REFINITIV

DELTA REPORT

10-K

PTC - PTC INC.

10-K - SEPTEMBER 30, 2023 COMPARED TO 10-K - SEPTEMBER 30, 2022

The following comparison report has been automatically generated

TOTAL DELTAS	4792
CHANGES	395
DELETIONS	2181
ADDITIONS	2216

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, 2022 2023

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	**04-2866152**
(State or other jurisdiction of incorporation or organization)	**(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 has filed a report on and attestation to its management’s assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☑

If securities are registered pursuant to Section 12(b) of the Act, indicate by check mark whether the financial statements of the registrant included in the filing reflect the correction of an error to previously issued financial statements. ☐

Indicate by check mark whether any of those error corrections are restatements that required a recovery analysis of incentive-based compensation received by any of the registrant’s executive officers during the relevant recovery period pursuant to §240.10D-1(b). ☐

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 $11,336,087,091 14,078,377,983 on March 31, 2022 March 31, 2023 based on the last reported sale price of our common stock on the Nasdaq Global Select Market on that date. There were 116,975,644 118,333,823 shares of our common stock outstanding on that day and 117,471,969 119,244,754 shares of our common stock outstanding on November 14, 2022 November 16, 2023.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the definitive Proxy Statement in connection with the 2023 2024 Annual Meeting of Stockholders (2023 (2024 Proxy Statement) are incorporated by reference into Part III.

PTC Inc.

ANNUAL REPORT ON FORM 10-K FOR FISCAL YEAR 2022 2023

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Cautionary Note About Forward-Looking Statements

This Annual Report contains forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. We intend such forward-looking statements to be covered by the safe harbor provisions for forward-looking statements contained in the Private Securities

Litigation Reform Act of 1995. In particular, statements that are not historical facts, including but not limited to, statements about our anticipated financial results, capital development and growth, as well as about the development of our products, markets and workforce, are forward-looking statements. These forward-looking statements are generally identifiable by use of the words "believe," "expect," "intend," "anticipate," "estimate," "project" or similar expressions, whether in the negative or affirmative. Forward-looking statements are based on our current plans, expectations and assumptions and are not guarantees of future performance. Factors that may cause our actual results to differ materially from these statements include, but are not limited to, the risks and uncertainties discussed in Item 1A. "Risk Factors" and elsewhere throughout this Annual Report. Such factors, among others, could have a material adverse effect upon our business, results of operations and financial condition. We caution readers not to place undue reliance on any forward-looking statements, which only speak as of the date made. We undertake no obligation to update any forward-looking statement to reflect events or circumstances after the date on which such statement is made.

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

Website References

References to our PTC.com website in this Annual Report and to our 2023 Impact Report are provided for convenience. The content on PTC.com and in our 2023 Impact Report is not incorporated by reference into this Annual Report unless expressly stated.

PART I

ITEM 1. Business

Our Business

PTC is a global software company that provides a portfolio of innovative digital solutions that work together to transform how physical products are engineered, manufactured, and serviced.

Our software portfolio includes award-winning offerings in the that enable companies to author product data (our computer-aided design (CAD) portfolio solutions) and to manage product data and orchestrate processes (our product lifecycle management (PLM) markets. CAD is utilized for product data authoring and PLM is for product data management and process orchestration. portfolio solutions).

Our software can be delivered on premises, in the cloud, or in a hybrid model.

Our customer base includes customers include some of the world's most innovative manufacturers companies in the aerospace and defense, automotive, electronics and high tech, industrial machinery and equipment, life sciences, retail and consumer products industries.

We generate revenue through the sale of software subscriptions, which include license access term-based on-premises software licenses and related support, (technical support Software-as-a-Service (SaaS), and software updates);

support for hosting services; perpetual licenses; cloud services (hosting support for our software and software-as-a-service (SaaS)); perpetual licenses; and professional services (consulting, implementation, and training).

Recent Developments

We acquired the ServiceMax® cloud-native field service management business in Q2'23, broadening our PLM solution set to encompass the service phase of the product lifecycle. We paid the first purchase payment installment of $835 million, as adjusted for working capital, indebtedness, cash, and transaction expenses, in January 2023, and the second and final installment of $650 million in October 2023. Refer to *Note 6. Acquisitions and Disposition of Businesses* of Notes to Consolidated Financial Statements in this Annual Report for additional discussion about the ServiceMax transaction.

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Our Strategy

There are three key elements We pursue multiple strategic initiatives designed to create value for our strategy to customers, increase our Annual Run Rate (ARR) and free cash flow, and deliver long-term shareholder value. value for stockholders.

Subscription Business Model

Our transition from a perpetual and maintenance model to a subscription business model continues to be key to driving growth. Our subscription model offers greater benefits of scale and growth potential, drives higher customer engagement and retention, and provides better business predictability, with over 90% of our annual revenues being recurring in nature. This, in turn, enables us to make steady and sustained investments to pursue mid-to-long-term growth opportunities.

Customer Expansion

Accelerate Digital Thread Solutions

With our Our solutions we enable portfolio encompasses the entire product life cycle, from design to manufacture to service, enabling companies to adopt a "digital thread" strategy to drive innovation and productivity. A digital thread manages product data and makes it accessible and useful to the right people, at the right time, and in the right context. This The digital thread is particularly relevant valuable for larger businesses pursuing a vertically integrated manufacturing strategy in which the reuse customers with complex products that tend to have longer life cycles. We seek to drive value for our customers by offering new and repurposing of earlier innovations drives next generation product offerings. enhanced features and products that enable our customers to pursue and expand their digital thread strategies.

Accelerate Product Innovation Our acquisition strategy targets companies with products that complement ours and that we believe will appeal to our existing customer base, allowing us to pursue cross-selling opportunities. The addition of ServiceMax in 2023 for the SLM part of our PLM portfolio further extends what was already a unique portfolio of interconnected digital thread capabilities across the full product life cycle. The addition of Codebeamer in 2022 for the ALM part of our PLM portfolio strengthened our offerings in the ALM space as software becomes integral to more and more products, especially in regulated industries where traceability is safety-critical.

PLM Expansion

PLM is at the heart of digital transformation and has become essential technology at industrial companies. No longer confined to the Engineering department, PLM data is driving decision-making across organizations, enabling them to improve how products are designed, manufactured, and serviced.

Our goal is to be the category leader in PLM and to provide our customers with best-in-class solutions to drive innovation and productivity.

SaaS Transition

We enable companies continue to upend invest in the product development process with solutions that apply agile concepts, originally focused on software development, to the entire product innovation process, from software to hardware and electronics. By applying agile product development processes across all three disciplines, companies can increase innovation velocity and bring new products to market faster to meet rapidly changing market demand. This is particularly relevant for start-up and upstart businesses focused on technology-centered innovations that commonly leverage contract manufacturers for production transformation of their designs.

Accelerate SaaS Transformation

Manufacturers today face a myriad of business challenges. Macroeconomic forces, such as an ever-evolving workforce, supply chain disruptions, the rise of smart, connected products, and the need to prove sustainability, are all driving the need for change. We enable companies to respond to these challenges with technology that leverages the cloud to transform how, where, and when work gets done. Software-as-a-service (SaaS), which has already reshaped nearly all aspects of business, is poised to transform management of the entire product lifecycle. Anticipating this need, PTC acquired the Onshape and Arena cloud-native product development solutions. In parallel, we are heavily investing to transform our technology portfolio to SaaS.

Strategic Transactions

During FY'22, include more SaaS offerings. Our acquisitions of Onshape, Arena, and ServiceMax brought cloud-native solutions to our portfolio, and we completed two strategic transactions. In Q3'22, continue to work towards creating and expanding SaaS offerings for our existing products. We believe that SaaS products represent a strong value proposition for our customers, offering reduced complexity; lower costs to implement, upgrade and administer; better user collaboration and mobility; and scalability. This is a longer-term strategy as we acquired expect that SaaS adoption in the Codebeamer™ application lifecycle management business to broaden CAD and deepen our ALM footprint across safety-critical PLM markets will be gradual at first, then accelerate significantly, given constraints such as the length and regulated industries. In Q3'22, we also sold a portion cost of conversion projects and budgeting timelines of our PLM services business to ITC Infotech. The transaction is designed to accelerate customer digital transformation initiatives and adoption of our Windchill+ SaaS solution. Refer to *Note 6. Acquisitions and Disposition of Business* of Notes to Consolidated Financial Statements in this Annual Report for additional discussion regarding these transactions. customers.

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Our Principal Products and Services

In 2022, we reported our Our Principal Product Groups

PLM Software Products For Product Data Management and Process Orchestration	CAD Software Products For Product Data Authoring

PLM

Our **Windchill®** PLM application suite manages all aspects of the product development lifecycle—from concept through service and retirement—by enabling a digital thread of product parts, materials, and configuration information. Windchill provides real-time information sharing, dynamic data visualization, and the ability to collaborate across geographically-distributed teams, enabling manufacturers to elevate their product development, manufacturing, and field service processes. With its open architecture that integrates with other enterprise systems, Windchill provides a solid foundation for a product-driven digital thread.

Our **ThingWorx®** platform is flexible and purpose-built for Industrial Internet of Things (IIoT). It offers a rich set of capabilities that enable enterprises to digitally transform every aspect of their business in two product groups: Digital Thread and Velocity. Digital Thread included products focused on customers with innovative solutions that are embracing enterprise-wide digital transformation simple to create, easy to implement, scalable to meet future needs, and Velocity included products focused on designed to enable customers that prioritize agile product development. Beginning in fiscal year 2023, we are reporting our businesses in two new product groups: CAD (Computer-Aided Design) to accelerate time to value. Primary use cases include remote asset monitoring, remote maintenance and PLM (Product Lifecycle Management). Products designated as CAD refer to software used for product data authoring. Products designated as PLM refer to software used for product data service, predictive maintenance and asset management, and process orchestration.optimized equipment effectiveness. Our ThingWorx Digital Performance Management solution enables manufacturers to identify, prioritize, and overcome their most significant production bottlenecks.

The new reporting structure aligns

Our **ServiceMax®** field service management (FSM) solutions enable companies to improve asset uptime with optimized in-person and remote service, boost technician productivity with the latest mobile tools, and deliver metrics for confident decision making.

Our **Arena®**SaaS PLM solution enables product teams to collaborate virtually anytime and anywhere, making it easier to share the latest product and quality information with internal teams and supply chain partners and deliver innovative products to customers faster. Our Arena quality management system software connects quality and product designs into a single system to simplify regulatory compliance.

Our **Codebeamer®** application lifecycle management (ALM) and model-based systems engineering capabilities enable companies to accelerate the development of software-intensive products through system modeling, software configuration, and requirements, risk, and test management.

Our **Servigistics®** service parts management solution enables companies to effectively manage their service parts inventory, enabling them to optimize equipment availability and uptime, and increase customer satisfaction.

Our **FlexPLM®** solution provides retailers with a single platform for merchandising and line planning, materials management, sampling, and more.

Our **Kepware®** portfolio of industrial connectivity solutions helps companies connect diverse automation devices and software applications.

CAD

Our **Creo®** 3D CAD technology enables the digital design, testing, and modification of product models. With its design simulation, additive manufacturing, and generative design innovations, we enable our customers to be first to market with differentiated products. From initial concept to design, simulation, and analysis, Creo provides designers with innovative tools to efficiently create better to our strategy, product offerings and industry segments. products, faster.

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Our **Windchill®** PLM application suite manages all aspects of the product development lifecycle - from concept through service and retirement - by enabling a digital thread of product parts, materials, and configuration information. Windchill provides real-time information sharing, dynamic data visualization, and the ability to collaborate across geographically-distributed teams, enabling manufacturers to elevate their product development process. With its open architecture that integrates with other enterprise systems, Windchill provides a solid foundation for a product-driven digital thread.

Our **Arena**

Our **Onshape®** SaaS product development platform unites computer-aided design with data management,

Our **Creo®** 3D CAD technology enables the digital design, testing, and modification of product models. With its design simulation, additive manufacturing, and generative design innovations, we enable our customers to be first to market with differentiated products. From initial concept to design, simulation, and analysis, Creo provides designers with innovative tools to efficiently create better products, faster.

Our **Onshape®** SaaS product development platform unites computer-aided design with data management, collaboration tools, and real-time analytics. A cloud-native multi-tenant solution that can be instantly deployed on virtually any computer or mobile device, Onshape enables teams to work together from just about anywhere. Real-time design reviews, commenting, and collaboration tools, and real-time analytics. A cloud-native multi-tenant solution that can be instantly deployed on virtually any computer or mobile device, Onshape enables teams to work together from just about anywhere. Real-time design reviews, commenting, and simultaneous editing enable a collaborative workflow where multiple design iterations can be completed in parallel and merged into the final design.

Our **Vuforia**® augmented reality (AR) technology enables the visualization of digital information in a physical context and the creation of AR and mixed reality experiences, enabling companies to drive results in manufacturing, service, engineering, and operations. Vuforia solutions equip frontline workers with focused and effective step-by-step instructions, procedural guidance, skill development and remote assistance that enable enterprises to improve workforce productivity, reduce errors, increase asset utilization and drive higher profitability.

SaaS PLM solution enables product teams to collaborate virtually anytime and anywhere, making it easier to share the latest product and quality information with internal teams and supply chain partners and help deliver innovative products to customers faster. Our Arena quality management system software connects quality and product designs into a single system to simplify regulatory compliance.

Our **ThingWorx**® platform is flexible and purpose-built for Industrial Internet of Things (IIoT). It offers a rich set of capabilities that enable enterprises to digitally transform every aspect of their business with innovative solutions that are simple to create, easy to implement, scalable to meet future needs, and designed to enable customers to accelerate time to value. Our ThingWorx Digital Performance Management solution enables manufacturers to identify, prioritize, and overcome their most significant production bottlenecks.

simultaneous editing enable a collaborative workflow where multiple design iterations can be completed in parallel and merged into the final design.

Our **Vuforia**® augmented reality (AR) technology enables the visualization of digital information in a physical context and the creation of AR and mixed reality experiences to deliver workforce productivity and business results in manufacturing, service, engineering, and operations. Vuforia solutions equip frontline workers with focused and effective step-by-step instructions, procedural guidance, skill development and remote assistance that enable enterprises to reduce errors, increase asset utilization and drive higher profitability.

Our **Arbortext**® dynamic publishing solution streamlines how organizations create, manage, and publish technical documentation.

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Our **Codebeamer™** and **Integrity™** application lifecycle management (ALM) and model-based systems engineering capabilities enable users to accelerate the development of software-intensive products through system modeling, software configuration, and requirements, risk, and test management.

Our **Servigistics®** service parts management solution enables customers to effectively manage their service parts inventory, enabling them to optimize equipment availability and uptime, and increase customer satisfaction.

Our **FlexPLM®** solution provides retailers with a single platform for merchandising and line planning, materials management, sampling, and more.

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To meet the increasing demand for SaaS delivered solutions, we expect to introduce a number of new SaaS offerings over time. These service offerings will provide an alternative to our traditional on-premises software products and provide our customers with the benefits of SaaS including accelerated time to value, reduced complexity, lower costs to implement, upgrade and administer, improved user collaboration and mobility, and scalability. We are giving this new generation of offerings a “plus” brand. We launched Windchill+ in the second quarter of 2022.

Our Markets and How We Address Them

The markets we serve present different growth opportunities for us. We The PLM market is undergoing expansion as PLM plays a larger role in industrial companies. Within PLM, we've extended our reach in the growing SLM and ALM spaces through our acquisitions of ServiceMax and Codebeamer. Across all our solutions, we see opportunity for further market growth for all our solutions with a new generation of SaaS solutions we are developing to bring to market over the next few years.

We derive most of our sales from products and services sold directly by our sales force to end-user customers. Approximately 25% to 30% of our sales of products and services are through third-party resellers. 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 alliance partners enable us to increase our market reach, offer broader solutions, and add compelling technology to our offerings. Our strategic services partners provide service offerings to help customers implement our product offerings and transition to SaaS.

Additional financial information about our segments and international and domestic operations may be found in *Note 18. Segment and Geographic Information* *3. Revenue from Contracts with Customers* 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 whose offerings address one or more specific functional areas covered by our solutions. For enterprise Creo CAD and Windchill PLM solutions, we compete with large established companies including Autodesk, Dassault Systèmes SA, and Siemens AG. In our IIoT business, we compete with large established companies such as Amazon, IBM, Oracle, SAP, Siemens AG, and Software AG as well as customers' homegrown solutions. There are also a number of smaller companies that compete in the market for IIoT products. For our AR products, our primary competitors include Microsoft, TeamViewer SE, and ScopeAR. Scope Technologies US Inc. For our ALM products, we compete with IBM, Jama Software, Inc. and Siemens AG. For our SLM products, we compete with enterprise software companies such as Oracle, SAP and IFS AB, and with companies that offer point solutions and with customers' homegrown solutions.

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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 the risks and uncertainties described under Item 1A. "Risk Factors" *Risk Factors* below, which is incorporated into this section by reference.

Environmental Sustainability

At PTC, we're motivated to become an impactful contributor to the dematerialization and decarbonization of global manufacturing. While we have a climate action plan committed to reduce our company's "footprint," we believe far larger benefits will flow from our "handprint" stemming from our software offerings. Our software solutions enable manufacturers to design, build, and service their products more sustainably.

Footprint

In 2023, we announced our footprint reduction commitment via the Science Based Target initiative (SBTi) and submitted near-term and net-zero targets for validation by SBTi. Our submitted near-term commitment is to reduce combined Scope 1 (direct emissions from owned/controlled operations) and Scope 2 (indirect energy use) emissions by 50% and reduce Scope 3 - Category 1 (Purchased Goods and Services) 25% compared to our 2022 baseline by 2030. Our long-term net-zero commitment is to reach net-zero across all scope emissions by 2050, with absolute reductions of over 90% across Scopes 1-3, with accredited carbon removal offsets for the remaining <10% as needed.

While we await SBTi approval of our near-term and net-zero targets, we have already begun to implement programs and pursue initiatives to reduce our emissions and carbon footprint, including:

- prioritizing energy efficiency and accessibility to public transportation when selecting office space;
- increasing our subsidy for employee’s public transportation commute costs; and
- consolidating our data center operations with providers committed to mid-decade 100% renewable energy and advancing circular outcomes.

Handprint

Environmental sustainability is integral to our product offerings. With our software, manufacturers can drive sustainability improvement, including by designing with less material, enhancing product repairability and circularity, improving factory efficiency, and enabling remote service.

People and Culture

PTC’s commitment At PTC, we don’t just imagine a better world, we help create it. Within our work environment we seek to building a diverse, create an equitable and inclusive culture in which all employees can thrive. This is fundamental to our purpose – the Power to Create – and critical to every a key aspect of our talent strategy. Our approach is focused on sustainable talent practices and core values that promote promoting an agile culture, an increased sense of belonging, engaged work environments, and high-performing teams.

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PTC at-a-Glance

As of September 30, 2022 September 30, 2023, PTC had 6,503 7,231 full-time employees. Our employee population is geographically diverse and serves a geographically diverse customer and partner network.

Worldwide Employee Representation

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United States Employee Representation

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Compensation and Benefits

PTC provides a comprehensive and competitive compensation and benefits package designed to attract, retain, motivate, and engage talent around the world that will drive success and innovation in meeting the goals of our business.world.

We provide employees with competitive compensation packages, including base salaries, and, for eligible roles, incentive compensation and in many cases, equity compensation. Employees also have the opportunity to purchase PTC stock at a discount through our Employee Stock Purchase Plan.

Our benefits offerings are designed to meet the unique needs of our employees. We believe employees and their families around the world. Specific offerings differ country by country due to cultural norms, market dynamics, and legal requirements, but we provide competitive benefits in each local market we operate in to help our employees care for themselves a wide variety of core health and their families. Common offerings are health benefits, retirement benefits, financial programs such as healthcare, life insurance and disability protection, insurance, employee assistance plans, retirement savings and pension benefit plans, and generous paid family leave and vacation time, holidays and leave benefits. To ensure our employees and families have the support they need as the COVID-19 pandemic begins to ease, PTC has continued its global emergency leave policy, which provides for ten days of paid time off over and above regular sick or other time off to recuperate from or care for a family member recovering from COVID-19. time.

Talent Development & Employee DevelopmentEngagement

We As we focus on enhancing the employee experience, we are increasing our efforts to invest in our employees, creating people and create meaningful opportunities to learn, grow, develop, and advance their careers. We have specific development programs including our Rotational Leadership Development, Managing at PTC, Leading at PTC, and 360-degree coaching programs, as well as numerous other self-led learning paths. The variety of options means that employees have the ability to focus on the development programs. path most meaningful to them.

Commitment to Diversity, Equity, and Inclusion (DEI)

We are improving our systems and processes to enable us to better track, manage and develop our employees. With these improvements, we are gaining a better understanding of our current demographic population and developing demographic goals, as we strive to create a more demographically diverse, inclusive, and equitable organization.

Starting in FY'22, our Self-Identification program invited U.S. employees to volunteer their personal information across categories such as race/ethnicity, sexual orientation, gender identity, pronouns, disability, veteran and military status, and more. By analyzing this information in aggregate, we can determine what we should adjust in terms of DEI programming, policies, and hiring practices.

