retired), ABB Vetco International, an
oil services business

James Heppelmann
President and Chief Executive Officer, PTC

Klaus Hoehn
Senior Advisor, Innovation and Technology to the Office of the
Chairman, Deere & Company, a manufacturing company

Paul Lacy
President (Retired), Kronos Incorporated, an enterprise
software company

Corinna Lathan
Chief Executive Officer, Co-Founder and Chair of the Board of
AnthroTronix, Inc., a biomedical engineering research and
development company

Blake Moret
President and Chief Executive Officer and Chairman of the
Board of Rockwell Automation, Inc., a company focused on
industrial automation and information

Corporate Officers

James Heppelmann
President and Chief Executive Officer

Kristian Talvitie
Executive Vice President, Chief Financial Officer

Kathleen Mitford
Executive Vice President, Products

Aaron von Staats
Executive Vice President, General Counsel and Secretary

Shareholders and Stock Listing

Our common stock is traded on the Nasdaq Global Select
Market under the symbol PTC. On September 30, 2019, our
common stock was held by 1,107 stockholders of record.

Dividends

We have not paid dividends on our common stock and have
historically retained earnings for use in our business. We review
our policy with respect to the payment of dividends from time
to time. However, there can be no assurance that we will pay
any dividends in the future.

Investor Information

You may obtain a copy of any of the exhibits to our Annual
Report on Form 10-K free of charge. These documents are
available on our website at www.ptc.com or by contacting
PTC Investor Relations.

Requests for information about PTC should be directed to:

Investor Relations
PTC
121 Seaport Boulevard
Boston, MA 02210
Telephone: 781.370.5000
Email: ir@ptc.com

Annual Meeting

The annual meeting of stockholders will be held at the time
and location stated below.

Wednesday, February 12, 2020
8:00 a.m., local time

PTC Headquarters
121 Seaport Boulevard
Boston, Massachusetts 02210

Internet Access

www.ptc.com

General Outside Counsel

Locke Lord LLP, Boston, Massachusetts

Independent Accountants

PricewaterhouseCoopers LLP, Boston, Massachusetts

Transfer Agent and Registrar

American Stock Transfer & Trust Company, New York, NY



PTC Worldwide Headquarters
121 Seaport Boulevard
Boston, MA 02210
PTC.com