Commitment to our values and diversity in our workforce has inspired our top-line company goals. Key milestones include launching leadership development experiences for underrepresented minority and underrepresented group populations, offering learning programs in psychological safety, requiring unconscious is supported by various ongoing efforts. We mitigate bias training for hiring by coaching managers and enhancing leaders in fostering psychologically safe environments. We also review and revise our processes based on feedback and engagement scores from employee pulse surveys. We embed equitable practices into the planning and execution of how we attract, select, develop, and retain talent. Meanwhile, our DEI ambassadors are aligned with functions across the business to amplify and enhance our efforts in these areas. Finally, to cultivate a community of belonging, our 12 Employee Resource Group (ERG) program Groups foster an inclusive culture and Global DEI Champions Network. PTC currently supports 12 ERGs that span a broad spectrum of identities, experiences, facilitate safe spaces for employees to navigate social issues and interests: Asian, Black, Early Career, Energize (Health & Wellness), Family, Green (Sustainability), Hola (Hispanic & Latine), Prism (LGBTQ+), SMART (Neurodiversity), Veterans, Virtual, and Women. In 2021, we introduced a CEO Rotation program that allows our CEO to spend three months with each ERG as a rotational sponsor. challenges.

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Additional Information About Our Employee Initiatives

You can find more information about our employee initiatives including our DEI, Training and Career Development, Compensation & Benefits, Employee Engagement, and Employee Health & Safety initiatives, in our Corporate Social Responsibility 2023 Impact Report, available on PTC.com. The references which we expect to our Corporate Social Responsibility Report and our website are not intended to incorporate information release in that report or on our website into this Annual Report by reference. December 2023.

Available Information

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.

Corporate Information

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

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ITEM 1A. Risk Factors

The following are important factors we have identified that could affect an investment in our securities. You should consider them carefully when evaluating an investment in PTC securities, because these factors could cause actual results to differ materially from historical results or any 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. results, and prospects.

I. Risks Related to Our Business Operations and Industry

We face significant competition, which may reduce could adversely affect our profitability business, financial condition, operating results, and limit or reduce our market share. prospects if we are unable to successfully compete.

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 adversely affect our business, financial condition, operating results, and market share. prospects.

For example, the COVID-19 pandemic caused companies worldwide to close their offices customer demand for SaaS solutions is increasing. While our Arena, ServiceMax, and their employees to have to work remotely from their homes, and there remains uncertainty about the extent to which employees will return to the office in the long term. This has focused companies on the need for Onshape solutions that empower and support remote work by employees. We believe customers and potential customers will increasingly seek software are cloud-native SaaS solutions, that support remote work by employees. Although many of our solutions support remote work, others are less efficient at doing so. We have embarked on an effort to make our solutions available on a SaaS platform; however, this will require significant effort and investment and we cannot be sure that we will be able to make have introduced our solutions available as Windchill+, Creo+, and Kepware+ SaaS solutions, as quickly as we expect or that customers will may not adopt them as we expect. If we are unable to compete successfully with competitors offering SaaS solutions, we could lose customers and/or fail to attract new customers, which could cause us to lose revenue and market share, which would adversely affect our business, financial condition, operating results, and financial results.

In addition, competitive pressures could cause us to reduce our prices, which could reduce our revenue and margins. prospects.

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 affect our business, financial results. condition, operating results, and prospects.

We have implemented and continue to implement measures intended to maintain the security and integrity of our products, source code and IT systems. The potential for a security breach or system disruption has significantly increased over time as the scope, number, intensity and sophistication of attempted cyberattacks and cyber intrusions have increased – particularly cyberattacks and intrusions designed to access and exfiltrate information and to disrupt and lock-up lock up access to systems for the purpose of demanding a ransom payment. It is impossible for us to eliminate the risk of a successful cyberattack or intrusion, and, in fact, we regularly deal with security issues on a regular basis and have experienced security incidents from time to time. Accordingly, there is a risk that a cyberattack or intrusion will be successful and that such event will be material.

In addition, we offer cloud services to our customers and some of our products, including our SaaS 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 and a cyberattack or intrusion may be successful and material. Interception of data transmission, misappropriation or modification of data, corruption of data and attacks against our service providers may adversely affect our products or product and service delivery. Malicious code, viruses or vulnerabilities that are undetected by our service providers may disrupt our business operations generally and may have a disproportionate effect on those of our products that are developed and delivered in the cloud environment.

While we devote resources to maintaining the security and integrity of our products and systems, as well as performing due diligence of our third-party service providers, security breaches that have not had a material effect on our business or that of our customers have occurred, and we will continue to face cybersecurity threats and exposure. A significant breach of the security and/or integrity of our products or systems, or those of our third-party service providers, whether or intentional or by human error by our employees or others, could disrupt our business operations or those of our customers, could prevent our products from functioning properly, could enable access to sensitive, proprietary or confidential information of our customers, or could enable access to our sensitive, proprietary or confidential information. This could require us to incur significant costs of investigation, remediation and/or payment of a ransom; harm our reputation; cause customers to stop buying our products; and cause us to face lawsuits and potential liability, any of which could have a material adverse effect on our business, financial condition, operating results, and results of operations. prospects.

We increasingly rely on third-party providers of cloud infrastructure services to deliver our offerings to users on our platform, and any disruption of or interference with our use of these services could adversely affect our business.business, financial condition, operating results, and prospects.

Our continued growth depends in part on the ability of our existing and potential customers to use and access our cloud services or our website in order to download our software or encrypted access keys for our software within an acceptable amount of time. We use a number of third-party service providers that we do not control for key components of our infrastructure, particularly with respect to development and delivery of our cloud-based products. The use of these service providers gives us greater flexibility in efficiently delivering a more tailored, scalable customer experience, but also exposes us to additional risks and vulnerabilities. Third-party service providers operate their own platforms that we access, and we are, therefore, vulnerable to their service interruptions. We may experience interruptions, delays and outages in service and availability from time to time as a result of problems with our third-party service providers' infrastructure. Lack of availability of this infrastructure could be due to a number of potential causes including technical failures, natural disasters, fraud or security attacks that we cannot predict or prevent. Such outages could trigger our service level agreements with customers and require us to issue the issuance of credits to our cloud-based product customers, which could adversely impact our business, financial condition, and results of operations. operations, and prospects.

If we are unable to renew our agreements with our cloud service providers on commercially reasonable terms, or any of our agreements are prematurely terminated, or we need to add new cloud services providers to increase capacity and uptime, we could experience interruptions, downtime, delays, and additional expenses related to transferring to and providing support for these new platforms. Any of the above circumstances or events may harm our reputation and brand, reduce the availability or usage of our platforms and impair our ability to attract new users, any of which could adversely affect our business, financial condition, and results of operations. operations, and prospects.

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We may be unable to hire or retain personnel employees with the necessary skills to operate and grow our business, which could adversely affect our ability to compete. compete and adversely affect our business, financial condition, results of operations, and prospects.

Our success depends upon our ability to attract and retain highly skilled managerial, sales employees to develop our products and marketing, technical, financial solutions and administrative personnel to operate and grow our business. Competition for such personnel employees in our industry is intense worldwide, and 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. If we are unable to attract and retain technical personnel employees 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 intense competition in our industry.

If we are unable to attract and retain the personnel we need to develop compelling our products and solutions, and or to guide, operate and support our business, we may be unable to compete successfully, compete, which would adversely affect our business, financial condition, and results of operations. operations, and prospects.

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 macroeconomic factors.

A large amount of our sales are to customers in the discrete manufacturing sector. Manufacturers worldwide continue to face uncertainty about the global macroeconomic environment due to, among other factors, the effects of earlier and ongoing supply chain disruptions, rising interest rates and inflation, volatile foreign exchange rates and the current relative strength of the U.S. dollar, the effects of the Russia—Ukraine conflict, including on the supply of energy resources in Europe, Dollar, and the U.S. Government's government's focus on technology transactions with non-U.S. entities. In light of these challenges and concerns, customers Customers may delay, reduce, or forego purchases of our solutions due to these challenges and concerns, which would could adversely affect our business, financial condition, results of operations, and financial results. prospects.

If we fail to successfully manage transform our transition operations to a support the sale of SaaS company, solutions and to develop competitive SaaS solutions, our business and financial results prospects could be adversely affected.

Becoming a Transforming our business to offer and support SaaS company solutions requires considerable additional investment in our organization. Whether our transition we will be successful and will accomplish our business and financial objectives is subject to risks and uncertainties, including but not limited to: customer demand, attach and renewal rates, channel adoption, our ability to further develop and scale infrastructure, our ability to include functionality and usability in such offerings that address customer requirements, our ability and the ability of our partners to transition existing customer implementations and subscriptions to SaaS, and our costs. If we are unable to successfully establish these new offerings and navigate our business transition, due to these risks and uncertainties, our business, financial condition, results of operations, and financial results prospects could be adversely impacted. affected.

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

We sell and deliver software and services, and maintain support operations, in many 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.

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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 business that relies heavily on a partner ecosystem, the fact that some of the countries we operate in countries with have a higher incidence of corruption and fraudulent business practices, than others, the fact that we deal with sell to governments and state-owned business enterprises, and the fact that global enforcement of laws has significantly increased.

Accordingly, while we strive to maintain a comprehensive compliance program, an employee, agent or business partner may violate our policies or U.S. or other applicable laws or we may inadvertently violate such laws. Investigations of alleged violations of those laws 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 loss and reputational harm, which could adversely affect our business, financial condition, results and/or stock price. of operations, and prospects.

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II. Risks Related to Acquisitions and Strategic Relationships

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

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, if an acquisition does not further our business strategy or return a level of sales as we expect, or if a business we acquire has unexpected legal or financial liabilities, our operating business, financial condition, results will of operations, and prospects could be adversely affected.

The types of issues that we may face in integrating and operating the acquired business include:

- 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 sales of the acquired entity;
- complications relating to the assumption of pre-existing contractual relationships of an acquired company that we would not have otherwise entered into, the termination or modification of which may be costly or disruptive to our business;
- issuing equity awards to, or assuming existing equity awards of, acquired employees, which may more rapidly deple share reserves available under our shareholder-approved equity incentive plans;
- litigation arising from the transaction, including potential intellectual property claims or disputes following our an acquisition;
- diversion of management and employee attention;
- challenges with implementing adequate and appropriate controls, procedures and policies in an acquired business;
- potential loss of key personnel in connection with an acquisition; and
- potential incompatibility of business cultures.

Further, if we do not achieve the expected return on our investments, it could impair the intangible assets and goodwill that we recorded as part of an acquisition, which could require us to record a reduction to the value of those assets.

We may incur significant debt or issue a material amount of debt or equity securities to finance an acquisition, which could adversely affect our operating flexibility, business and financial statements. prospects.

If we were to incur a significant amount of debt—whether by borrowing funds under our credit facility or otherwise or issuing new debt securities—to finance an acquisition, our interest expense, debt service requirements and leverage would increase significantly. The increases in these expenses and in our leverage could constrain our ability to operate as we might otherwise or to borrow additional amounts. amounts and could adversely affect our business, financial condition, results of operations, and prospects.

If we were to issue a significant amount of equity securities in connection with an acquisition, existing stockholders would be diluted and earnings per share our stock price could decrease. decline.

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

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, financial condition, results of operations, and financial condition prospects 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. prospects.

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. adversely affect our business, financial condition, operating results, and prospects.

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 could adversely affect our business, financial condition, operating results. results, and prospects.

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. property, and could adversely affect our business and prospects.

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 We have faced such lawsuits from time to time. Any such claim 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, and prospects, as well as our ability to meet our payment obligations under our debt.

We have a significant substantial amount of indebtedness. As of November 15, 2022 November 17, 2023, our total debt outstanding was approximately $1,359 $2,307 billion, million and €85 million, $1 billion of which was associated with the 3.625% Senior Notes and 4.000% Senior Notes (together, "Senior Notes") issued in February 2020, which mature in February 2025 and 2028, respectively, and are unsecured, unsecured; $807 million and $359 million €85 million of which was borrowed under our credit facility revolving line, which matures in February 2025. January 2028; and $500 million of which was borrowed under our credit facility term loan, which begins amortizing in March 2024. All amounts outstanding under the credit facility and the Senior Notes will be due and payable in full on their respective maturity dates. As of November 15, 2022 November 17, 2023, we had unused commitments under our credit facility of $641 million approximately $350 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.

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 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 ar expenses;
- limit our ability to obtain additional financing to fund future working capital, capital expenditures, acquisitions or othe general corporate requirements;

- reduce the availability of our cash 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 adverse economic and industry conditions;
- amplify the risk of increased interest rates as certain of our borrowings, including borrowings under our 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; and
- place us at a competitive disadvantage compared to other, less leveraged competitors.

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

Despite our current level of indebtedness, we and our subsidiaries may still be able to incur substantially more debt and other obligations. This could further exacerbate the risks to our business, financial condition, and prospects described above.

We and our subsidiaries may be able to incur significant additional indebtedness and other obligations in the future, including secured debt. Although the credit agreement governing our credit facility contains restrictions on the incurrence of additional indebtedness, these restrictions are subject to a number of qualifications and exceptions. The additional indebtedness incurred in compliance with these restrictions could be substantial. In addition, the credit agreement and the indenture governing our Senior Notes due 2025 and 2028, will not prevent us from incurring obligations that do not constitute indebtedness. If new debt is added to our current debt levels, or we incur other obligations, the related risks that we now face could intensify.

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We may not be able to generate enough cash to service all our indebtedness and may be forced to take other actions to satisfy our obligations under our indebtedness, which may not be successful. successful, and could harm our business and prospects.

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 Senior 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. 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 enough working capital or liquidity to satisfy any repayment obligations if those obligations were accelerated. 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 funds to borrow funds, pursue certain corporate initiatives, including for strategic acquisitions, which could adversely affect our business 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. On March 5, 2021, the Intercontinental Exchange Benchmark Administration, the U.K.

Financial Conduct Authority (FCA) regulated and authorized administrator of LIBOR, announced, and the FCA confirmed, that one week and two-month USD LIBOR settings will cease on December 31, 2021, and that the USD LIBOR panel for all other tenors will cease on June 30, 2023.

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The credit facility provides a mechanism pursuant to which we and the administrative agent may agree, under certain circumstances, to transition to an alternate base rate borrowing or amend the credit facility to establish an alternate interest rate to LIBOR that includes consideration of the then-prevailing market convention for determining interest rates for syndicated loans in the United States at that time.

Although we believe the alternative rates will not materially increase the rates on our credit facility, the final agreed rate may increase the cost of our variable rate indebtedness. prospects.

V. Risks Related to Our Common Stock

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:

- our adoption of Accounting Standards Update 2014-09, *Revenue from Contracts with Customers: Topic 606* in 2019 creates significant revenue volatility;
- variability in our contracts, including timing of start dates, length of contracts, and mix of on-premises and cloud-based purchases, which would impact our revenue and earnings;
- the rate at which our existing contracts renew or churn;
- 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 bookings, any failure to achieve our bookings targets could cause us to miss our near term earnings and cash flow targets;
- because a significant portion of our revenue and expenses are generated from outside the U.S., shifts in foreign currency exchange rates have had and could continue to have an adverse effect on 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 expectations could adversely impact the market price of our securities.

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. Further, our stock price has been more volatile than that of other software companies. Accordingly, the trading prices and valuations of software companies' 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.

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Also, a large percentage of our common stock is held by institutional investors and by Rockwell Automation. investors. Purchases and sales of our common stock by these investors could have a significant impact on the market price of our stock.

If our results of operations do not meet market or analysts' expectations, our stock price could decline.

Our quarterly operating results fluctuate depending on many factors, including the stock. effect of ASC 606 on revenue recognition for the on-premises software subscriptions we offer, variability in the timing of start dates for our subscription and SaaS offerings, length of contracts, and renewals, and significant unexpected expenses in a quarter. Accordingly, our quarterly results are difficult to predict and we may

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be unable to confirm or adjust expectations with respect to our operating results for a quarter until that quarter has closed. If our quarterly operating results do not meet market or analysts' expectations, our stock price could decline.

VI. General Risk Factors

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

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;
- exposure of our operations and employees to political instability and armed conflict in the countries and regions in which we operate, including Israel;
- increased financial accounting and reporting burdens and complexities;
- increased regulatory and compliance risks;
- 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, reduce our net income, and increase our tax payment obligations.

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.

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

- changes in tax laws (for example, the introduction of an amendment to Section 174 of the U.S. tax legislation), 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.

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ITEM 1B. Unresolved Staff Comments

None.

ITEM 2. Properties

We currently have 98 83 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 1,209,000 1,076,000 square feet of leased facilities used in operations, approximately 484,000 421,000 square feet are located in the U.S., including approximately 250,000 square feet at our headquarters facility located in Boston, Massachusetts, and approximately 250,000 267,000 square feet are located in India, where a significant amount of our research and development is conducted.

ITEM 3. Legal Proceedings

Information on legal proceedings can be found in *Note 10. Commitments and Contingencies-- Legal Proceedings* of Notes to Consolidated Financial Statements in this Annual Report, which information is incorporated herein by reference. 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, 2022 September 30, 2023, the close of our fiscal year, and on November 14, 2022 November 13, 2023, our common stock was held by 1,003 952 and 1,000 950 shareholders of record, respectively.

ITEM 6. [Reserved]

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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, capital developments and growth, as well as about the development of our products, markets and workforce, 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 ARR (Annual Run Rate) operating measure, non-GAAP financial measures, and disclosure of our results on a constant currency basis. ARR and our non-GAAP financial measures, including the reasons we use those measures, are described below in *Results of Operations - Operating Measure* and *Results of Operations - Non-GAAP Financial Measures,* respectively. The methodology used to calculate constant currency disclosures is described in *Results of Operations - Impact of Foreign Currency Exchange on Results of Operations.* You should read those sections to understand our operating measure, non-GAAP financial measures, and constant currency disclosures.

Executive Overview

ARR increased 7% (16% grew 26% (23% constant currency) to $1,572 million in FY’22 compared to $1.98 billion as of the end of FY’21. Excluding FY'23 compared to FY’22. Organic ARR, which excludes contributions from the impact of Codebeamer, which ServiceMax business we acquired in the third quarter of FY’22, organic Q2'23, grew 15% (13% constant currency) year over year to $1.81 billion. Organic ARR growth was 6% (15% constant currency) driven by double-digit growth across all product groups and geographies.

We generated $611 million of cash from operations in FY’23 compared to $435 million in FY’22, compared to FY’21.

FY’22 revenue an increase of $1.93 billion increased 7% over FY’21 (11% in constant currency) 40%. FY’22 operating margin of 23% increased approximately 200 basis points over FY’21 and non-GAAP operating margin of 38% increased approximately 300 basis points. Operating margin improvements are due to higher revenue and continued operating expense discipline. FY’22 diluted EPS was $2.65 compared to $4.03 in FY'21. Diluted EPS in FY'22 included a $35 million non-operating charge associated with the decrease in value of an equity investment in a publicly-traded company, offset by a non-operating $30 million credit associated with the sale of a portion of our PLM services business. Diluted EPS in FY'21 benefited from gains associated with an equity investment in a publicly-traded company, and income tax credits related to a release of a previously held valuation allowance. FY'22 non-GAAP diluted EPS was $4.58, representing a 15% increase over non-GAAP diluted EPS of $3.97 in FY'21.

FY’22 operating Free cash flow of $435 million grew 18% over FY’21; FY’22 free $587 million in FY'23 increased 41% from $416 million in FY'22. Our cash flow of $416 million grew 21% over FY’21. growth is attributable to strong collections driven by our solid top-line growth from our subscription business model and operational discipline. Interest payments were $41 million higher in FY'23 compared to FY’22, operating cash flow and free cash flow included an $11.8 million outflow related to acquisition and transaction-related costs and $40.8 million of while restructuring payments. payments decreased $39 million year-over-year. We ended FY’22 FY’23 with cash and cash equivalents of $272 million $288 million and gross debt of $1.36 billion $1.70 billion, with an aggregate weighted average interest rate of 3.9% 5.2%.

Revenue growth of 8% (12% constant currency) in FY'23 compared to FY'22 was primarily due to the contributions from ServiceMax and Codebeamer. The timing of revenue recognition for on-premises subscription revenue can vary significantly, impacting reported revenue and growth rates. Interest expense was $75 million higher in FY'23 compared to FY'22, which adversely affected our net income and earnings per share results. The increase was driven by debt and liabilities related to the ServiceMax acquisition.

Results of Operations

The following table shows the measures that we consider the most significant indicators of our business performance. In addition to providing operating income, operating margin, diluted earnings per share and cash from operations as calculated under GAAP, we provide our ARR operating measure and non-GAAP operating income, non-GAAP operating margin, non-GAAP diluted earnings per share, and free cash flow for the reported periods. We also provide a view of our actual results on a constant currency basis. Our non-GAAP financial measures exclude the items described in *Non-GAAP Financial Measures* below. Investors should use our non-GAAP financial measures only in conjunction with our GAAP results.

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For discussion of our FY'21 FY'22 results and comparison to our FY'20 FY'21 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, 2021 September 30, 2022.

(Dollar amounts in millions, except per share data)	**Year ended September 30,**		**Percent Change**		**Year ended September 30,**		**Percent Change**	
	2022	**2021**	**Actual**	**Constant Currency(1)**	**2023**	**2022**	**Actual**	**Constant Currency(1)**
ARR as of September 30(2)	$ 1,572.0	$ 1,468.5	7 %	16 %	$ 1,978.6	$ 1,572.0	26 %	23 %
Total recurring revenue(3) (2)	$ 1,736.2	$ 1,616.3	7 %	12 %	$ 1,907.9	$ 1,736.2	10 %	13 %
Perpetual license	34.1	33.0	3 %	6 %	38.6	34.1	13 %	17 %
Professional services	163.1	157.8	3 %	9 %	150.5	163.1	(8)%	(5)%
Total revenue	1,933.3	1,807.2	7 %	11 %	2,097.1	1,933.3	8 %	12 %
Total cost of revenue	386.0	371.1	4 %	7 %	441.0	386.0	14 %	16 %

Gross margin	1,547.4	1,436.1	8 %	12 %	1,656.0	1,547.4	7 %	11 %
Operating expenses	1,100.0	1,055.3	4 %	6 %	1,197.6	1,100.0	9 %	11 %
Operating income	$ 447.4	$ 380.7	17 %	30 %	$ 458.5	$ 447.4	2 %	10 %
Non-GAAP operating income(1)	$ 732.2	$ 634.4	15 %	23 %	$ 758.9	$ 732.2	4 %	8 %
Operating margin	23.1 %	21.1 %			21.9 %	23.1 %		
Non-GAAP operating margin(1)	37.9 %	35.1 %			36.2 %	37.9 %		
Diluted earnings per share	$ 2.65	$ 4.03			$ 2.06	$ 2.65		
Non-GAAP diluted earnings per share(1)	$ 4.58	$ 3.97			$ 4.34	$ 4.58		
Cash flow from operations(4) (3)	$ 435.3	$ 368.8			$ 610.9	$ 435.3		
Capital expenditure	(19.5)	(24.7)			(23.8)	(19.5)		
Free cash flow	$ 415.8	$ 344.1			$ 587.0	$ 415.8		

(1) See *Non-GAAP Financial Measures* below for a reconciliation of our GAAP results to our non-GAAP measures and *Impact of Foreign Currency Exchange on Results of Operations* below for a description of how we calculate our results on a constant currency basis.

(2) For the September 30, 2021 period, to facilitate comparability, we removed $6.2 million of ARR associated with a Vuforia AR product that we ceased selling as of September 30, 2021 from our ARR operating measure.

(3) Recurring revenue is comprised of on-premises subscription, perpetual support, and SaaS, and cloud revenue.

(4) (3) Cash flow from operations for FY'22 FY'23 and FY'21 FY'22 includes $40.8 million $1.5 million and $14.5 million $40.8 million of restructuring payment respectively. Cash from operations for FY'22 FY'23 and FY'21 FY'22 includes $11.8 million $19.6 million and $15.0 million $11.8 million of acquisition a transaction-related payments, respectively. Cash from operations for FY'21 includes $17.9 million in un-forecasted payments related to the prior perio tax exposure from a non-U.S. tax dispute.

Impact of Foreign Currency Exchange on Results of Operations

Approximately 55% 50% of our revenue and 40% 35% of our expenses are transacted in currencies other than the U.S. Dollar. Because we report our results of operations in U.S. Dollars, currency translation, particularly changes in the Euro, Yen, Shekel, and Rupee relative to the U.S. Dollar, affects our reported results. Changes in foreign currency exchange rates have been were a headwind to reported income statement results in FY'22.FY'23. However, ARR was positively impacted by improvements in currency exchange rates, particularly the Euro to U.S. Dollar exchange rate, as of September 30, 2023 compared to September 30, 2022.

The results of operations in the table above, and the tables and discussions below about revenue by line of business and product group and geographic region present both actual percentage changes year over year and percentage changes on a constant currency basis. Our constant currency disclosures are calculated by multiplying the results in local currency for FY'22 FY'23 and FY'21 FY'22 by the exchange rates in effect on September 30, 2021 September 30, 2022. If FY'23 reported results were converted into U.S. Dollars using the rates in effect as of September 30, 2022, ARR would have been lower by $38 million, revenue would have been lower by $59 million, and expenses would have been lower by $26 million. If FY'22 reported results were converted into U.S. dollars Dollars using the rates in effect as of September 30, 2021 September 30, 2022, ARR as of September 30, 2022 would have been higher by $134 million and operating income in FY'22 the same, revenue would have been $27 million higher. lower by $112 million, and expenses would have been lower by $50 million.

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Revenue

Under ASC 606, the volume, mix, and duration of contract types (support, SaaS, on-premises subscription) starting or renewing in any given period may can have a material impact on revenue in the period, and as a result can impact the comparability of reported revenue period-over-period. period over period. We recognize revenue for the license portion of on-premises subscription contracts up front when we deliver the licenses to the customer, typically on the start date, and we recognize revenue on the support element portion of on-premises subscription contracts and stand-alone support contracts ratably over the term. We continue to convert existing perpetual support contracts to on-premises subscriptions, resulting in a shift to up-front recognition of on-premises subscription license revenue in the period converted compared to ratable recognition for a perpetual support contract. Revenue from our cloud services (primarily SaaS) contracts is recognized ratably. As we continue to expand our SaaS offerings and release additional cloud functionality into our products, and customers begin to migrate from on-premises subscriptions to SaaS products, we We expect that over time a higher portion of our revenue will be recognized ratably. ratably as we continue to expand our SaaS offerings, release additional cloud functionality into our products, and migrate customers from on-premises subscriptions to SaaS. Given the different mix, duration and volume of new and renewing contracts in any period, year-over-year or sequential revenue comparisons can vary significantly.

Revenue by Line of Business

(Dollar amounts in millions)	**Year ended September 30,**	**Percent Change**	**Year ended September 30,**	**Percent Change**

	2022	2021	Actual	Constant Currency	2023	2022	Actual	Constant Currency
License (1)	$ 782.7	$ 738.1	6 %	10 %	$ 747.0	$ 782.7	(5)%	(1)%
Support (2) and cloud services	987.6	911.3	8 %	13 %				
Support and cloud services(2)					1,199.5	987.6	21 %	25 %
Total software revenue	1,770.3	1,649.3	7 %	12 %	1,946.6	1,770.3	10 %	13 %
Professional services	163.1	157.8	3 %	9 %	150.5	163.1	(8)%	(5)%
Total revenue	$ 1,933.3	$ 1,807.2	7 %	11 %	$ 2,097.1	$ 1,933.3	8 %	12 %

(1) Includes perpetual licenses and the license portion of on-premises subscription sales.
(2) Includes support on perpetual licenses, and the support portion of on-premises subscription sales. sales, SaaS, and cloud services.

The strengthening of the U.S. dollar compared to foreign currencies had a substantial impact on our revenue growth in FY'22. On an actual currency basis, FY'22 revenue increased $126 million (7%), compared to an increase of $202 million (11%) on a constant currency basis.

Software revenue increased in FY’22 compared FY'23 benefited from contributions from ServiceMax, acquired early in Q2'23, and Codebeamer, acquired in Q3'22. Changes in foreign currency exchange rates were a headwind to FY’21 due to growth year-over-year revenue growth.

Within software revenue, license revenue is impacted by the quantity and size of Windchill expiring and Arena revenue renewing multi-year on-premises subscription contracts, along with the duration of those contracts that start in the Americas and contribution from period. In FY'23, the recently acquired Codebeamer business in Europe, offset by a decline in Creo revenue primarily driven by foreign currency fluctuations in Europe and changes in contract durations. In FY'22, our average durations for on-premises subscriptions weighted-average duration of contracts starting in the year decreased slightly, resulting in a reduced revenue benefit compared to FY'21, which benefited from significant increases in average contractual durations FY'22 primarily due to business rule changes.a few high-value renewal contracts in FY'22 that had longer than typical durations. Because longer duration contracts typically have a higher total contract value, which drives the amount of upfront license revenue recognized for on-premises contracts, this year-over-year duration decrease represented a headwind to license revenue growth in FY'23.

Professional services revenuedecreased in FY’22 compared to FY'21 reflects an increase in revenue associated with large PLM consulting engagements, particularly with automotive, aerospace and defense and consumer electronics customers. Professional services revenue in the first half of FY'21 was negatively impacted by services delivery challenges associated with the COVID-19 pandemic.

Our long-term expectation is that professional services revenue will trend down over time FY'23 as we migrate more continue to execute on our strategy of leveraging partners to deliver services engagements rather than contracting to our partners and deliver products that require less consulting and training services. As described in Part I, Item 1. Business above, in services ourselves, including the second half of FY'22, we accelerated this strategy through the Q3'22 sale of a portion of our PLM services business to ITC Infotech. Infotech (which branded the business DxP Services). Changes in foreign currency exchange rates also contributed to the year-over-year revenue decline. These decreases were partially offset by ServiceMax professional services revenue.

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Revenue Our expectation is that professional services revenue will continue to trend down over time as we execute on our partner strategy and ARR by Product Group deliver products that require less consulting and training services.

Software Revenue by Product Group(1)

(Dollar amounts in millions)	**Year ended September 30,**		**Percent Change**	
	2022	**2021**	**Actual**	**Constant Currency**
Digital Thread - Core	$ 1,212.1	$ 1,161.7	4 %	9 %
Digital Thread - Growth	249.6	236.7	5 %	9 %
Digital Thread - FSG	227.0	210.2	8 %	12 %
Digital Thread (Total)	1,688.7	1,608.6	5 %	9 %
Velocity	81.6	40.7	101 %	101 %
Software revenue	$ 1,770.3	$ 1,649.3	7 %	12 %
Product lifecycle management (PLM)	$ 980.5	$ 862.9	14 %	18 %
Computer-aided design (CAD)	789.8	786.4	0 %	5 %
Software revenue	$ 1,770.3	$ 1,649.3	7 %	12 %

(1) We describe our Product Groups for FY'22 and FY'21 and the change for FY'23, including the products in each group, in Part I, Item 1. Business above

Windchill software revenue increased by 12% (16% constant currency), driven by a significant increase in on-premises subscription license revenue and an increase in cloud services revenue. Windchill ARRincreased 10% (19% constant currency) in FY'22 compared to FY'21.

Arena software revenue increased by 122% (actual and constant currency), driven by an increase in cloud services revenue and an increase in on-premises subscription license revenue. Arena was acquired in January 2021, so it did not contribute to FY'21 revenue for the full year and purchase accounting adjustments to acquired deferred revenue had a greater impact on FY'21 revenue than FY'22. Arena ARR increased by 27% (actual and constant currency) in FY'22 compared to FY'21.

IIoT software revenueincreased by 7% (10% constant currency) driven by an increase in cloud services revenue. IIoT ARRincreased 14% (21% constant currency) in FY'22 compared to FY'21.

The Codebeamer business, which we acquired in the third quarter, performed well and added a point of ARR growth, taking constant currency ARR growth to 16% for the fourth quarter and full year. Codebeamer generated $9 million of revenue in FY'22, with $6 million of on-premises subscription revenue and $2 million of perpetual support revenue. Codebeamer ARR as of September 30, 2022 was $16 million ($18 million on a constant currency basis).

Creo software revenue decreased by 1% primarily driven by the effect of foreign currency headwinds in Europe. Creo software revenue increased 4% on a constant currency basis. Creo ARRwas flat (increased 11% in constant currency) in FY'22 compared to FY'21.

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Software Revenue & ARR by Geographic Region Product Group

A significant portion of our software revenue is generated outside the U.S. In both FY’22 and FY’21, approximately 40% to 45% of software revenue was generated in the Americas, 35% to 40% in Europe, and 15% to 20% in Asia Pacific.

(Dollar amounts in millions)	**Year ended September 30,**		**Percent Change**	
	2023	**2022**	**Actual**	**Constant Currency**
Product lifecycle management (PLM)	$ 1,186.0	$ 980.5	21 %	24 %
Computer-aided design (CAD)	760.6	789.8	(4)%	0 %
Software revenue	$ 1,946.6	$ 1,770.3	10 %	13 %

(Dollar amounts in millions)	**Year ended September 30,**		**Percent Change**	
	2022	**2021**	**Actual**	**Constant Currency**
Americas	$ 835.9	$ 710.7	18 %	18 %
Europe	633.4	645.8	(2)%	6 %
Asia Pacific	301.0	292.8	3 %	9 %
Total Software revenue	$ 1,770.3	$ 1,649.3	7 %	12 %

Americas **PLM** software revenue growth in FY’22 FY'23 benefited from contributions from ServiceMax and Codebeamer. Changes in foreign currency exchange rates were a headwind to year-over-year revenue growth. Excluding contributions from ServiceMax and Codebeamer, constant currency revenue growth was driven by Windchill revenue growth of 23%, Arena revenue growth of 133%, and IIoT revenue growth of 10%. The increase in revenue from Arena includes the effect of purchase accounting adjustments to reduce acquired deferred revenue. Americas ARR was up 17%.Americas.

Europe software revenue declined in FY’22, PLM ARR grew 36% (34% constant currency) from Q4’22 to Q4'23, driven by a $48 million foreign currency impact associated with the strengthening ServiceMax, which contributed $171 million of the U.S. Dollar compared to foreign currencies. Creo revenue decreased 5% (2% increase in constant currency), partially offset by Windchill revenue growth of 4% (12% constant currency) ARR; Windchill; IIoT; and the addition of Codebeamer revenue. ARR in Europe was up 16% constant currency. Codebeamer.

Asia Pacific **CAD** software revenue was negatively impacted by changes in foreign currency exchange rates. Constant currency revenue growth was flat due to decreases in Creo revenue in Europe due to shorter durations of on-premises subscription contracts, offset by Creo revenue growth in FY’22 included a $19 million foreign currency impact associated with the strengthening of the US Dollar Americas and Asia Pacific.

CAD ARR grew 12% (10% constant currency) in FY'23 compared to foreign currencies. Creo revenue grew 4% (11% constant currency) and Windchill revenue grew 3% (9% constant currency). ARR in Asia Pacific was up 13% constant currency. FY'22, driven by Creo.

Gross Margin

(Dollar amounts in millions)	Year ended September 30,			Year ended September 30,		
	2022	2021	Percent Change	2023	2022	Percent Change
Gross margin:						
License gross margin	$ 733.4	$ 676.3	8 %	$ 693.8	$ 733.4	(5)%
License gross margin percentage	94 %	92 %		93 %	94 %	
Support and cloud services gross margin	$ 802.8	$ 747.2	7 %	$ 954.5	$ 802.8	19 %
Support and cloud services gross margin percentage	81 %	82 %		80 %	81 %	
Professional services gross margin	$ 11.1	$ 12.6	(11)%	$ 7.7	$ 11.1	(31)%
Professional services gross margin percentage	7 %	8 %		5 %	7 %	

Total gross margin	$	1,547.4	$	1,436.1	8 %	$	1,656.0	$	1,547.4	7 %
Total gross margin percentage		80 %		79 %			79 %		80 %	
Non-GAAP gross margin(1)	$	1,595.7	$	1,485.1	7 %	$	1,712.6	$	1,595.7	7 %
Non-GAAP gross margin percentage(1)		83 %		82 %			82 %		83 %	

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

The strengthening of the U.S. dollar compared to foreign currencies had a substantial impact on our gross margin increase in FY'22. On an actual currency basis, FY'22 gross margin increased $111 million (8%), compared to an increase of $176 million (12%) on a constant currency basis.

License gross margin increased decreased in FY’22 FY’23 compared to FY’21 FY’22 due to an increase in lower license revenue of $44.6 million and a decrease in cost of license of $12.5 million, which was driven by lower amortization expense, higher royalty expense and compensation costs. expense.

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Support and cloud services gross margin increased in FY’22 FY’23 compared to FY’21 FY’22 due to increases in higher support and cloud services revenue, of $76.3 million, partially offset by increases in cost of support and cloud services, of $20.7 million, which were driven by higher royalty expenses, compensation maintenance costs, higher intangible amortization expense due to the ServiceMax acquisition, and cloud hosting costs.

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Professional services gross margin decreased in FY’22 FY’23 compared to FY’21 FY’22 due to increases lower professional services revenue, offset by lower professional services costs. The decrease in professional services costs revenue is mainly due to the sale of $6.7 million, including $5.1 million a portion of our PLM services business in FY'22 and continued execution on our strategy of leveraging partners to deliver services rather than contracting to deliver services ourselves.

Operating Expenses

(Dollar amounts in millions)	Year ended September 30,

	2023	2022	Percent Change
Sales and marketing	$ 530.1	$ 485.2	9 %
% of total revenue	25 %	25 %	
Research and development	394.4	338.8	16 %
% of total revenue	19 %	18 %	
General and administrative	233.5	204.7	14 %
% of total revenue	11 %	11 %	
Amortization of acquired intangible assets	40.0	35.0	14 %
% of total revenue	2 %	2 %	
Restructuring and other charges (credits), net	(0.5)	36.2	(101)%
% of total revenue	0 %	2 %	
Total operating expenses	$ 1,197.6	$ 1,100.0	9 %

Total headcount increased by 11% between FY'22 and FY'23, primarily driven by our acquisition of ServiceMax.

Operating expenses in FY'23 compared to FY'22 increased primarily due to the following:

- a $90 million increase in compensation expense (including stock-based compensation and benefit costs), primarily due to our acquisition of ServiceMax;
- a $12 million increase in marketing expense, primarily due to our Q3'23 LiveWorx event;
- an $11 million increase in software subscriptions and internal hosting costs;
- a $10 million increase in travel expenses;

partially offset by:

- a $38 million decrease in restructuring charges, primarily due to the restructuring plan initiated and substantially completed in FY'22.

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Interest Expense

(Dollar amounts in millions)	Year ended September 30,		
	2023	2022	Percent Change
Interest and debt premium expense	$ (129.4)	$ (54.3)	138 %

Interest expense includes interest on our revolving credit facility and term loan, our Senior Notes due 2025 and 2028, and imputed interest on the deferred payment of a portion of the ServiceMax purchase price. The increase in interest expense was driven by higher total debt and higher interest rates in FY'23 compared to FY'22, as well as $30 million of imputed interest associated with the ServiceMax deferred acquisition payment.

Other Income

(Dollar amounts in millions)	Year ended September 30,		Percent Change
	2023	2022	
Interest income	$ 5.4	$ 2.5	116 %
Other income (expense), net	(1.9)	1.5	(227)%
Other income, net	$ 3.5	$ 4.0	(13)%

Other income (expense), net in FY'23 was related to foreign currency exchange losses. Other income (expense), net in FY'22 included $36 million of recognized in FY'22 gains from the sale of assets, primarily related to the sale of a portion of our PLM services business, in Q3'22, partially offset by a $5.3 million increase in revenue.

Operating Expenses

(Dollar amounts in millions)	Year ended September 30,		Percent Change
	2022	2021	
Sales and marketing	$ 485.2	$ 517.8	(6)%
% of total revenue	25 %	29 %	
Research and development	338.8	299.9	13 %
% of total revenue	18 %	17 %	
General and administrative	204.7	206.0	(1)%
% of total revenue	11 %	11 %	
Amortization of acquired intangible assets	35.0	29.4	19 %
% of total revenue	2 %	2 %	
Restructuring and other charges, net	36.2	2.2	1545 %
% of total revenue	2 %	0 %	
Total operating expenses	$ 1,100.0	$ 1,055.3	4 %

The strengthening of the U.S. dollar compared to foreign currencies had a substantial reduction to our operating expense increase in FY'22. On an actual currency basis, FY'22 operating expenses increased $45 million (4%), compared to an increase of $67 million (6%) on a constant currency basis.

Total headcount decreased by 3% in FY'22 to 6,503 from 6,709 at the end of FY'21.

Operating expenses in FY'22 compared to FY'21 increased primarily due to the following:

- a $34 million increase in restructuring charges primarily due to the restructuring plan initiated in Q1'22;
- a $9 million increase in travel expenses;

- a $6 million increase in intangible amortization expense;
- a $6 million increase in software subscriptions; and
- a $5 million increase in internal hosting costs;

partially offset by:

- a $12 million decrease in compensation expense (including benefit costs) due to lower headcount caused by attritio and restructuring actions; and
- a $6 million decrease in stock-based compensation.

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Interest Expense

(Dollar amounts in millions)	Year ended September 30,		
	2022	**2021**	**Percent Change**
Interest and debt premium expense	$ (54.3)	$ (50.5)	8 %

Interest expense includes interest under our credit facility and senior notes. Interest expense was higher in FY'22 than FY'21. We had $1,359 million of total debt at September 30, 2022, compared to $1,450 million at September 30, 2021. We repaid $355 million of our revolving credit facility in FY'22, offset by $264 million borrowed at the end of April to fund the acquisition of the Codebeamer business. Loans under the credit facility bear interest at variable rates which reset every 30 to 180 days. As of September 30, 2022, the annual rate for borrowings under the credit facility was 4.1%, which has subsequently increased to 5.7%. For additional detail on the changes in our debt structure, see *Note 9. Debt*, included in the Notes to Consolidated Financial Statements in this Annual Report.

The average interest rate on our total borrowings was 3.4% in FY'22 and 3.3% in FY'21.

Other Income (Expense)

(Dollar amounts in millions)	Year ended September 30,		
	2022	**2021**	**Percent Change**
Interest income	$ 2.5	$ 1.8	39 %
Other income (expense), net	1.5	59.7	(97)%
Other income, net	$ 4.0	$ 61.5	(93)%

Interest income represents earnings on the investment of our available cash and marketable securities.

The decrease in Other income, net, in FY'22 over FY'21 was driven by a FY'21 credit of $69 million $35 million loss associated with unrealized gains related to an equity investment in a publicly-traded publicly traded company. In FY'22,

Income Taxes

(Dollar amounts in millions)	Year ended September 30,		
	2023	2022	Percent Change
Income before income taxes	$ 332.6	$ 397.1	(16)%
Provision for income taxes	87.0	84.0	4 %
Effective income tax rate	26 %	21 %	

The effective tax rate for FY'23 was higher than the value effective rate for FY'22, primarily due to tax expense of that equity investment decreased, resulting $21.8 million related to an uncertain tax position regarding transfer pricing in a $35 million charge. That foreign jurisdiction where we are currently under audit. Our rate was also impacted by tax expense of $6.3 million related to non-deductible imputed interest related to the deferred payment on the acquisition of ServiceMax Inc. Additionally, in FY'22, charge was offset by a gain our rate included $8.1 million of tax expense arising from the basis difference on goodwill related to the sale of a portion of our PLM services business of $30 million and $6 million of gains on the sale of other assets and investments. business.

Income Taxes

(Dollar amounts in millions)	Year ended September 30,		
	2022	2021	Percent Change
Income before income taxes	$ 397.1	$ 391.8	1 %
Provision (benefit) for income taxes	84.0	(85.2)	(199)%
Effective income tax rate	21 %	(22)%	

In FY'22 and FY'21, our effective tax rate is impacted by our corporate structure in which our foreign taxes are at a net effective tax rate lower than the U.S. rate. A significant amount of our foreign earnings is generated by our subsidiaries organized in Ireland and the Cayman Islands. In FY'22 and FY'21 the foreign rate differential predominantly relates to those earnings. In addition to the foreign rate differential, our tax rate differed from the statutory federal income tax rate due to the net effects of the Global Intangible Low-Taxed Income (GILTI) and Foreign Derived Intangible Income (FDII) regimes (together referred to as U.S. Tax reform), and the excess tax benefit related to stock-based compensation.

Additionally in FY'22, our results include tax expense relating to the book over tax basis difference on goodwill disposed of as part of the sale of a portion of our PLM service business. As a result of the net effect of these items in 2022, our effective tax rate did not differ significantly from the U.S. federal income tax rate.

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In FY'21, our tax rate includes a benefit due to the release normal course of business, PTC and its subsidiaries are examined by various taxing authorities, including the valuation allowance on the majority of our U.S. net deferred tax assets.

Our results for the twelve months ended September 30, 2021, include a charge of $37.3 million related to the effects of a tax matter IRS in the Republic United States. We regularly assess the likelihood of Korea (South Korea) of $34.4 million, additional assessments by tax authorities and the resulting impact on U.S. income taxes of $2.9 million. The charge related to an assessment with respect to various tax issues, primarily foreign withholding taxes, in South Korea. provide for these matters as appropriate. We made additional payments of approximately $20 million to the are currently under audit by tax authorities in South Korea in FY'21 for several jurisdictions including Germany, Ireland, and Italy. Audits by tax authorities typically involve examination of the years 2016 to 2021. deductibility of certain permanent items, transfer pricing, limitations on net operating losses, and tax credits.

Liquidity and Capital Resources

(in millions)	September 30,		September 30,	
	2022	2021	2023	2022
Cash and cash equivalents	$ 272.2	$ 326.5	$ 288.1	$ 272.2
Restricted cash	0.7	0.5	0.7	0.7
Total	$ 272.9	$ 327.0	$ 288.8	$ 272.9
Activity for the year included the following:				
Net cash provided by operating activities	$ 435.3	$ 368.8		
Net cash used in investing activities	$ (201.2)	$ (687.9)		
Net cash (used in) provided by financing activities	$ (264.1)	$ 370.3		

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(in millions)	Year ended September 30,	
	2023	2022
Net cash provided by operating activities	$ 610.9	$ 435.3
Net cash used in investing activities	$ (866.1)	$ (201.2)
Net cash provided by (used in) financing activities	$ 268.3	$ (264.1)

Cash, cash equivalents Cash Equivalents and restricted cash Restricted Cash

We invest our cash with highly rated financial institutions and in diversified domestic and international money market mutual funds. cash institutions. Cash and cash equivalents include highly liquid investments with original maturities of three months or less. At September 30, 2022, cash and cash equivalents totaled $272 million, compared to $327 million at September 30, 2021.

A significant portion of our cash is generated and held outside the U.S. As of September 30, 2022 September 30, 2023, we had cash and cash equivalents of $11 million $35 million in the U.S., $105 million $111 million in Europe, $128 million $121 million in Asia Pacific (including India), and $28 million $21 million in other non-U.S. countries. We have substantial cash requirements in the U.S., but we believe that the combination of our existing U.S. cash and cash equivalents, marketable securities, our ability to repatriate cash to the U.S., future U.S. operating cash flows, and cash available under our revolving credit facility will be sufficient to meet our ongoing U.S. operating expenses and known capital requirements.

Cash provided Provided by operating activities Operating Activities

Cash provided by operating activities was $435 million increased by $175.6 million in FY'22 FY'23 compared to $369 million in FY'21. The year-over-year FY'22. This increase is primarily was driven by higher collections, including contributions from ServiceMax, offset by higher vendor disbursements and higher interest payments due to approximately $170 million a higher debt burden and higher interest rates. Cash from operations in FY'23 includes $1.5 million of higher cash collections, offset by $30 million more in salary restructuring payments and salary-related $19.6 million of acquisition and transaction-related payments a $57 million increase in disbursements largely related to prepayments made in FY'22, and a $12 million increase in tax-related payments.

Restructuring payments totaled $41 million in FY'22, compared to $15 million $40.8 million of restructuring payments and $11.8 million of acquisition and transaction-related payments in FY'21. Cash paid for income taxes was $55 million in FY'22 compared to $58 million in FY'21. FY'22.

Cash used Used in investing activities Investing Activities

(in millions)	Year ended September 30,	
	2022	**2021**
Additions to property and equipment	$ (19.5)	$ (24.7)
Proceeds from short- and long-term marketable securities, net	—	58.4
Acquisitions of businesses, net of cash acquired	(282.9)	(718.0)
Proceeds from sales of investments	46.9	—
Purchases of investments	—	(4.0)
Purchase of intangible assets	(6.5)	(0.6)
Settlement of net investment hedges	24.9	1.0
Divestiture of business, net	32.5	—
Other investing activities	3.4	—
Net cash used in investing activities	$ (201.2)	$ (687.9)

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Cash used in investing activities in FY'23 was driven by the acquisition of ServiceMax, with $828.2 million paid in Q2'23. Cash used in investing activities in FY'22 reflects $278 million ($264 million was driven by the acquisition of which we borrowed under our credit facility) used to acquire the Codebeamer business in FY'22, compared to $718 million used in FY’21 for the Arena acquisition, $278.1 million, offset by FY'22 $46.9 million of proceeds from the sale of an investment and $32.5 million of proceeds from the sale of a portion of our PLM services business business.

Cash Provided by (Used in) Financing Activities

Cash provided by financing activities in FY’23 was primarily related to net new borrowings of $33 million $771.0 million (a $500.0 million term loan and proceeds from a $271.0 million incremental revolving line) to fund the sale ServiceMax acquisition and net repayments of investments $428.0 million on the new revolving facility. Cash used in financing activities in FY’22 includes repayments of $47 million. For additional detail on $355.0 million under our acquisitions, see credit facility and repurchases of common stock of $125.0 million, offset by borrowings of $264.0 million to fund our acquisition of the Codebeamer business.

Outstanding Debt

(in millions)		**September 30, 2023**
4.000% Senior Notes due 2028	$	500.0
3.625% Senior Notes due 2025		500.0
Credit facility revolver line		202.0
Credit facility term loan		500.0
Total debt		1,702.0
Unamortized debt issuance costs for the Senior Notes		(6.2)
Total debt, net of issuance costs	$	1,695.8
Undrawn under credit facility revolver	$	1,048.0
Undrawn under credit facility revolver available for borrowing	$	384.6

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In addition to the debt shown in the above table, as of September 30, 2023, we had a $620 million deferred acquisition payment liability related to the fair value of the $650 million installment paid in October 2023 for the ServiceMax acquisition. Of the $650 million paid, $620 million has been recorded as a financing outflow and the $30 million of imputed interest has been recorded as an operating cash outflow in our Q1'24 financials. To finance this payment and the payment for the acquisition of pure-systems in Q1'24, we borrowed $740 million under the revolving line of our credit facility. This is described in *Note 6. 18. Subsequent Events Acquisitions and Disposition of Business* of Notes to the Consolidated Financial Statements in this Annual Report.

Cash (used in) provided by financing activities

(in millions)	**Year ended September 30,**	
	2022	**2021**

Borrowings (repayments) on debt, net	$ (91.0)	$ 432.0
Repurchases of common stock	(125.0)	(30.0)
Proceeds from issuance of common stock	21.2	21.6
Payments of withholding taxes in connection with stock-based awards	(69.0)	(53.0)
Payments of principal for financing leases	(0.3)	(0.4)
Net cash (used in) provided by financing activities	$ (264.1)	$ 370.3

Cash used in financing activities in FY'22 reflects borrowings of $264 million, offset by repayments of $355 million under our credit facility, repurchases of common stock of $125 million, payments of withholding taxes related to stock-based awards of $69 million and proceeds from the issuance of common stock of $21 million. In FY'21, net borrowings of $600 million were offset by $168 million of repayments under our credit facility, repurchases of common stock of $30 million, and payments of withholding taxes related to stock-based awards of $53 million.

Outstanding Debt

As of September 30, 2022, we had:

(in millions)	**September 30, 2022**
4.000% Senior notes due 2028	$ 500.0
3.625% Senior notes due 2025	500.0
Credit facility revolver	359.0
Total debt	1,359.0
Unamortized debt issuance costs for the Senior notes	(8.4)
Total debt, net of issuance costs	$ 1,350.6
Undrawn under credit facility revolver	$ 641.0
Undrawn under credit facility revolver available for borrowing	$ 625.1

As of September 30, 2022 September 30, 2023, we were in compliance with all financial and operating covenants of the credit facility and the note Senior Note indentures. Any failure to comply with such covenants under the credit facility would prevent us from being able to borrow additional funds under the credit facility, and, as with any failure to comply with such covenants under the note Senior Note indentures, could constitute a default that could cause all amounts outstanding to become due and payable immediately. Loans under the credit facility bear interest at variable rates which reset every 30 to 180 days. As of September 30, 2022 September 30, 2023, the annual rate rates for borrowings outstanding was 4.1%, which has subsequently increased to 5.7% under the credit facility revolver line and term loan were both 7.2%.

Our credit facility and our Senior Notes are described in *Note 9. Debt* of Notes to the Consolidated Financial Statements in this Annual Report.

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 billion of our common stock through September 30, 2023. We may use cash from operations and borrowings under our credit facility to make any such repurchases. All shares of our common stock repurchased are automatically restored to the status of authorized and unissued.

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In FY'22 and in FY'21 we repurchased 1.05 million shares for $125 million and approximately 0.23 million shares in the open market for $30 million, respectively.

Our long-term goal is to return approximately 50% of our free cash flow to shareholders via share repurchases, while also taking into consideration the interest rate environment and strategic initiatives and acquisitions, which could cause us to reduce, suspend, or cease repurchases.

Expectations for Fiscal 2023 2024

We believe that existing cash and cash equivalents, together with cash generated from operations and amounts available under the our credit facility, and otherwise, will be sufficient to meet our working capital and capital expenditure requirements (which we expect to be approximately $20 million in FY’23) FY’24) through at least the next twelve months and to meet our known long-term capital requirements.

For the remainder of FY'24, we expect to use substantially all our cash generated from operating activities to repay debt outstanding under our credit facility revolving line.

Our expected uses and sources of cash could change, our cash position could be reduced, and we could incur additional debt obligations if we decide to retire other debt, engage in strategic transactions, retire debt, or repurchase shares, any of which could be commenced, suspended, or completed at any time. Any share such repurchases or retirement of debt retirement will depend on prevailing market conditions, our liquidity requirements, contractual restrictions and other factors. Such The amounts involved in any debt retirement or issuance, share repurchases, or strategic transactions may be material. We regularly borrow under our credit facility to make strategic acquisitions and expect to continue to do so, and may substantially increase our indebtedness to pursue strategic acquisitions, which would increase our debt repayment obligations, including related interest obligations.

Contractual Obligations

At September 30, 2022 September 30, 2023, our future contractual obligations were related to debt, deferred acquisition payments, leases, pension liabilities, unrecognized tax benefits, and purchase obligations. See *Note 6. Acquisitions and Disposition of Businesses, Note 9. Debt, Note 19. 17. Leases, Note 14. Pension Plans,* and *Note 8. Income Taxes* of Notes to Consolidated Financial Statements in this Annual Report for information about those obligations, which Notes are incorporated by reference into this section. Our purchase obligations were approximately $161.4

million $164.7 million, with $64.2 million $75.9 million expected to be paid in FY'23 FY'24 and $97.2 million $88.8 million thereafter. 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, financing leases, operating leases with original terms of less than 12 months, and other marketing and consulting contracts. Contracts for which our commitment is variable or based on volumes with no fixed minimum quantities and contracts that can be canceled without payment penalties are not included in the purchase obligation amounts above. The purchase obligations included above are in addition to amounts included in Current liabilities and Prepaid expenses recorded on our September 30, 2022 September 30, 2023 Consolidated Balance Sheet.

As of September 30, 2022 September 30, 2023, we had letters of credit and bank guarantees outstanding of approximately $15 million $13.1 million (of which $0.5 million was collateralized).

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Operating Measure

ARR

ARR (Annual Run Rate) represents the annualized value of our portfolio of active subscription software, cloud, SaaS, and support contracts as of the end of the reporting period. We calculate ARR as follows:

- We consider a contract to be active when the product or service contractual term commences (the “start date”) unti the right to use the product or service ends (the “expiration date”). Even if the contract with the customer is execute before the start date, the contract will not count toward ARR until the customer right to receive the benefit of the products or services has commenced.

- For contracts that include annual values that increase over time, which we refer to as ramp contracts, we include in ARR only the annualized value of components of the contract that are considered active as of the date of the ARR calculation. We do not include any future committed increases in the contract value as of the date of the ARR calculation.

- As ARR includes only contracts that are active at the end of the reporting period, ARR does not reflect assumption estimates regarding future customer renewals or non-renewals.

- Active contracts are annualized by dividing the total active contract value by the contract duration in days (expiratio date minus start date), then multiplying that by 365 days (or 366 days for leap years).

We believe ARR is a valuable operating metric measure to measure assess the health of a subscription business because it captures expected subscription and support cash generation from customers. Because this measure represents is aligned with the amount that we invoice the customer on an annual basis. We generally invoice customers annually for the current year of the contract. A customer with a one-year contract will typically be invoiced for the total value of the contract at the beginning of the contractual term, while a customer with a multi-year contract will be invoiced for each annual period at the beginning of each year of the contract.

ARR increases by the annualized value of customer active contracts that commence in a reporting period and decreases by the annualized value of contracts that expire in the reporting period.

As ARR is not annualized recurring revenue, it is not calculated based on recognized or unearned revenue and is not affected by variability in the timing of revenue under ASC 606, particularly for on-premises license subscriptions where a substantial portion of the total value of the contract is recognized as of revenue at a point in time it does upon the later of when the software is made available, or the subscription term commences.

ARR should be viewed independently of recognized and unearned revenue and is not represent revenue for any particular period intended to be combined with, or remaining revenue that will be recognized to replace, either of those items. Investors should consider our ARR operating measure only in future periods.conjunction with our GAAP financial results.

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:

- free cash flow—cash flow from operations
- non-GAAP gross margin—GAAP gross margin
- non-GAAP operating income—GAAP operating income
- non-GAAP operating margin—GAAP operating margin

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- non-GAAP net income—GAAP net income
- non-GAAP diluted earnings or loss per share—GAAP diluted earnings or loss per share

Free cash flow is cash flow from operations net of capital expenditures, which are expenditures for property and equipment and consist primarily of facility improvements, office equipment, computer equipment, and software. We believe that free cash flow, in conjunction with cash from operations, is a useful measure of liquidity since capital expenditures are a necessary component of ongoing operations.

The non-GAAP financial measures other than free cash flow exclude, as applicable: stock-based compensation expense; amortization of acquired intangible assets; acquisition and transaction-related charges included in general General and administrative expenses; restructuring and other charges (credits), net; non-operating charges; charges (credits), net; and income tax adjustments.

The items excluded from these non-GAAP financial measures are normally included in the comparable measures calculated and presented in accordance with GAAP. Our management excludes We do not include these items, which can vary significantly from period to period, when evaluating reviewing our operating results internally because we do not consider them to be part of our core operating results. Excluding them facilitates evaluation of our ongoing performance, and/or predicting our earnings trends, and therefore excludes them when presenting non-GAAP financial measures. comparisons to the performance of other companies in our industry. Management uses non-GAAP financial measures in conjunction with our GAAP results, as should investors.

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 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.

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Acquisition and transaction-related charges included in General and administrative expenses 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 and transaction-related charges. Other transactional charges include third-party costs related to structuring unusual transactions. merger and acquisition transactions outside of ordinary business operations. 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 and transactions.

Restructuring and other charges (credits), net includes excess facility restructuring charges (credits); impairment and accretion expense charges related to the lease assets of exited facilities; sublease income from previously impaired facilities; and severance costs charges resulting from reductions of personnel personnel; and third-party professional consulting fees related to modifications of our business strategy. These costs may vary in size based on our restructuring plan.

Non-operating charges (credits) includes , net are gains or losses associated with sales or changes in value of assets or liabilities which that are generally investing or financing in nature and are inconsistent not indicative of our ongoing ordinary operating activities. In FY'23, we recognized a financing charge for a debt commitment agreement associated with our ordinary operating activities. acquisition of ServiceMax. In FY'22, we recorded gains associated with the sale of assets, including the sale of a portion of our PLM services business. Additionally in FY'22, business, and we recorded a loss associated with the reduction in value of an equity investment in a publicly-traded company. In FY'21, we recorded a gain related to the change in value

Table of an equity investment in a publicly-traded company. Contents

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. above. Additionally, we exclude other material tax items that we do not include when reviewing our operating results internally. For example, in FY'23, adjustments include a charge related to an uncertain tax position in a foreign jurisdiction.

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.

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(in millions, except per share amounts)	**Year ended September 30,**	
	2023	**2022**
GAAP gross margin	$ 1,656.0	$ 1,547.4
Stock-based compensation	20.9	22.8
Amortization of acquired intangible assets included in cost of revenue	35.7	25.6
Non-GAAP gross margin	$ 1,712.6	$ 1,595.7
GAAP operating income	$ 458.5	$ 447.4

Stock-based compensation		206.5		174.9
Amortization of acquired intangible assets		75.7		60.5
Acquisition and transaction-related charges		18.7		13.2
Restructuring and other charges (credits), net		(0.5)		36.2
Non-GAAP operating income	$	758.9	$	732.2
GAAP net income	$	245.5	$	313.1
Stock-based compensation		206.5		174.9
Amortization of acquired intangible assets		75.7		60.5
Acquisition and transaction-related charges		18.7		13.2
Restructuring and other charges (credits), net		(0.5)		36.2
Non-operating charges (credits), net(1)		5.1		(1.4)
Income tax adjustments(2)		(33.5)		(55.1)
Non-GAAP net income	$	517.6	$	541.5
GAAP diluted earnings per share	$	2.06	$	2.65
Stock-based compensation		1.73		1.48
Total amortization of acquired intangible assets		0.63		0.51
Acquisition and transaction-related charges		0.16		0.11
Restructuring and other charges (credits), net		—		0.31
Non-operating charges (credits), net(1)		0.04		(0.01)
Income tax adjustments(2)		(0.28)		(0.47)
Non-GAAP diluted earnings per share	$	4.34	$	4.58
Cash flow from operations	$	610.9	$	435.3
Capital expenditure		(23.8)		(19.5)
Free cash flow	$	587.0	$	415.8

(in millions, except per share amounts)	**Year ended September 30,**			
	2022		**2021**	
GAAP gross margin	$	1,547.4	$	1,436.1
Stock-based compensation		22.8		19.3
Amortization of acquired intangible assets included in cost of revenue		25.6		29.8
Non-GAAP gross margin	$	1,595.7	$	1,485.1
GAAP operating income	$	447.4	$	380.7
Stock-based compensation		174.9		177.3
Amortization of acquired intangible assets		60.5		59.2

Acquisition and transaction-related charges	13.2	15.0
Restructuring and other charges, net	36.2	2.2
Non-GAAP operating income	$ 732.2	$ 634.4
GAAP net income	$ 313.1	$ 476.9
Stock-based compensation	174.9	177.3
Amortization of acquired intangible assets	60.5	59.2
Acquisition and transaction-related charges	13.2	15.0
Restructuring and other charges, net	36.2	2.2
Non-operating charges(credits), net(1)	(1.4)	(68.8)
Income tax adjustments(2)	(55.1)	(191.6)
Non-GAAP net income	$ 541.5	$ 470.2
GAAP diluted earnings per share	$ 2.65	$ 4.03
Stock-based compensation	1.48	1.50
Total amortization of acquired intangible assets	0.51	0.50
Acquisition and transaction-related charges	0.11	0.13
Restructuring and other charges, net	0.31	0.02
Non-operating charges(credits), net(1)	(0.01)	(0.58)
Income tax adjustments(2)	(0.47)	(1.62)
Non-GAAP diluted earnings per share	$ 4.58	$ 3.97
Cash flow from operations	$ 435.3	$ 368.8
Capital expenditure	(19.5)	(24.7)
Free cash flow	$ 415.8	$ 344.1

(1) Non-operating net In FY'23, we recognized $4.2 million of financing charges for a debt commitment agreement associated with our acquisition of ServiceMax. Net credits for FY'22 include a $29.8 million gain on the sale of a portion of our PLM services business, a $3.4 million gain on the sale of asset, and a $3.0 million gain on the sale of an investment, offset by a $34.8 million expense recognized due to charge from the reduction in value of a equity investment in a publicly-traded company. Non-operating credits for FY'21 include a $68.8 million gain associated with an increase in value of an equity investment in a publicly-traded company.

(2) Income tax adjustments reflect the tax effects of non-GAAP adjustments which are calculated by applying the applicable tax rate by jurisdiction to the GAAP adjustments listed above. In FY'22, adjustments include tax FY'23, non-GAAP expense of $15.5 million excludes $21.8 million related to the sale uncertain tax positions in a foreign jurisdiction.

Table of a portion of our PLM services business, of which $8.1 million pertains to the basis difference in goodwill. Our FY'21 GAAP results included benefits of $179.7 million related to the release of the valuation allowance on the majority of our U.S. net deferred tax assets. As we were profitable on a non-GAAP basis, the FY'21 tax provision was calculated assuming there was no valuation allowance. Additionally, our non-GAAP results for FY'21 excluded tax expenses of $34.8 million related to a non-U.S. prior period tax exposure, primarily related to foreign withholding taxes.

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Operating margin impact of non-GAAP adjustments:

	Year ended September 30,		Year ended September 30,	
	2022	**2021**	**2023**	**2022**
GAAP operating margin	23.1 %	21.1 %	21.9 %	23.1 %
Stock-based compensation	9.0 %	9.8 %	9.8 %	9.0 %
Total amortization of acquired intangible assets	3.1 %	3.3 %	3.6 %	3.1 %
Acquisition and transaction-related charges	0.7 %	0.8 %	0.9 %	0.7 %
Restructuring and other charges, net	1.9 %	0.1 %		
Restructuring and other charges (credits), net			(—)%	1.9 %
Non-GAAP operating margin	37.9 %	35.1 %	36.2 %	37.9 %

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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.

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Revenue Recognition

We record revenues in accordance with the guidance provided by ASC 606, *Revenue from Contracts with Customers*. For a full description of our revenue accounting policy, refer to *Note 2. Summary of Significant Accounting Policies*, included in the Notes to Consolidated Financial Statements in this Annual Report.

Our sources of revenue include: (1) subscriptions, (2) perpetual licenses, (3) support for perpetual licenses, and (4) professional services. Subscriptions include term-based on-premises licenses and related support, Software-as-a-Service (SaaS), and hosting services.

Judgments and Estimates

Determination of performance obligations. Our subscriptions are frequently sold as a bundle of products and services, typically pairing on-premises term software licenses with support and/or and, for certain offerings, cloud services over the same term. Significant judgment is used in determining the performance obligations related to these bundled products and services. On-premises software is typically determined to be a distinct performance obligation and is thus recognized separately from the support and/or and cloud components. On-premises license software revenue is generally recognized at the point in time that the software is made available to the customer, while the support and cloud software revenue components are recognized ratably over the term of the contract. In cases where subscriptions include cloud functionality and on-premises software, an assessment has been performed to determine whether the cloud services are distinct from the on-premises software. In the substantial majority of instances, cloud services provide incremental functionality to customers and have been considered distinct and recognized separately from the on-premises software. This assessment could have a significant impact on the timing of revenue recognition and may change as our product offerings evolve.

Allocation of transaction price. We estimate the standalone selling price of each identified performance obligation and use that estimate to allocate the transaction price among said performance obligations. The estimated standalone selling price is determined using all information reasonably available to us, including market conditions and other observable inputs. Significant judgment is used in determining the standalone selling prices of the on-premises license, support, and cloud components of our subscription products. These estimates are subject to change as our product offerings change and could have a significant impact due to the difference in the timing of revenue recognition for on-premises licenses versus support and support and/or cloud.

Right to exchange. Our multi-year, non-cancellable on-premises subscription contracts provide customers with an annual right to exchange software within the original subscription with other software. We When it applies to on-premises licenses, we account for this right as a liability. For most contracts, we use the expected value method to determine the liability associated with this right across a portfolio of contracts. Where contracts 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 liability for each individual contract. In both circumstances, the transaction price is constrained based on our estimates, which impacts the amount of revenue recognized. Changes in these estimates could significantly impact revenue for any given period.

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 recorded tax liabilities.

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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.

We have unrecognized tax benefits as of September 30, 2023 of $50.7 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 $26 million as audits close and statutes of limitations expire.

As of September 30, 2022 September 30, 2023, we have a valuation allowance of $17.8 million $17.4 million against net deferred tax assets in the U.S. and a valuation allowance of $4.5 million $4.3 million against net deferred tax assets in certain foreign jurisdictions. We have concluded, based on the weight of available evidence, that a full The valuation allowance is not required against our U.S. net deferred tax assets as they are more likely than not to be realized recorded in the future. We will continue U.S. relates to reassess our valuation allowance requirements each financial reporting period. Massachusetts tax credit carryforwards that we do not expect to realize a benefit from prior to expiration.

The valuation allowance recorded against net deferred tax assets of certain foreign jurisdictions is established primarily for our capital loss carryforwards, the majority of which do not expire. However, there are limitations imposed on the utilization of such capital losses that could further restrict the recognition of any tax benefits. We will continue to reassess our valuation allowance requirements each financial reporting period.

Prior to the passage of the U.S. Tax Act, the Company we 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 and there is therefore no longer a material cumulative basis difference associated with the undistributed earnings. We maintain our assertion 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.

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, purchased software, tradenames, customer lists and contracts, and software support agreements and related relationships. Developed technology Purchased software consists of products that have reached technological feasibility. Core technology represents a feasibility and the 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. models. Critical estimates in valuing certain of the intangible assets include but are not limited to:

- future expected cash flows from revenues and costs related to software license sales, customer support agreements customer contracts and related customer relationships and acquired developed technologies and trademarks and trade names names; 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. For acquisitions completed prior to FY'22, 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. During FY'22, we adopted ASU 2021-08, whereby deferred revenue for acquisitions completed in FY'22 and thereafter reflect the amounts that would have been deferred as of the acquisition date in accordance with ASC 606.

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 date. 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.

Recent Accounting Pronouncements

In accordance with recently issued accounting pronouncements, we will be required to comply with certain changes in accounting rules and regulations, none of which are expected to have a material impact on our consolidated financial statements. Refer to *Note 2. Summary of Significant Accounting Policies* of Notes to the Consolidated Financial Statements in this Annual Report for all recently issued accounting pronouncements, which is incorporated herein by reference.

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.

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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 Eurozone countries, Japan, Israel, Sweden, Switzerland, China and Canada. India. We enter into foreign currency forward contracts and options 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 flows or forecast transactions. purposes.

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. Approximately 55% 50% of our revenue and 40% 35% of our expenses were transacted in currencies other than the U.S. dollar. Dollar. 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 EUR exchange rate and a 10 Yen change in the Yen to USD exchange rate would impact operating income by approximately $32 million $30 million and $12 million $6 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 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 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 Dollars (translation risk). If sales to customers outside 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 Dollar value of balances denominated in foreign currency, resulting from changes in foreign currency exchange rates. Our foreign currency hedging program uses forward contracts and options to manage the foreign currency exposures that exist as part of our ongoing business operations. The contracts are primarily denominated in Japanese Yen the Euro, Swedish Krona, and European Swiss Franc currencies, and have maturities of less than four months.

The majority of our foreign currency forward contracts and options are not designated as hedges for accounting purposes, and changes in the fair value of these instruments are recognized immediately in earnings. Because we enter into forward these derivative 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 derivative contract. Gains and losses on forward contracts these derivatives and foreign currency denominated receivables and payables are included in foreign currency net losses. Other income, net.

As of September 30, 2022 September 30, 2023 and 2021, 2022, we had outstanding forward contracts for derivatives not designated as hedging instruments with notional amounts equivalent to the following:

	September 30,		September 30,	
Currency Hedged *(in thousands)*	**2022**	**2021**	**2023**	**2022**
Canadian / U.S. Dollar	$ 2,731	$ 4,894		
Canadian Dollar / U.S. Dollar			$ 5,135	$ 2,731
Euro / U.S. Dollar	316,869	387,466	383,227	316,869

British Pound / U.S. Dollar	7,368	23,141	6,058	7,368
Israeli Shekel / U.S. Dollar	12,052	10,475	11,852	12,052
Japanese Yen / U.S. Dollar	25,566	46,450	4,770	25,566
Swiss Franc / U.S. Dollar	25,559	18,039	32,766	25,559
Swedish Krona / U.S. Dollar	35,713	34,196	35,085	35,713
Singapore Dollar / U.S. Dollar	3,637	3,498	—	3,637
Chinese Renminbi / U.S. Dollar	23,965	23,297	16,660	23,965
New Taiwan Dollar / U.S. Dollar	13,906	3,369	11,855	13,906
Russian Ruble/ U.S. Dollar	—	2,614		
Korean Won/ U.S. Dollar	4,919	—		
Danish Krone/ U.S. Dollar	3,192	2,380		
Australian Dollar/ U.S. Dollar	3,269	2,086		
Korean Won / U.S. Dollar			6,157	4,919
Danish Krone / U.S. Dollar			6,731	3,192
Australian Dollar / U.S. Dollar			452	3,269
All other	4,432	2,016	2,888	4,432
Total	$ 483,178	$ 563,921	$ 523,636	$ 483,178

Debt

In addition to the $1 billion due under our 2025 and 2028 Senior Notes, as of September 30, 2022 September 30, 2023, we had $359 million $702 million outstanding under our credit facility. We also had a $620 million deferred acquisition payment liability related to the fair value of the $650 million installment for the ServiceMax acquisition, which we paid in October 2023 leveraging financing from our 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 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, 2022 September 30, 2023, the annual rate on the credit facility loans was 4.14% 7.18%. If there were a 100 basis point change in interest rates, the annual net impact to earnings and cash flows would be $3.6 million $7 million. This change in cash flows and earnings has been calculated based on the borrowings outstanding at September 30, 2022 September 30, 2023 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, 2022 September 30, 2023, 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, 2022 September 30, 2023, we had cash and cash equivalents of $11 million $35 million in the United States, $105 million $111 million in Europe, $128 million $121 million in Asia Pacific (including India), and $28 million $21 million in other non-U.S. countries. Given the short maturities and investment grade quality of the portfolio holdings at September 30, 2022 September 30, 2023, 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 exchange rate 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 has 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. Changes in foreign currencies relative to the U.S. dollar Dollar had a favorable impact of $2.9 million and an unfavorable impact of $24.2 million and $0.1 million on our consolidated cash balances in 2022 FY'23 and 2021, respectively, FY'22, respectively. The impact in FY'23 was due in particular due to changes in the Euro and the Japanese Yen. Korean Won.

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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, 2022 September 30, 2023.

Management excluded ServiceMax from its assessment of internal control over financial reporting as of September 30, 2023 because it was acquired in a business combination in the current fiscal year. ServiceMax's total assets and total revenues represent approximately 1% (excluding the impact of goodwill and intangibles from the acquisition) and 7%, respectively, of our total assets and total revenues, as of and for the year ended September 30, 2023.

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 dispositi of our assets that could have a material effect on the financial statements.

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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 deteriorate.

Our management assessed the effectiveness of our internal control over financial reporting as of September 30, 2022 September 30, 2023 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, 2022 September 30, 2023, our internal control over financial reporting was effective.

The effectiveness of our internal control over financial reporting as of September 30, 2022 September 30, 2023 has been audited by PricewaterhouseCoopers LLP, an independent registered public accounting firm, as stated in their report, which appears under Item 8.

Change Changes 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, 2022 September 30, 2023 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

ITEM 9B. Other Information

None. Item 5.02 Departure of Directors or Certain Officers; Election of Directors; Appointment of Certain Officers; Compensatory Arrangements of Certain Officers.

On November 16, 2023, Michael DiTullio, President and Chief Operating Officer of the Company, Kristian Talvitie, Executive Vice President, Chief Financial Officer, Catherine Kniker, Executive Vice President, Chief Strategy and Marketing Officer, and Aaron von Staats, Executive Vice President, General Counsel entered into new Executive Agreements with PTC Inc. (the "Company"). The new Executive Agreements replace the executives' existing Executive Agreements with the Company.

The Executive Agreements provide certain compensation and employment protections to the executives. Each Executive Agreement provides that, upon a change in control of the Company, (i) all performance measures under any outstanding equity award held by the executive will be deemed to have been met at the target level, and (ii) the executive will receive a payment in an amount equal to the pro-rata portion of the executive's target incentive bonus for the current year. Upon any termination of the executive's employment after a change in control of the Company, (i) all equity awards held by the executive will accelerate and vest in full, (ii) the executive will receive a payment in an amount equal to: (a) 100% of the executive's highest base salary in the six months preceding the termination date, plus (b) 100% of the executive's highest applicable target bonus, and (iii) the executive will be entitled to continued participation in the Company's medical, dental and vision benefit plans (the "Benefit Plans") for one year, or payment of an amount sufficient to purchase substantially equivalent benefits if continued participation is not permitted under the applicable Benefit Plan or if the Benefit Plan is terminated. The Executive Agreement also provides that, upon termination of the executive's employment by the Company without cause (i) the executive will receive a payment in an amount equal to 100% of the executive's highest base salary in the six months preceding the termination date plus 100% of the executive's target bonus for the year in which the termination occurs, (ii) all equity awards held by the executive that would have vested in the twelve months following the termination date will vest, and (iii) the executive will be entitled to continued participation in the Benefit Plans or payment in lieu thereof as described above. The Executive Agreement also provides that upon termination of the executive's employment by the Company due to the executive's death or disability, all equity held by the executive will vest in full. Mr. DiTullio's Executive Agreement also provides that if he voluntarily terminates his employment after September 30, 2025, or if he is terminated without cause, all outstanding equity held by him will continue to vest after such termination in accordance with its terms, which continued equity vesting after termination without cause replaces the equity acceleration described above in the event of termination without cause. To receive the payments and benefits under the Executive Agreement, the

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executive must execute a release of claims in favor of the Company and continue to comply with the terms of the executive's Proprietary Information Agreement with the Company. The preceding description of the Executive Agreements is qualified by reference to the full text of such agreements, copies of which are filed as Exhibits 10.5 and 10.6 of this Form 10-K.

Insider Trading Arrangements

Our Section 16 officers and directors may enter into plans or arrangements for the purchase or sale of our securities that are intended to satisfy the affirmative defense conditions of Rule 10b5-1(c) of the Exchange Act. Such plans and arrangements must comply in all respects with our insider trading policies, including our policy governing entry into and operation of 10b5-1 plans and arrangements.

During the quarter ended September 30, 2023, the following Section 16 officers and directors adopted Rule 10b5-1 trading arrangements (as defined in Item 408 of Regulation S-K of the Exchange Act). All plans adopted covered only sales of PTC common stock. No plans were modified or terminated.

Name and Title of Director or Section 16 Officer	**Date of Adoption, Modification, or Termination**	**Duration of the Plan**	**Aggregate Number of Shares of Common Stock that may be Sold under the Plan**
James Heppelmann, Chairman and Chief Executive Officer	Adopted August 7, 2023	Ends February 12, 2024	35,000
Kristian Talvitie, Executive Vice President, Chief Financial Officer	Adopted August 31, 2023	Ends February 29, 2024	22,240
Catherine Kniker, Executive Vice President, Chief Strategy and Marketing Officer	Adopted August 15, 2023	Ends August 8, 2024	4,857, plus all net vested shares issued for the FY2023 Corporate Incentive Plan, plus all shares purchased under the 2016 Employee Stock Purchase Plan for the offering periods ending on January 31, 2024 and July 31, 2024(1)(2)

Aaron von Staats, Executive Vice President, General Counsel	Adopted August 24, 2023	Ends May 31, 2024	3,835, plus all net vested shares issued for the FY2023 Corporate Incentive Plan, plus 40.5% of total shares that vest on November 15, 2023 under the performance-based RSU awards granted on November 17, 2020, November 17, 2021, and November 16, 2022(1)(3)

(1) The total number of shares that would be issued for the FY2023 Corporate Incentive Plan could not be known when the plan was adopted as the FY2 performance period had not yet ended and attainment of the performance measure was not known.
(2) The total number of shares that will be purchased under the 2016 Employee Stock Purchase Plan for the offering periods ending January 31, 2024 ar July 31, 2024 could not be known when the plan was adopted.
(3) The total number of shares that would be earned and vested under the performance-based RSU awards for the FY2023 performance period could no known when the plan was adopted as the FY2023 performance period had not yet ended and attainment of the performance measures was not know

ITEM 9C. Disclosure Regarding Foreign Jurisdictions that Prevent Inspections

Not applicable.

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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 under the headings “Proposal 1: Election of Directors,” “Corporate Governance,” "Information About Our Executive Officers," and “Transactions with Related Persons” appearing in our 2023 2024 Proxy Statement. Such information is incorporated herein 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, “Compensation Committee Report,” “Compensation Tables,” and “Compensation Committee Report” “Pay Ratio Disclosure” appearing in our 2023 2024 Proxy Statement. Such information is incorporated herein by reference.

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

The information required by this item Information about our common stock ownership may be found under the headings “Proposal 2: Approve an Increase in the Number of Shares Available under the 2000 Equity Incentive Plan,” ”Equity Compensation Plan Information,” and heading “Information about PTC Common Stock Ownership” appearing in our 2023 2024 Proxy Statement. Such information is incorporated herein by reference.

EQUITY COMPENSATION PLAN INFORMATION
as of September 30, 2023

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)	2,580,222	—	7,257,075
2016 Employee Stock Purchase Plan(2)	—	—	2,223,947
Total	2,580,222	—	9,481,022

(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 105,794 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” appearing in our 2023 2024 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 2023 2024 Proxy Statement. Such information is incorporated herein by reference.

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PART IV

ITEM15. ITEM 15. Exhibits and Financial Statement Schedules

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

1. Financial Statements

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.

ITEM16. ITEM 16. Form 10-K Summary

None.

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EXHIBIT INDEX

Exhibit Number	Exhibit
2.1 1.1	— Share Sale and Purchase Agreement dated as of April 19, 2022 November 17, 2022, by and among PTC (SSI) Inc., Intland Software GmbH, Eger Invest GmbH, Janos Rezso Koppány, Zsolt Koppány, Szabolcs Koppány ServiceMax JV, LP, and Eger Software Holding UG (haftungsbeschränkt) & Co. KG. ServiceMax, Inc. (filed as Exhibit 1.1 to our Current Report on Form 8-K filed on April 20, 2022 November 17, 2022 (File No. 0-18059) and incorporated herein by reference).
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	— Amended and Restated By-Laws of PTC Inc., as amended through June 24, 2021(filed as Exhibit 3.2 to our Annual Report on Form 10-K for the year ended September 30, 2022 (File No. 0-18059) and incorporated herein by reference).
4.1	— Indenture, dated as of February 13, 2020, between PTC Inc. and Wells Fargo Bank, National Association, as trustee (filed as Exhibit 4.1 to our Current Report on Form 8-K filed on February 13, 2020 (File No. 0-18059) and incorporated herein by reference).
4.2	— Form of 3.625% senior unsecured notes due 2025 (filed as Exhibit 4.2 to our Current Report on Form 8-K filed on February 13, 2020 (File No. 0-18059) and incorporated herein by reference).
4.3	— Form of 4.000% senior unsecured notes due 2028 (filed as Exhibit 4.3 to our Current Report on Form 8-K filed on February 13, 2020 (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 (filed as Exhibit 4.4 to our Annual Report on Form 10-K for the year ended September 30, 2019 (File No. 0-18059) and incorporated herein by reference).
10.1.1* 10.1*	— 2000 Equity Incentive Plan (filed as Exhibit 10 10.1 to our Current Report on Form 8-K filed on March 8, 2019 February 21, 2023 (File No. 0-18059) and incorporated herein by reference. reference).
10.1.2 10.1.1	— 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).
10.1.3* 10.1.2*	— 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).
10.1.4 10.1.3	— 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).
10.1.5 10.1.4	— 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).
10.1.6 10.1.5	— 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).
10.1.7 10.1.6	— 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).
10.1.8* 10.1.7*	— 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).

10.1.9 10.1.8 — 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).

10.1.10 10.1.9 — 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).

10.1.11* 10.1.10* — 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).

10.1.12* 10.1.11* — 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).

10.1.12* Form of Restricted Stock Unit Certificate (U.S.).

10.1.13* Form of Restricted Stock Unit Certificate (U.S. Section 16 and U.S. EVP).

10.1.14* Form of Restricted Stock Unit Certificate (U.S. Section 16 and U.S. EVP).

10.2* — 2016 Employee Stock Purchase Plan (filed as Exhibit 10.1 10.2 to our Quarterly Current Report on Form 10-Q for the fiscal quarter ended December 28, 2019 8-K filed on February 21, 2023 (File No. 0-18059) and incorporated herein by reference).

10.3* 10.3.1* — Executive Agreement by and between the Company and James Heppelmann President and Chief Executive Officer, dated September 30, 2020 (filed as Exhibit 10.1 to our Current Report on Form 8-K dated September 30, 2020 (File No. 0-18059) and incorporated herein by reference).

10.4* 10.3.2* — Form of Amended and Restated Amendment No. 1 to Executive Agreement by and between the Company and each of Kristian Talvitie and Aaron von Staats James Heppelmann dated February 16, 2023 (filed as Exhibit 10.3 to PTC's Quarterly our Current Report on Form 10-Q for the period ended December 28, 2019 (File. 8-K filed on February 21, 2023 (File No. 0-18059) and incorporated herein by reference).

10.5* 10.4.1* — Form of Executive Agreement Offer Letter dated July 24, 2023 by and between the Company and Michael DiTullio Neil Barua (filed as Exhibit 10.1 to PTC's Quarterly our Current Report on Form 10-Q for the period ended March 28, 2020 (File. No. 0-18059) and incorporated herein by reference).

10.6* — Executive Agreement between the Company and Catherine Kniker dated September 23, 2021.

10.7 — Lease dated December 14, 1999 by and between PTC Inc. and Boston Properties Limited Partnership (filed as Exhibit 10.21 to our Annual Report 8-K filed on Form 10-K for the fiscal year ended September 30, 2000 July 26, 2023 (File No. 0-18059) and incorporated herein by reference).

10.8 10.4.2* — Third Amendment to Lease Executive Agreement between the Company and Neil Barua dated as of October 27, 2010 by and between Boston Properties Limited Partnership and PTC Inc. July 24, 2023 (filed as Exhibit 10.1 10.2 to our Current Report on Form 8-K dated November 8, 2010 filed on July 26, 2023 (File No. 0-18059) and incorporated herein by reference).

10.9 10.5* — Fifth Amendment Form of Executive Agreement dated April 10, 2020 to Lease dated December 14, 1999 November 16, 2023 by and between PTC Inc. and Boston Properties Limited Partnership (filed as Exhibit 10.2 to PTC's Quarterly Report on Form 10-Q for the period ended March 28, 2020 (File. No. 0-18059) each of Kristian Talvitie, Catherine Kniker, and incorporated herein by reference). Aaron von Staats.

10.6* Executive Agreement dated November 16, 2023 by and between Michael DiTullio and PTC Inc.

10.10 — 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).

10.11 — 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).

10.12*** 10.16 — Third Fourth Amended and Restated Strategic Alliance Credit Agreement dated January 3, 2023 by and between among PTC, Inc. PTC (IFSC) Limited, JPMorgan Chase Bank, N.A., as administrative agent, and Rockwell Automation, Inc. dated as of October 28, 2020 the Lenders named therein (filed as Exhibit 10.1 4.4 to our Current Report on Form 8-K dated October 28, 2020 filed on January 3, 2023 (File No. 0-18059) and incorporated herein by reference).

10.13 — Registration Rights Agreement by and between the Company and Rockwell Automation, Inc., dated July 19, 2018 (filed as Exhibit 10.1 in our Current Report on Form 8-K filed on July 19, 2018 (File No. 0-18059) and incorporated herein by reference).

10.14 — 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).

10.15 — Amendment No. 1 to Securities Purchase Agreement dated as of May 11, 2021 between PTC Inc. and Rockwell Automation, Inc. filed as Exhibit 10.1 to our Current Report on Form 8-K filed on May 13, 2021 (File No. 0-18059) and incorporated herein by reference).

10.16 — Third Amended and Restated Credit Agreement, by and among the Company, PTC (IFSC) Limited, the lenders listed thereto and JPMorgan Chase Bank, N.A., as administrative agent (filed as Exhibit 4.4 to our Current Report on Form 8-K filed on February 13, 2020 (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.

REFINITIV

101 — The following materials from PTC Inc.'s Annual Report on Form 10-K for the year ended September 30, 2022 September 30, 2023, formatted in Inline XBRL (eXtensible Business Reporting Language): (i) Consolidated Balance Sheets as of September 30, 2022 September 30, 2023 and 2021; 2022; (ii) Consolidated Statements of Operations for the years ended September 30, 2022 September 30, 2023, 2021 2022 and 2020; 2021; (iii) Consolidated Statements of Comprehensive Income for the years ended September 30, 2022 September 30, 2023, 2021 2022 and 2020; 2021; (iv) Consolidated Statements of Cash Flows for the years ended September 30, 2022 September 30, 2023, 2021 2022 and 2020; 2021; (v) Consolidated Statements of Stockholders' Equity for the years ended September 30, 2022 September 30, 2023, 2021 2022 and 2020; 2021; 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.

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SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the Registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized on the 15th 17th day of November, 2022. 2023.

PTC Inc.

By: /s/ JAMES HEPPELMANN

James Heppelmann

President Chairman of the Board and Chief Executive Officer

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the Registrant and in the capacities indicated below, on the 15th 17th day of November, 2022. 2023.

Signature	**Title**
(i) Principal Executive Officer:	
/s/ JAMES HEPPELMANN **James Heppelmann**	President and Chief Executive Officer
(ii) Principal Financial and Accounting Officer:	
/s/ KRISTIAN TALVITIE	Executive Vice President and Chief Financial Officer

Kristian Talvitie

(iii) Board of Directors:

/s/ JAMES HEPPELMANN **James Heppelmann**	Chairman of the Board
/s/ JANICE CHAFFIN **Janice Chaffin**	Lead Independent Director
/s/ NEIL BARUA **Neil Barua**	Director
/s/ MARK BENJAMIN **Mark Benjamin**	Director
/s/ MICHAL KATZ **Michal Katz**	Director
/s/ PAUL LACY **Paul Lacy**	Director
/s/ CORINNA LATHAN **Corinna Lathan**	Director
/s/ JANESH MOORJANI **Janesh Moorjani**	Director
/s/ ROBERT SCHECHTER **Robert Schechter**	Chairman of the Board of Directors Director
/s/ MARK BENJAMIN **Mark Benjamin**	Director
/s/ JANICE CHAFFIN **Janice Chaffin**	Director
/s/ AMAR HANSPAL **Amar Hanspal**	Director
/s/ JAMES HEPPELMANN **James Heppelmann**	Director
/s/ KLAUS HOEHN **Klaus Hoehn**	Director

/s/ MICHAL KATZ	Director
Michal Katz	
/s/ PAUL LACY	Director
Paul Lacy	
/s/ CORINNA LATHAN	Director
Corinna Lathan	
/s/ BLAKE MORET	Director
Blake Moret	

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APPENDIX A

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, 2022 September 30, 2023 and 2021, 2022, and the related consolidated statements of operations, of comprehensive income, of stockholders' equity and of cash flows for each of the three years in the period ended September 30, 2022 September 30, 2023, 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, 2022 September 30, 2023, 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, 2022 September 30, 2023 and 2021, 2022, and the results of its operations and its cash flows for each of the three years in the period ended September 30, 2022 September 30, 2023 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, 2022 September 30, 2023, based on criteria established in *Internal Control - Integrated Framework*(2013) issued by the COSO.

Changes in Accounting Principles

As discussed in Note 2 to the consolidated financial statements, the Company changed the manner in which it accounts for leases in fiscal 2020.

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.

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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.

As described in Management's Annual Report on Internal Control over Financial Reporting, management has excluded ServiceMax, Inc. from its assessment of internal control over financial reporting as of

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September 30, 2023 because it was acquired by the Company in a purchase business combination during fiscal 2023. We have also excluded ServiceMax, Inc. from our audit of internal control over financial reporting. ServiceMax, Inc. is a wholly-owned subsidiary whose total assets and total revenues excluded from management's assessment and our audit of internal control over financial reporting represent 1% and 7%, respectively, of the related consolidated financial statement amounts as of and for the year ended September 30, 2023.

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

Revenue from Contracts with Customers Recognition - Identification of Distinct Performance Obligations

As described in Note 2 to the consolidated financial statements, the Company's sources of revenue include: (1) subscriptions, (2) perpetual licenses, (3) support for perpetual licenses and (4) professional services. Revenue is derived from the licensing of computer software products, cloud-based offerings, and from related support and/or and professional services contracts. During the year ended September 30, 2022 September 30, 2023, the Company recognized revenue from contracts with customers of $1,933.3 million $2,097 million. The Company's contracts with customers for subscriptions typically include commitments to transfer term-based, on-premises software licenses bundled with support and/or cloud services. On-premises software is determined to be a distinct performance obligation from support. As disclosed by management, significant judgment is used in determining the performance obligations related to these bundled products and services. 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, is a critical audit matter are the (i) significant judgment by management in when identifying the identification of distinct performance obligations, specifically the determination that the on-premises software is determined to be a distinct performance obligation from support, which in turn led to and (ii) 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.

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 the identification of distinct performance obligations. These procedures also included, among others (i) evaluating the Company's revenue recognition accounting policy and (ii) testing management's identification of distinct performance obligations in its contracts with customers by examining revenue contracts on a sample basis and evaluating whether these performance obligations are satisfied at a point in time or satisfied over time.

Acquisition of ServiceMax, Inc. – Valuation of the Customer Relationships and Purchased Software Intangible Assets

As described in Note 6 to the consolidated financial statements, the Company completed its acquisition of ServiceMax, Inc. on January 3, 2023, for purchase consideration of $1,448.2 million, net of cash acquired. The Company has accounted for the acquisition of ServiceMax, Inc. as a business combination. Assets acquired and liabilities assumed have been recorded at their estimated fair values as of the acquisition date. The purchase price allocation resulted in $512.7 million of customer relationships and $106.9 million of purchased software being recorded. Management estimated the fair value of the customer relationships and purchased software intangible assets using discounted cash flow models which included significant estimates and assumptions related to future revenues, costs and an applicable discount rate.

The principal considerations for our determination that performing procedures relating to the valuation of the customer relationships and purchased software intangible assets in the acquisition of ServiceMax, Inc. is a critical audit matter are (i) the significant judgment by management when developing the fair value estimate of the customer relationships and purchased software acquired, (ii) a high degree of auditor judgment, subjectivity, and effort in performing procedures and evaluating management's significant assumptions related to future revenues, costs and the discount rate for the customer relationships and future revenues and the discount rate for the purchased software intangible assets; and (iii) the audit effort involved the use of professionals with specialized skill and knowledge.

Addressing the matter involved performing procedures and evaluating audit evidence in connection with forming our overall opinion on the consolidated financial statements. These procedures included testing the effectiveness of controls relating to the acquisition accounting, including controls over management's valuation of the customer relationships and purchased software acquired. These procedures also included, among others (i) reading the purchase agreement; (ii) testing management's process for developing the fair value estimate of the customer relationships and purchased software acquired; (iii) evaluating the appropriateness of the discounted cash flow models used by management to develop the fair value estimates; (iv) testing the completeness and accuracy of the underlying data used in the discounted cash flow models used by management to develop the fair value estimates; and (v) evaluating the reasonableness of the significant assumptions used by management related to future revenues, costs and the discount rate for the customer relationships and future revenues and the discount rate for the purchased software intangible assets. Evaluating management's assumptions related to future revenues, costs and the discount rate for the customer relationships intangible asset and the future revenues and the discount rate for the purchased software intangible asset involved considering (i) the consistency with external economic and industry data, (ii) the past performance of the acquired business, and (iii) whether these assumptions were consistent with evidence obtained in other areas of the audit. Professionals with specialized skill and knowledge were used to assist in evaluating the appropriateness of the discounted cash flow models and the reasonableness of the discount rate assumptions.

/s/ PricewaterhouseCoopers LLP

Boston, Massachusetts

November 15, 2022 17, 2023

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

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PTC Inc.

CONSOLIDATED BALANCE SHEETS

(in thousands, except per share data)

	September 30,		September 30,	
	2022	2021	2023	2022
ASSETS				
Current assets:				

Cash and cash equivalents	$ 272,182	$ 326,532	$ 288,103	$ 272,182
Accounts receivable, net of allowance for doubtful accounts of $362 and $304 at September 30, 2022 and September 30, 2021, respectively	636,556	541,072		
Accounts receivable, net of allowance for doubtful accounts of $429 and $362 at September 30, 2023 and September 30, 2022, respectively			811,398	636,556
Prepaid expenses	88,854	69,991	96,016	88,854
Other current assets	71,065	135,415	81,849	71,065
Total current assets	1,068,657	1,073,010	1,277,366	1,068,657
Property and equipment, net	98,101	100,237	88,391	98,101
Goodwill	2,353,654	2,191,887	3,358,511	2,353,654
Acquired intangible assets, net	382,718	378,967	941,249	382,718
Deferred tax assets	256,091	297,789	123,319	256,091
Operating right-of-use lease assets	137,780	152,337	143,028	137,780
Other assets	390,267	313,333	356,978	390,267
Total assets	$ 4,687,268	$ 4,507,560	$ 6,288,842	$ 4,687,268
LIABILITIES AND STOCKHOLDERS' EQUITY				
Current liabilities:				
Accounts payable	$ 40,153	$ 33,381	$ 43,480	$ 40,153
Accrued expenses and other current liabilities	117,158	113,067	132,841	117,158
Accrued compensation and benefits	104,022	117,784	160,431	104,022

Accrued income taxes	5,142	5,055	14,919	5,142
Current portion of long-term debt			9,375	—
Deferred acquisition payments			620,040	—
Deferred revenue	503,781	482,131	665,362	503,781
Short-term lease obligations	22,002	27,864	24,737	22,002
Total current liabilities	792,258	779,282	1,671,185	792,258
Long-term debt	1,350,628	1,439,471	1,686,410	1,350,628
Deferred tax liabilities	28,396	4,165	29,508	28,396
Deferred revenue	16,552	15,546		
Long-term deferred revenue			16,188	16,552
Long-term lease obligations	167,573	180,935	168,455	167,573
Other liabilities	35,827	49,693	39,806	35,827
Total liabilities	2,391,234	2,469,092	3,611,552	2,391,234
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; 117,472 and 117,163 shares issued and outstanding at September 30, 2022 and September 30, 2021, respectively	1,175	1,172		
Common stock, $0.01 par value; 500,000 shares authorized; 118,846 and 117,472 shares issued and outstanding at September 30, 2023 and September 30, 2022, respectively			1,188	1,175

Additional paid-in capital	1,720,580	1,718,504	1,820,905	1,720,580
Retained earnings	727,737	414,656	973,277	727,737
Accumulated other comprehensive loss	(153,458)	(95,864)	(118,080)	(153,458)
Total stockholders' equity	2,296,034	2,038,468	2,677,290	2,296,034
Total liabilities and stockholders' equity	$ 4,687,268	$ 4,507,560	$ 6,288,842	$ 4,687,268

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

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PTC Inc.

CONSOLIDATED STATEMENTS OF OPERATIONS

(in thousands, except per share data)

	Year ended September 30,			Year ended September 30,		
	2022	**2021**	**2020**	**2023**	**2022**	**2021**
Revenue:						
License	$ 782,680	$ 738,053	$ 509,792	$ 747,022	$ 782,680	$ 738,053
Support and cloud services	987,573	911,288	804,825	1,199,536	987,573	911,288
Total software revenue	1,770,253	1,649,341	1,314,617	1,946,558	1,770,253	1,649,341
Professional services	163,094	157,818	143,798	150,495	163,094	157,818
Total revenue	1,933,347	1,807,159	1,458,415	2,097,053	1,933,347	1,807,159
Cost of revenue:						
Cost of license revenue	49,240	61,750	53,195	53,200	49,240	61,750
Cost of support and cloud services revenue	184,789	164,108	145,386	245,027	184,789	164,108
Total cost of software revenue	234,029	225,858	198,581	298,227	234,029	225,858

Cost of professional services revenue	151,951	145,244	135,690	142,779	151,951	145,244
Total cost of revenue	385,980	371,102	334,271	441,006	385,980	371,102
Gross margin	1,547,367	1,436,057	1,124,144	1,656,047	1,547,367	1,436,057
Operating expenses:						
Sales and marketing	485,247	517,779	435,451	530,125	485,247	517,779
Research and development	338,822	299,917	256,575	394,370	338,822	299,917
General and administrative	204,732	206,006	159,826	233,516	204,732	206,006
Amortization of acquired intangible assets	34,970	29,396	28,713	40,022	34,970	29,396
Restructuring and other charges, net	36,234	2,211	32,716			
Restructuring and other charges (credits), net				(460)	36,234	2,211
Total operating expenses	1,100,005	1,055,309	913,281	1,197,573	1,100,005	1,055,309
Operating income	447,362	380,748	210,863	458,474	447,362	380,748
Interest and debt premium expense	(54,268)	(50,478)	(76,428)	(129,417)	(54,268)	(50,478)
Other income, net	4,004	61,485	271	3,509	4,004	61,485
Income before income taxes	397,098	391,755	134,706	332,566	397,098	391,755
Provision (benefit) for income taxes	84,017	(85,168)	4,011	87,026	84,017	(85,168)
Net income	$ 313,081	$ 476,923	$ 130,695	$ 245,540	$ 313,081	$ 476,923
Earnings per share—Basic	$ 2.67	$ 4.08	$ 1.13	$ 2.07	$ 2.67	$ 4.08
Earnings per share—Diluted	$ 2.65	$ 4.03	$ 1.12	$ 2.06	$ 2.65	$ 4.03
Weighted-average shares outstanding—Basic	117,194	116,836	115,663	118,341	117,194	116,836
Weighted-average shares outstanding—Diluted	118,233	118,367	116,267	119,334	118,233	118,367

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

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PTC Inc.

CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME

(in thousands)

	Year ended September 30,			Year ended September 30,		
	2022	2021	2020	2023	2022	2021
Net income	$ 313,081	$ 476,923	$ 130,695	$ 245,540	$ 313,081	$ 476,923
Other comprehensive income (loss), net of tax:						
Hedge gain (loss) arising during the period, net of tax of $5.8 million, $0.4 million, and $1.7 million in 2022, 2021, and 2020, respectively	17,556	1,248	(13,242)			
Hedge gain (loss) arising during the period, net of tax of $2.5 million, $(5.8) million, and $(0.4) million in 2023, 2022, and 2021, respectively				(7,516)	17,556	1,248
Foreign currency translation adjustment, net of tax of $0 for each period	(92,768)	1,613	22,076	45,692	(92,768)	1,613
Unrealized gain (loss) on marketable securities, net of tax of $0 for each period	—	(307)	188			
Amortization of net actuarial pension gain included in net income, net of tax of $0.4 million, $1.2 million, and $0.9 million in 2022, 2021, and 2020, respectively	1,010	2,930	2,983			
Pension net gain (loss) arising during the period net of tax of $6.1 million, $0.7 million, and $0.7 million in 2022, 2021, and 2020, respectively	15,027	1,891	(2,791)			
Change in unamortized pension gain (loss) related to changes in foreign currency, net of tax of $0.6 million, $0.0 million, and $0.7 million in 2022, 2021, and 2020, respectively	1,581	135	(1,878)			
Unrealized loss on marketable securities, net of tax of $0 for each period				—	—	(307)
Amortization of net actuarial pension loss included in net income, net of tax of $(0.1) million, $(0.4) million, and $(1.2) million in 2023, 2022, and 2021, respectively				161	1,010	2,930

Pension net gain (loss) and plan amendments arising during the period, net of tax of $1.3 million, $(6.1) million, and $(0.7) million in 2023, 2022, and 2021, respectively				(2,642)	15,027	1,891
Change in unamortized pension loss during the period related to changes in foreign currency, net of tax of $0.1 million, $(0.6) million, and $0.0 million in 2023, 2022, and 2021, respectively				(317)	1,581	135
Other comprehensive income (loss)	(57,594)	7,510	7,336	35,378	(57,594)	7,510
Comprehensive income	$ 255,487	$ 484,433	$ 138,031	$ 280,918	$ 255,487	$ 484,433

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

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PTC Inc.

CONSOLIDATED STATEMENTS OF CASH FLOWS

(in thousands)

	Year ended September 30,			Year ended September 30,		
	2022	**2021**	**2020**	**2023**	**2022**	**2021**
Cash flows from operating activities:						
Net income	$ 313,081	$ 476,923	$ 130,695	$ 245,540	$ 313,081	$ 476,923
Adjustments to reconcile net income to net cash provided by operating activities:						
Depreciation and amortization	87,694	85,239	80,817	104,760	87,694	85,239
Amortization of right-of-use lease assets	34,346	37,295	38,687	32,402	34,346	37,295
Stock-based compensation	174,863	177,289	115,149	206,459	174,863	177,289
Loss (gain) on investment	31,854	(68,829)	—	—	31,854	(68,829)

Gain on divestiture of business	(29,808)	—	—	—	(29,808)	—
Other non-cash items, net	(4,560)	(1,381)	(3,167)	(4,065)	(4,560)	(1,381)
Provision (benefit) from deferred income taxes	42,963	(158,105)	(24,641)	16,676	42,963	(158,105)
Changes in operating assets and liabilities, excluding the effects of acquisitions:						
Accounts receivable	(165,006)	(119,418)	(32,365)	(98,607)	(165,006)	(119,418)
Accounts payable and accrued expenses	6,957	25,096	(5,135)	15,918	6,957	25,096
Accrued compensation and benefits	(6,645)	16,775	10,282	7,845	(6,645)	16,775
Deferred revenue	57,586	58,702	17,046	56,572	57,586	58,702
Income taxes	(15,329)	13,979	(26,616)			
Accrued income taxes				4,639	(15,329)	13,979
Other current assets and prepaid expenses	(40,643)	(14,206)	36,189	6,974	(40,643)	(14,206)
Operating lease liabilities	(13,610)	(7,129)	(11,110)	(1,929)	(13,610)	(7,129)
Other noncurrent assets and liabilities	(38,417)	(153,421)	(92,023)	17,677	(38,417)	(153,421)
Net cash provided by operating activities	435,326	368,809	233,808	610,861	435,326	368,809
Cash flows from investing activities:						
Additions to property and equipment	(19,496)	(24,713)	(20,196)	(23,814)	(19,496)	(24,713)
Purchases of short- and long-term marketable securities	—	(7,562)	(33,869)	—	—	(7,562)

Proceeds from sales of short- and long-term marketable securities	—	56,170	1,521	—	—	56,170
Proceeds from maturities of short- and long-term marketable securities	—	9,861	30,521	—	—	9,861
Acquisitions of businesses, net of cash acquired	(282,943)	(718,030)	(483,478)	(828,271)	(282,943)	(718,030)
Proceeds from sales of investments	46,906	—	—			
Proceeds from sale of investments				349	46,906	—
Purchases of investments	—	(4,000)	—	(5,823)	—	(4,000)
Purchase of intangible assets	(6,451)	(550)	(11,050)	(800)	(6,451)	(550)
Settlement of net investment hedges	24,857	965	(9,421)	(7,602)	24,857	965
Divestiture of business, net	32,518	—	—			
Divestitures of businesses and assets, net				(154)	32,518	—
Other investing activities	3,408	—	—	—	3,408	—
Net cash used in investing activities	(201,201)	(687,859)	(525,972)	(866,115)	(201,201)	(687,859)
Cash flows from financing activities:						
Proceeds from issuance of Senior Notes	—	—	1,000,000			
Borrowings under credit facility	264,000	600,000	455,000	1,540,000	264,000	600,000
Repayments of Senior Notes	—	—	(500,000)			
Repayments of borrowings under credit facility	(355,000)	(168,000)	(610,125)	(1,197,000)	(355,000)	(168,000)
Repurchases of common stock	(125,000)	(30,000)	—	—	(125,000)	(30,000)

Proceeds from issuance of common stock	21,207	21,575	18,382	21,652	21,207	21,575
Debt issuance costs	—	—	(17,107)			
Debt early redemption premium	—	—	(15,000)			
Payments of withholding taxes in connection with stock-based awards	(68,991)	(52,957)	(33,740)	(82,448)	(68,991)	(52,957)
Payments of principal for financing leases	(297)	(354)	—	(536)	(297)	(354)
Net cash (used in) provided by financing activities	(264,081)	370,264	297,410			
Effect of exchange rate changes on cash, cash equivalents and restricted cash	(24,203)	(127)	25			
Credit facility origination costs				(13,355)	—	—
Net cash provided by (used in) financing activities				268,313	(264,081)	370,264
Effect of exchange rate changes on cash, cash equivalents, and restricted cash				2,851	(24,203)	(127)
Net change in cash, cash equivalents, and restricted cash	(54,159)	51,087	5,271	15,910	(54,159)	51,087
Cash, cash equivalents, and restricted cash, beginning of period	327,047	275,960	270,689	272,888	327,047	275,960
Cash, cash equivalents, and restricted cash, end of period	$ 272,888	$ 327,047	$ 275,960	$ 288,798	$ 272,888	$ 327,047
Supplemental disclosure of non-cash financing activities:						
Withholding taxes in connection with stock-based awards, accrued	$ —	$ 120	$ —			

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

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CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY

(in thousands)

	Common Stock		Additional Paid-In Capital	Retained Earnings (Accumulated Deficit)	Accumulated Other Comprehensive Loss	Total Stockholders' Equity	Common Stock		Additional Paid-In Capital	Retained Earnings (Accumulated Deficit)	Accumulated Other Comprehensive Loss	Total Stockholders' Equity
	Shares	Amount					Shares	Amount				
Balance as of September 30, 2019	114,899	$ 1,149	$ 1,502,949	$ (191,390)	$ (110,710)	$ 1,201,998						
ASU 2016-02 (ASC 842) adoption	—	—	—	(1,572)	—	(1,572)						
Common stock issued for employee stock-based awards	1,392	14	(14)	—	—	—						
Shares surrendered by employees to pay taxes related to stock-based awards	(455)	(4)	(33,736)	—	—	(33,740)						
Common stock issued for employee stock purchase plan	289	2	18,380	—	—	18,382						
Compensation expense from stock-based awards	—	—	115,149	—	—	115,149						
Net income	—	—	—	130,695	—	130,695						

Unrealized loss on net investment hedges, net of tax	—	—	—	—	(13,242)	(13,242)						
Foreign currency translation adjustment	—	—	—	—	22,076	22,076						
Unrealized gain on available-for-sale securities, net of tax	—	—	—	—	188	188						
Change in pension benefits, net of tax	—	—	—	—	(1,686)	(1,686)						
Balance as of September 30, 2020	116,125	$ 1,161	$ 1,602,728	$ (62,267)	$ (103,374)	$ 1,438,248	116,125	$ 1,161	$ 1,602,728	$ (62,267)	$ (103,374)	$ 1,438,248
Common stock issued for employee stock-based awards	1,490	15	(15)	—	—	—	1,490	15	(15)	—	—	—
Shares surrendered by employees to pay taxes related to stock-based awards	(466)	(4)	(53,073)	—	—	(53,077)	(466)	(4)	(53,073)	—	—	(53,077)
Common stock issued for employee stock purchase plan	240	2	21,573	—	—	21,575	240	2	21,573	—	—	21,575
Compensation expense from stock-based awards	—	—	177,289	—	—	177,289	—	—	177,289	—	—	177,289

Net income	—	—	—	476,923	—	476,923	—	—	—	476,923	—	476,923
Repurchases of common stock	(226)	(2)	(29,998)	—	—	(30,000)	(226)	(2)	(29,998)	—	—	(30,000)
Unrealized gain on net investment hedges, net of tax	—	—	—	—	1,248	1,248						
Gain on net investment hedges, net of tax							—	—	—	—	1,248	1,248
Foreign currency translation adjustment	—	—	—	—	1,613	1,613	—	—	—	—	1,613	1,613
Unrealized loss on available-for-sale securities, net of tax	—	—	—	—	(307)	(307)	—	—	—	—	(307)	(307)
Change in pension benefits, net of tax	—	—	—	—	4,956	4,956	—	—	—	—	4,956	4,956
Balance as of September 30, 2021	117,163	$ 1,172	$ 1,718,504	$ 414,656	$ (95,864)	$ 2,038,468	117,163	$ 1,172	$ 1,718,504	$ 414,656	$ (95,864)	$ 2,038,468
Common stock issued for employee stock-based awards	1,737	18	(18)	—	—	—	1,737	18	(18)	—	—	—

Shares surrendered by employees to pay taxes related to stock-based awards	(597)	(6)	(68,985)	—	—	(68,991)	(597)	(6)	(68,985)	—	—	(68,991)
Common stock issued for employee stock purchase plan	215	2	21,205	—	—	21,207	215	2	21,205	—	—	21,207
Compensation expense from stock-based awards	—	—	174,863	—	—	174,863	—	—	174,863	—	—	174,863
Net income	—	—	—	313,081	—	313,081	—	—	—	313,081	—	313,081
Repurchases of common stock	(1,046)	(11)	(124,989)	—	—	(125,000)	(1,046)	(11)	(124,989)	—	—	(125,000)
Unrealized gain on net investment hedges, net of tax	—	—	—	—	17,556	17,556						
Gain on net investment hedges, net of tax							—	—	—	—	17,556	17,556
Foreign currency translation adjustment	—	—	—	—	(92,768)	(92,768)	—	—	—	—	(92,768)	(92,768)
Change in pension benefits, net of tax	—	—	—	—	17,618	17,618	—	—	—	—	17,618	17,618

Balance as of September 30, 2022	117,472	$ 1,175	$ 1,720,580	$ 727,737	$ (153,458)	$ 2,296,034	117,472	$ 1,175	$ 1,720,580	$ 727,737	$ (153,458)	$ 2,296,034
Common stock issued for employee stock-based awards							1,798	18	(18)	—	—	—
Shares surrendered by employees to pay taxes related to stock-based awards							(620)	(7)	(82,761)	—	—	(82,768)
Common stock issued for employee stock purchase plan							196	2	21,650	—	—	21,652
Compensation expense from stock-based awards							—	—	161,454	—	—	161,454
Net income							—	—	—	245,540	—	245,540
Loss on net investment hedges, net of tax							—	—	—	—	(7,516)	(7,516)
Foreign currency translation adjustment							—	—	—	—	45,692	45,692
Change in pension benefits, net of tax							—	—	—	—	(2,798)	(2,798)

Balance as of September 30, 2023	118,846	$ 1,188	$ 1,820,905	$ 973,277	$ (118,080)	$ 2,677,290

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

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PTC Inc 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 company that provides a portfolio of innovative digital solutions that work together to transform how physical products are engineered, manufactured, and serviced.

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 United States. 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 United States. States that require management to make estimates and assumptions that affect the amounts reported and the related disclosures. Actual results could differ from these estimates.

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 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 Other income, 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 Other income, net in the Consolidated Statements of Operations.

Revenue Recognition

Nature of Products and Services

Our sources of revenue include: (1) subscriptions, (2) perpetual licenses, (3) support for perpetual licenses and (4) professional services. Subscriptions include term-based on-premises licenses and related support, Software-as-a-Service (SaaS), and hosting services. Revenue is derived from the licensing of computer software products, cloud-based offerings, and from related support and/or and professional services contracts. In accordance with ASC 606, *Revenue from Contracts with Customers*, 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) allocate the transaction price to performance obligations in the contract, and

(5) recognize revenue when or as we satisfy a performance obligation.

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We enter into contracts that include combinations of licenses, support, cloud-based offerings, and professional services, each of 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-premises 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 (including SaaS)	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

Judgments and Estimates

Our contracts with customers for subscriptions typically include commitments to transfer term-based, on-premises software licenses bundled with support and/or cloud services. Significant judgment is used in determining the performance obligations related to these bundled products and services. On-premises 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 and on-premises licenses, we assess whether the cloud component is highly interrelated with the on-premises term-based software licenses. Other than a limited population of subscriptions, the cloud component is not currently deemed to be interrelated with the on-premises 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. Where subscriptions include on-premises software and support only, we determined that approximately 55% of the estimated standalone selling price for subscriptions is attributable to software licenses and approximately 45% is attributable to support for those licenses. Some of our subscription offerings include a combination of on-premises and cloud-based technology. In such cases, the cloud-based technology is generally considered distinct and receives an allocation of approximately 5% to 50% of the estimated standalone selling price of the subscription. The amounts allocated to cloud are based on assessment of the relative value of the cloud functionality in the subscription, with the remaining amounts allocated between software and support.

Our multi-year, non-cancellable on-premises 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, for on-premises licenses, 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 in 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, 2022 2023 and 2021, 2022, the total liability was $34.2 23.7 million and $40.3 34.2 million, respectively, primarily associated with the annual right to exchange on-premises subscription software.

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Practical Expedients

We have elected certain practical expedients associated with our revenue recognition policy. 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 to 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

As of September 30, 2022 September 30, 2023, our investment portfolio consisted of certificates of deposit, commercial paper, corporate notes/bonds and government securities that had a maximum maturity of three years. we did not hold any marketable securities. In December 2020, we sold all our marketable securities to partially fund the Arena acquisition, resulting in proceeds of $56.2 million. Neither gross realized gains nor gross realized losses related to the sale were material.

Equity Securities

On July 22, 2021, In July 2021, a company in which we were a preferred equity investor, Matterport, Inc., completed a business combination with a public company. The carrying value of our investment, which was classified as a non-marketable equity investment, was approximately $8.7 million prior to the business combination. Our preferred shares were converted into common shares of Matterport. As of September 30, 2022, PTC held no shares in Matterport, as we sold all previously held shares during the three months ended March 31, 2022. The shares sold included those held as of September 30, 2021, as well as additional shares which PTC earned during the second quarter of FY'22 based on contingent earn-outs achieved in January 2022. Shares related to the original investment were restricted from sale until January 2022 (six months after Matterport became a public company). At expiration of this lock-out, we sold all shares held from the original investment for $39.1 million at an average price of $9.1 per share. In February 2022, we sold all remaining shares for $3.6 million at an average share price of $7.6 per share. Due to the decline in the price per share during the first six months of fiscal 2022, we recognized a net loss of $34.8 million in Other income, net on the Consolidated Statements of Operations. No additional gains or losses have been recognized for 2022 and the aggregate realized gain from the original investment of $8.7 million was $34.0 million.

The fair value of the Matterport shares as of September 30, 2021 was $77.5 million and was determined using the closing price of Matterport's common stock as of September 30, 2021, less a temporary discount for lack of marketability. 2022. For the year ended September 30, 2021, we recorded an unrealized gain of $68.8 million on the appreciation of the value of the shares in Other income, net on in the Consolidated Statement of Operations. In 2022, we sold all shares held for a total of $

We also have non-marketable equity investments 42.7 million. The shares sold included those held as of September 30, 2021, as well as additional shares that we account for at cost, less any impairment, plus or minus adjustments resulting from observable price changes in orderly transactions for identical or similar investments off earned based on contingent earn-outs. In the same issuer. We monitor non-marketable equity investments for events that could indicate that the investments are impaired, such as deterioration in the issuer's financial condition and business forecasts and lower valuation in recent or proposed financings. Changes in fair value year ended September 30, 2022, we recognized a net loss of non-marketable equity investments are recorded $34.8 million in Other income, net on in the Consolidated Statements of Operations. In The aggregate realized gain from the years ended September 30, 2022 and 2021, we did not record any impairment charges for our investments. The carrying value original investment of our non-marketable equity investments is recorded in Other assets on the Consolidated Balance Sheets and totaled $1.0 8.7 million and was $2.2 34.0 million as million. As of September 30, 2022 and 2021, respectively. subsequent to September 30, 2022, PTC held no shares in Matterport.

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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, 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 many geographically diverse customers dispersed across many industries. No individual customer comprised more than 10% of our trade accounts receivable as of September 30, 2022 September 30, 2023 or 2021 2022 or more than 10% of our revenue for the years ended September 30, 2022 September 30, 2023, 2021 2022 or 2020. 2021.

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Fair Value Measurements

Fair value is defined as the price that would be received from selling the sale of an asset or paid to transfer a liability in the principal or most advantageous market for the asset or liability in an orderly transaction between market participants at on 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

The valuation hierarchy for disclosure of assets and liabilities reported at fair value hierarchy that requires an entity to maximize prioritizes 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: for such valuations into three broad levels:

- Level 1: quoted prices (unadjusted) in active markets for identical assets or liabilities;
- Level 2: quoted prices for similar assets and liabilities in active markets or inputs other than Level 1 that are observable for the asset or liability, 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 through market data corroboration, for substantially the full term of the assets or liabilities; financial instrument; 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. The hierarchy requires us to maximize the use of observable inputs and minimize the use of unobservable inputs when measuring fair value.

Allowance for Doubtful Accounts

We maintain allowances for doubtful accounts for estimated losses resulting from the inability of our customers to make required payments. Effective October 1, 2020, we adopted ASC 326, Financial Instruments—Credit Losses, which replaced the incurred loss impairment model with an expected loss model that requires the use of forward-looking information to calculate credit loss estimates. In determining the adequacy of the allowance for doubtful accounts, management specifically analyzes we analyze specific 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 $0.4 million, $0.3 million and $0.5 million as of September 30, 2022, 2021 and 2020, respectively. Uncollectible trade accounts receivable written-off, net of recoveries, were $0.4 million, $0.1 million and $0.2 million in 2022, 2021 and 2020, respectively. Net bad debt expense was $0.5 million in 2022, net bad debt recovery was $0.2 million in 2021 and net bad debt expense was $0.0 million in 2020, and is included in General and administrative expenses in the accompanying Consolidated Statements of Operations.

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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 Eurozone countries, Japan, Sweden, Switzerland, China and India. Our foreign currency risk management strategy is principally designed to mitigate the future potential financial impact of changes in the U.S. dollar Dollar value of anticipated transactions and balances denominated in foreign currencies resulting from changes in foreign currency exchange rates. We enter into derivative derivatives transactions, specifically foreign currency forward contracts and options, to manage the exposures our exposure to foreign currency exchange risk in order 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 net investment hedge activity see *Note 17. 16. 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 four months. The majority of our Generally, we do not designate these foreign currency forward contracts are not designated 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 or and losses on forward contracts and foreign denominated receivables and payables are included in Other income, net.

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We hedge our forecasted U.S. Dollar cash flows with foreign exchange options to reduce the underlying foreign-denominated balance risk that they will be adversely affected by changes in Euro or Japanese Yen exchange rates. We did not hold any foreign currency option contracts as of September 30, 2023. We do not designate these foreign currency options as hedges for accounting purposes and changes in the fair value of these instruments are recognized immediately in earnings. Because we enter into options as an economic hedge, currency impacts on the Euro or Japanese Yen-denominated operations as compared to the forecasted plan rate may be partially offset by the loss or gain gains on the forward contract options. Gains and losses on foreign exchange options are included in Other income, net.

Net Investment Hedges

We translate balance sheet accounts of subsidiaries with foreign functional currencies into the U.S. Dollars Dollar 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. Sheets. We designate certain foreign exchange forward contracts as net investment hedges against exposure on translation of balance sheet accounts of Euro and Japanese Yen 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. Sheets. All foreign exchange forward contracts are carried at fair value on the Consolidated Balance Sheet Sheets and the maximum duration of net investment hedge 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 and Japanese Yen functional subsidiaries. As the forward contracts are highly effective in offsetting exchange rate exposure, we record changes in these Unrealized gain (loss) on net investment hedges in Accumulated other comprehensive loss and subsequently upon contract maturity reclassify them to Foreign currency translation adjustment in Accumulated other comprehensive loss at the time of forward contract maturity. loss. 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 counterparties by trading among several counterparties, and we review our counterparties' credit at least quarterly.

Leases

We adopted ASC 842, *Leases* effective October 1, 2019. ASC 842 requires a modified retrospective transition method that could either be applied at the earliest comparative period in the financial statements or in the period of adoption. We elected to use the period of adoption (October 1, 2019) transition method and therefore did not recast prior periods.

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We determine if an arrangement is a lease at inception. Operating leases are included in Operating right-of-use lease right-of-use assets, Short-term lease obligations, and Operating Long-term lease obligations on our Consolidated Balance Sheets. Our operating leases are primarily for office space, cars, automobiles, servers, and office equipment. We made an election not to separate lease components from non-lease components for office space, servers and office equipment. We combine fixed payments for non-lease components with lease payments and account for them together as a single lease component which increases the amount of our lease assets and liabilities. Finance leases are included in Property and equipment, Accrued expenses and Other other current liabilities, and Other liabilities on our Consolidated Balance Sheets.

Right-of-use assets represent our right to use an underlying asset for the lease term and lease liabilities represent our obligation to make lease payments arising from the leases. Right-of-use assets and liabilities are recognized at the lease commencement date based on the present value of lease payments over the lease term. As most of our leases do not provide an implicit rate, we generally use our incremental borrowing rate based on the estimated rate of interest for collateralized borrowing over a similar term as that of the lease payments at the commencement date. The right-of-use assets include any lease payments made and exclude lease incentives received. Operating lease expense is recognized on a straight-line basis over the lease term.

Our lease terms include periods under options to extend or terminate the lease when it is reasonably certain that we will exercise that option. We generally use the base non-cancellable lease term when determining the lease assets and liabilities.

Certain lease agreements contain variable payments, which are expensed as incurred and not included in the lease assets and liabilities. These variable payments include insurance, taxes, consumer price index payments, and payments for maintenance and utilities.

Our operating leases expire at various dates through 2037.

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 twelve 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 term 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. Our research and development expenses consist principally of salaries and benefits, costs of computer software and equipment, and facility expenses. 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 internal development costs for software to be sold externally were capitalized in 2023, 2022 2021 or 2020. 2021. We purchased software of $1.0 million, $6.0 million, and $0.6 million in 2023, 2022, and 2021, respectively. Additionally, we acquired capitalized software through business combinations (for further detail, see *Note 6. Acquisitions and Disposition of Business Businesses*). These assets are included in Intangible Acquired intangible assets, net in the accompanying Consolidated Balance Sheets.

Business Combinations

We allocate the purchase price of acquisitions to the tangible and intangible assets acquired and liabilities assumed based on their estimated fair value. Goodwill is measured as the excess of the purchase price over the value of net identifiable assets acquired. While best estimates and assumptions are used to accurately value assets acquired and liabilities assumed at the acquisition date as well as contingent consideration, where applicable, our estimates are inherently uncertain and subject to refinement. Any adjustments to estimated fair value are recorded to goodwill, provided that we are within the measurement period (up to one year from the acquisition date) and that we continue to collect information to determine estimated fair value. Subsequent to the measurement period or our final determination of estimated fair value, whichever comes first, adjustments are recorded in the Consolidated Statements of Operations.

Segments

In the third quarter of 2023, we reevaluated our operating segments to better align with how our chief operating decision maker ("CODM"), who is our Chief Executive Officer, evaluates performance and allocates resources, which resulted in a change from two operating segments—Software Products and Professional Services—to a single operating segment. The key factors evaluated included our organization structure, financial results reviewed by the CODM, and compensation structure, among others. This change reflects our strategy to focus our professional services business on high-value services and to

leverage partners to provide services, while delivering products that require fewer consulting and training services. Based on this change, we determined we have a single reportable segment.

Goodwill, Acquired Intangible Assets and Long-lived Assets

Goodwill is the amount by which the purchase price in a business acquisition exceeds the fair value 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 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 quantitative or qualitative assessment. A quantitative assessment 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 estimated 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 and operating plans; and industry data. A qualitative assessment 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. Qualitative 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.

In the third quarter of 2023, we reevaluated our operating segments to better align with how our CODM evaluates performance and allocates resources, which resulted in a change from two operating segments—Software Products and Professional Services—to a single operating segment. As part of this reevaluation, we determined that our reporting unit is the same as our operating segment.

We completed our annual goodwill impairment review as of June 30, 2022, which consisted of Before combining the reporting units, we performed a step zero qualitative assessment of our the Software Products reporting unit and a step one quantitative assessment of the Professional Services reporting unit. As of June 30, 2023 (prior to the reporting unit change), goodwill attributable to the Software Products segment was $3,367.5 million and a quantitative assessment of our to the Professional Services segment in conjunction with the sale of a portion of that business to ITC Infotech. Our qualitative assessment for Software Products included company-specific (e.g., financial performance and long-range plans), industry, and macroeconomic factors, as well as consideration of the fair value of each reporting unit relative to its carrying value at the last valuation date (June 27, 2020). was $9.8 million. Based on our qualitative assessment, we believe concluded it is was more likely than not that the fair value of our Software Products reporting unit exceeds exceeded its carrying value and no further impairment testing is was required. Our quantitative assessment for the Professional Services segment compared the fair value of the reporting unit to its carrying value. We estimated the fair value of the reporting unit using a discounted cash flow valuation model. This model requires estimates of future revenues, profits, capital expenditures, working capital, and a terminal value based on a residual cash flow valuation model. We estimated this amount by evaluating historical trends, current budgets and operating plans, including consideration of the completed transaction with ITC Infotech. Based on a comparison of the estimated fair value to the carrying value of the Professional Services reporting unit as of June 30, 2022 June 30, 2023, no impairment was required.

After combining the reporting units, we performed a step zero qualitative assessment on the combined goodwill balance and determined that it is more likely than not that the fair value of the combined reporting unit exceeds its carrying value and no further impairment testing is required. Through September 30, 2022 September 30, 2023, there were no events or changes in circumstances that indicated that the carrying values of goodwill or acquired intangible assets may not be recoverable.

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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 16 years, customer lists are amortized over periods up to 13 20 years and trademarks are amortized over periods up to 12 15 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 $11.7 million, $8.6 million and $7.1 million in 2023, 2022 and $3.8 million in 2022, 2021, and 2020, respectively and are included in sales 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 Provision (benefit) for income taxes in the Consolidated Statements of Operations.

Comprehensive Income

Comprehensive income consists of Net income 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. 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 equity and comprised the following as of September 30, 2023: cumulative translation adjustment losses of $114.5 million, unrecognized actuarial losses related to pension benefits of $9.6 million ($6.7 million net of tax), and accumulated net gains from net investment hedges of $6.9 million ($3.1 million net of tax). As of September 30, 2022, was Accumulated other comprehensive loss comprised of the following: cumulative translation adjustment losses of $160.2 million, unrecognized actuarial losses related to pension benefits of $5.4 million ($3.9 million net of tax), and accumulated net gains from net investment hedges of $16.9 million ($10.6 million net of tax). As of September 30, 2021, Accumulated other comprehensive loss was comprised of the following: cumulative translation adjustment losses of $67.5 million, unrecognized actuarial losses related to pension benefits of $30.2 million ($21.5 million net of tax), and accumulated net losses from net investment hedges of $6.5 million ($6.5 million net of tax).

Earnings per Share (EPS)

Basic EPS is calculated by dividing net income by the weighted average number of shares outstanding during the period. 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. Anti-dilutive shares excluded from the calculations of diluted EPS were immaterial in the years ended September 30, 2022 September 30, 2023, 2022, and 2021.

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

(in thousands, except per share data)	Year ended September 30,			Year ended September 30,		
	2022	**2021**	**2020**	**2023**	**2022**	**2021**
Net income	$ 313,081	$ 476,923	$ 130,695	$ 245,540	$ 313,081	$ 476,923
Weighted average shares outstanding	117,194	116,836	115,663	118,341	117,194	116,836
Dilutive effect of employee stock options, restricted shares and restricted stock units	1,039	1,531	604	993	1,039	1,531
Diluted weighted average shares outstanding	118,233	118,367	116,267	119,334	118,233	118,367
Earnings per share—Basic	$ 2.67	$ 4.08	$ 1.13	$ 2.07	$ 2.67	$ 4.08
Earnings per share—Diluted	$ 2.65	$ 4.03	$ 1.12	$ 2.06	$ 2.65	$ 4.03

Stock-Based Compensation

We measure the compensation cost of employee services received in exchange for an award of equity 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 Plans* for a description of the types of equity awards granted, the compensation expense related to such awards and detail of such 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

Intangibles—Goodwill and Other—Internal-Use Software

In August 2018, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update (ASU) 2018-15, Intangibles—Goodwill and Other—Internal-Use Software (Subtopic 350-40): Customer's Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement That is a Service Contract, which aligns the requirements for capitalizing implementation costs in cloud computing arrangements with the requirements for capitalizing implementation costs incurred to develop or obtain internal-use software. We adopted the new standard prospectively effective October 1, 2020. As a result, we are required to capitalize certain costs related to the implementation of cloud computing arrangements. Capitalized costs related to cloud computing arrangements, which are included in Other assets on the Consolidated Balance Sheets, were $14.3 million and $2.8 million as of September 30, 2022 and September 30, 2021, respectively,

Financial Instruments—Credit Losses

In June 2016, the FASB issued ASU 2016-13, Financial Instruments—Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments (ASC 326), which, along with subsequent amendments, replaces the incurred loss impairment methodology in current U.S. GAAP with a methodology that reflects expected credit losses and requires consideration of a broader range of reasonable and supportable information when recording credit loss estimates. We adopted the new standard effective October 1, 2020, with no impact on our consolidated financial statements.

Income Taxes

In December 2019, the FASB issued ASU 2019-12, Income Taxes (Topic 740) on Simplifying the Accounting for Income Taxes. The decisions reflected in ASU 2019-12 update specific areas of ASC 740, Income Taxes, to reduce complexity while maintaining or improving the usefulness of the information provided to users of financial statements. The new standard became effective for us in the first quarter of 2022 ending December 31, 2021 and did not have a material impact on our consolidated financial statements.

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Business Combinations

In October 2021, the FASB issued ASU 2021-08, Business Combinations (Topic 805) on Accounting for Contract Assets and Contract Liabilities from Contracts with Customers. This ASU is intended to improve the accounting for acquired revenue contracts with customers in a business combination by addressing diversity in practice and inconsistency related to 1) recognition of an acquired contract asset and liability, and 2) payment terms and their effect on subsequent revenue recognized by the acquirer. We adopted ASU 2021-08 early as of the third quarter of 2022 and applied it to our acquisition of Intland Software, which was completed in the quarter. The adoption of ASU 2021-08 did not have a material impact on our consolidated financial statements. Refer to *Note 6. Acquisitions and Disposition of Business* for additional discussion regarding the accounting for the acquisition of Intland Software.

Pending Accounting Pronouncements

Reference Rate Reform

In March 2020, the FASB issued ASU 2020-04, Reference Rate Reform (Topic 848): Facilitation of the Effects of Reference Rate Reform on Financial Reporting. The ASU provides optional guidance for contract modifications and certain hedging relationships associated with the transition from reference rates that are expected to be discontinued. ASU 2020-04 is effective for all entities upon issuance through December 31, 2022. We are still evaluating the impact, but do not expect the standard to have a material impact on our consolidated financial statements.

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3. Revenue from Contracts with Customers

Receivables, Contract Assets, and Contract Liabilities

(in thousands)	September 30,		September 30,	
	2022	2021	2023	2022
Short-term and long-term receivables			$ 997,490	$ 870,962
Contract asset	$ 21,096	$ 12,934	$ 16,465	$ 21,096
Deferred revenue	$ 520,333	$ 497,677	$ 681,550	$ 520,333

As of September 30, 2022 September 30, 2023, $16.9 16.1 million of our contract assets are expected to be transferred to receivables within the next 12 months and therefore are included in Other current assets. The remainder is included in Other assets and expected to be transferred within the next 24 months. As of September 30, 2021 September 30, 2022, $8.2 16.9 million of our contract asset balance was included in Other current assets with the remainder included in Other assets.

Approximately $7.0 14.7 million of the September 30, 2021 September 30, 2022 contract asset balance was transferred to receivables during the year ended September 30, 2022 September 30, 2023 as a result of the right to payment becoming unconditional. The majority of the Additions to contract asset balance relates to two large professional services contracts with invoicing terms based on performance milestones. The net increase in contract assets of $8.2million includes an increase of approximately $15.2 10.0 million primarily related to revenue recognized in the period, net of billings. There were no impairments of contract assets in the year ended September 30, 2023.

During the year ended September 30, 2022 September 30, 2023, we recognized $491.6 509.1 million of revenue that was included in Deferred deferred revenue as of September 30, 2021 and there September 30, 2022. There were additional deferrals of $507.3 572.5 million, primarily related to new billings. In addition, deferred revenue increased by $6.9 million as a result of the acquisition of Intland Software. ServiceMax added $97.8 million of deferred revenue. For subscription contracts, we generally invoice customers annually. The balance

Table of total short- and long-term receivables as of September 30, 2022 was $ Contents871.0 million, compared to $744.6 million as of September 30, 2021.

Costs to Obtain or Fulfill a Contract

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 (primarily commissions) are amortized proportionately related to revenue over 5 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, 2022 September 30, 2023 and September 30, 2021 September 30, 2022, deferred costs of $40.7 41.8 million and $40.2 40.7 million, respectively, were included in Other current assets and $77.0 78.7 million and $81.1 77.0 million, respectively, were included in Other assets. Amortization expense related to costs to obtain a contract with a customer was $50.9 53.4 million and $46.7 50.9 million in the years ended September 30, 2022 September 30, 2023 and 2021, 2022, respectively. There were no substantial impairments of the contract cost asset in the years ended September 30, 2022 September 30, 2023 and 2021. 2022.

Remaining Performance Obligations

Our contracts with customers include transaction price amounts allocated to performance obligations that will be satisfied and recognized as revenue at a later date. As of September 30, 2022 September 30, 2023, the transaction price amounts include additional performance obligations of $520.3 681.6 million recorded in deferred revenue and $1,092.7 1,369.4 million that are not yet recorded in the Consolidated Balance Sheets. We expect to recognize approximately 57 59% of the total $1,613.0 2,051.0 million over the next 12 months, with the remaining amount thereafter.

Disaggregation of Revenue

(in thousands)	**Year ended September 30,**			**Year ended September 30,**		
	2022	**2021**	**2020**	**2023**	**2022**	**2021**
Total recurring revenue	$ 1,736,188	$ 1,616,328	$ 1,281,949			
Recurring revenue(1)				$ 1,907,918	$ 1,736,188	$ 1,616,328
Perpetual license	34,065	33,013	32,668	38,640	34,065	33,013
Professional services	163,094	157,818	143,798	150,495	163,094	157,818
Total revenue	$ 1,933,347	$ 1,807,159	$ 1,458,415	$ 2,097,053	$ 1,933,347	$ 1,807,159

(1) Recurring revenue is comprised of on-premises subscription, perpetual support, SaaS, and cloud services revenue.

We report revenue by the following two product groups:

(in thousands)	**Year ended September 30,**

	2023	2022	2021
Product lifecycle management (PLM)	1,330,316	1,137,016	1,012,120
Computer-aided design (CAD)	766,737	796,331	795,039
Total revenue	$ 2,097,053	$ 1,933,347	$ 1,807,159

F-19 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 region. 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)	Year ended September 30,		
	2023	2022	2021
Americas(1)	$ 1,023,273	$ 895,095	$ 766,021
Europe(2)	753,796	714,216	722,977
Asia Pacific	319,984	324,036	318,161
Total revenue	$ 2,097,053	$ 1,933,347	$ 1,807,159

(1) Includes revenue in the United States totaling $993.8 million, $864.7 million, and $741.3 million for 2023, 2022 and 2021, respectively.

(2) Includes revenue in Germany totaling $292.0 million, $318.5million, and $290.7 million for 2023, 2022 and 2021, respectively.

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

4. Restructuring and Other Charges (Credits), Net

Restructuring and other charges (credits), net includes restructuring charges (credits), headquarters relocation charges, and impairment and accretion expense charges related to the lease assets of exited facilities. Refer to

Note 19. Leases for additional information about exited facilities.In 2023, Restructuring and other charges (credits), net and related payments were immaterial.

In 2022, Restructuring and other charges (credits), net totaled $36.2 million, of which $32.4 million is attributable to restructuring charges primarily related to employee termination benefits, $5.1 million is attributable to other charges for professional fees included in restructuring related to our SaaS transformation, offset by a $1.3 million credit attributable to sublease income and the reversal of lease liabilities related to exited lease facilities. These charges substantially relate to a plan to restructure our workforce and consolidate select facilities to align our customer facing and product-related functions with SaaS industry best practices and accelerate the opportunity for our on-premises customers to move to the cloud. We made cash payments related to restructuring charges of $40.8 million ($34.0 million related to employee charges, $2.5 million in payments for other professional fees, included in restructuring related to our SaaS transformation, and $4.3 million in net payments for variable costs related to restructured facilities).

In 2021, Restructuring and other charges (credits), net totaled $2.2 million, of which $2.1 million was attributable to restructuring charges and $0.1 million was attributable to impairment and accretion expense related to exited lease facilities. We made cash payments related to restructuring charges of $6.7 million ($3.9 million related to the 2020 restructuring and $2.8 million in rent payments for the restructured facilities).

In 2020, Restructuring and other charges, net totaled $32.7 million, of which $26.4 million was attributable to restructuring charges, $5.6 million was attributable to impairment and accretion expense related to exited lease facilities, and $0.7 million was attributable to accelerated depreciation related to the planned exit of a facility. We made cash payments related to restructuring charges of $31.5 million ($27.3 million related to the 2020 restructuring, $3.9 million related to the 2019 restructuring, and $0.3 million related to a prior restructuring).

Restructuring Charges

In the first quarter of 2022, we committed to a plan to restructure our workforce and consolidate select facilities to align our customer facing and product-related functions with the SaaS industry best practices and accelerate the opportunity for our on-premises customers to move to the cloud. The restructuring plan resulted in charges of $33.1 million in 2022, primarily associated with the termination of benefits for approximately 330 employees.

In the first quarter of 2020, we initiated a restructuring program as part of a realignment associated with expected synergies and operational efficiencies related to the Onshape acquisition. The restructuring plan resulted in charges of $30.8 million through fiscal year 2020 for termination benefits associated with approximately 250 employees. In the year ended September 30, 2022 and 2021, we recorded a credit of $0.1 million and a charge of $0.2 million, respectively, related to this restructuring plan.

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The following table summarizes restructuring accrual activity for the three years ended September 30, 2022 September 30, 2023:

(in thousands)	Employee severance and related benefits	Facility closures and other costs	Consolidated total	Employee severance and related benefits	Facility closures and other costs	Consolidated total
Balance, September 30, 2019	$ 298	$ 30,788	$ 31,086			

ASC 842 adoption	—	(16,462)	(16,462)			
Charges (credits) to operations, net	30,690	(4,263)	26,427			
Cash disbursements	(27,256)	(4,246)	(31,502)			
Other non-cash	—	164	164			
Foreign exchange impact	260	14	274			
Balance, September 30, 2020	3,992	5,995	9,987	$ 3,992	$ 5,995	$ 9,987
Charges to operations, net	1,887	249	2,136	1,887	249	2,136
Cash disbursements	(3,925)	(2,756)	(6,681)	(3,925)	(2,756)	(6,681)
Foreign exchange impact	27	17	44	27	17	44
Balance, September 30, 2021	1,981	3,505	5,486	1,981	3,505	5,486
Charges (credits) to operations, net	32,971	(561)	32,410	32,971	(561)	32,410
Cash disbursements	(34,023)	(2,355)	(36,378)	(34,023)	(2,355)	(36,378)

Foreign exchange impact	(583)	—	(583)	(583)	—	(583)
Balance, September 30, 2022	$ 346	$ 589	$ 935	346	589	935
Credits to operations, net				(143)	(281)	(424)
Cash disbursements				(121)	(304)	(425)
Foreign exchange impact				21	—	21
Balance, September 30, 2023				$ 103	$ 4	$ 107

As of September 30, 2022 September 30, 2023 and 2021, 2022, the accrual for employee severance and related benefits was included in Accrued compensation and benefits in the Consolidated Balance Sheets.

As of September 30, 2022, September 30, 2023 and 2022, the accrual for facility closures and related costs was included in Accrued expenses and other current liabilities in the Consolidated Balance Sheets and as of September 30, 2021, $2.6 million was included in Accrued expenses and other current liabilities and $0.9 million was included in Other liabilities in the Consolidated Balance Sheets.

5. Property and Equipment

Property and equipment consisted of the following:

(in thousands)	September 30,		September 30,	
	2022	2021	2023	2022
Computer hardware and software	$ 364,762	$ 352,704	$ 304,045	$ 364,762
Furniture and fixtures	29,744	30,568	20,042	29,744
Leasehold improvements	95,383	94,959	77,703	95,383
Gross property and equipment	489,889	478,231	401,790	489,889
Accumulated depreciation and amortization	(391,788)	(377,994)	(313,399)	(391,788)
Net property and equipment	$ 98,101	$ 100,237	$ 88,391	$ 98,101

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Depreciation expense was $29.0 million, $27.1 million and $26.1 million in 2023, 2022 and 2021, respectively.

Property and equipment additions which were accrued and unpaid as of September 30, 2023, 2022, and 2021 were $1.8 million, $6.8 million, and $24.7 0.6 million, respectively.

Our material long-lived assets primarily reside in the United States in 2023, 2022 2021 and 2020, respectively. 2021.

6. Acquisitions and Disposition of Business Businesses

Acquisition and transaction-related costs were $18.7 million, $13.2 million and $15.0 million in 2023, 2022 and $8.6 million in 2022, 2021, and 2020, respectively. Acquisition and transaction-related costs include direct costs of potential and completed acquisitions (e.g., investment banker fees and professional fees, including legal and valuation services) and expenses related to acquisition integration activities (e.g., professional fees and severance). In addition, subsequent adjustments to our initial estimated amount of contingent consideration associated with specific acquisitions are included within acquisition and transaction-related charges. Other transactional charges include third-party costs related to structuring unusual transactions, such as the divestiture of a portion of our business. These costs are classified in General and administrative expenses in the accompanying Consolidated Statements of Operations.

Our results of operations include or exclude, as applicable, the results of acquired or sold businesses beginning on their respective acquisition or sale date.

The acquisitions described below have been accounted for as business combinations. Assets acquired and liabilities assumed have been recorded at their estimated fair values as of the respective acquisition date. For all acquisitions made The fair values of intangible assets were based on valuations using discounted cash flow models which require the use of significant estimates and assumptions, including estimating future revenues, future costs, and an applicable discount rate. The excess of the purchase price over the tangible assets, identifiable intangible assets and assumed liabilities was recorded as goodwill.

ServiceMax

On January 3, 2023, we acquired ServiceMax, Inc. pursuant to a Share Purchase Agreement dated November 17, 2022 by and among PTC, ServiceMax, Inc., and ServiceMax JV, LP. ServiceMax develops and licenses cloud-native, product-centric field service management (FSM) software, which is included within our PLM product group. The purchase price of $1,448.2 million, net of cash acquired, was payable in 2022, two installments. Upon closing of the transaction, PTC paid the first installment of $828.2 million, as adjusted for working capital, indebtedness, cash, and transaction expenses as set forth in the Share Purchase Agreement. The remaining installment of $650.0 million, of which $620.0 million represents the fair value as of the acquisition date and $30.0 million is imputed interest, was paid in October 2023. The fair value of the deferred acquisition payment was calculated based on our borrowing rate at the time of the acquisition.

PTC borrowed $630 million under the revolving line of our new credit facility and $500 million under the term loan of the new credit facility to repay amounts under the prior credit facility and to pay the closing purchase price and transaction expenses related to the acquisition. ServiceMax had approximately 500 employees on the close date. In the year ended September 30, 2023, ServiceMax revenue was $137.6 million and ServiceMax earnings were immaterial.

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The following table sets forth the purchase price allocation for ServiceMax. The purchase price allocation includes the finalization of measurement period adjustments related to intangibles and deferred tax liabilities that resulted in a $3.5 million increase in customer relationships, a $3.2 million increase in net tax liability, and a $0.3 million decrease in goodwill compared to the balances reported as of March 31, 2023. We have also recorded a liability of $620.0 million related to the fair value of the $650.0 million deferred purchase price payment.

(in thousands)		
Goodwill	$	974,850
Customer relationships		512,700
Purchased software		106,900
Accounts receivable		58,722
Trademarks		9,000
Other net assets		5,540
Net tax liability		(121,656)
Deferred revenue		(97,829)
Total	$	1,448,227

The acquired customer relationships, purchased software, and trademarks are being amortized over useful lives of 20 years, 10 years, and 10 years, respectively, based on the expected economic benefit pattern of the assets. The acquired goodwill will not be deductible for income tax purposes. The amount of goodwill resulting from the purchase price allocation reflects expected future growth as ServiceMax expands our closed-loop product lifecycle management (PLM) strategy.

Unaudited Pro Forma Financial Information

The unaudited pro forma financial information in the table below summarizes the combined results of operations for PTC and ServiceMax. The unaudited pro forma financial information for all periods presented includes adjustments to reflect certain business combination effects, including: amortization of acquired intangible assets and the elimination of related ServiceMax expenses; acquisition-related costs incurred by both parties; reversal of certain costs incurred by ServiceMax which would not have been incurred had the acquisition occurred at the beginning of fiscal 2022; interest expense under the new combined capital structure; stock-based compensation charges; and the related tax effects as though ServiceMax was acquired as of the beginning of fiscal 2022. The unaudited pro forma financial information as presented below is for informational purposes only and is not necessarily indicative of the results of operations that would have been achieved if the acquisition had taken place at the beginning of fiscal 2022.

The unaudited pro forma financial information for the years ended September 30, 2023 and 2022 presented below combines the historical results of PTC for those periods, the historical results of ServiceMax for the year ended October 31, 2022 and the three months ended January 31, 2023, and the effects of the pro forma adjustments listed above.

(in thousands)	**Pro forma year ended September 30,**	
	2023	**2022**
Revenue	$ 2,140,738	$ 2,101,796
Net income	$ 239,437	$ 230,655

The impact from acquisitions other than ServiceMax for the reported periods if presented on a pro forma basis would not differ materially from our reported results.

Intland Software

On April 29, 2022, we acquired Intland Software, GmbH, and Eger Invest GmbH (together, “Intland Software”) pursuant to a Share Sale and Purchase Agreement. Intland Software developed and marketed the Codebeamer™ Codebeamer Application Lifecycle Management (ALM) family of software products. The purchase price of the acquisition was $278.1 million, net of cash acquired, which was financed with cash

on hand and $264 million borrowed under our existing credit facility. Intland Software had approximately 150 employees on the close date.

The acquisition of Intland Software 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 following table sets forth the purchase price over the tangible assets, identifiable intangible assets and assumed liabilities was recorded as goodwill. The purchase price allocation is considered preliminary, and additional adjustments may be recorded during the measurement period as the company receives additional information relevant to the acquisition related to the finalization of working capital adjustments to the purchase price and deferred tax assets and liabilities.

The purchase price allocation resulted in $240.9 million of goodwill, $38.8 million of customer relationships, $19.1 million of purchased software, $1.3 million of trademarks, $20.1 million of deferred tax liabilities, $0.7 million of income tax payables, $6.9 million of deferred revenue, $6.5 million of accounts receivable, and $0.8 million of other net liabilities. for Intland Software. The purchase price allocation includes the finalization of measurement period adjustments, which resulted in a $0.9 million increase in goodwill from $240.0 million as of Q3'22, June 30, 2022, driven by completion of working capital adjustments.

(in thousands)		
Goodwill	$	240,971
Customer relationships		38,800
Purchased software		19,100
Accounts receivable		6,506
Trademarks		1,300
Net tax liability		(20,811)
Deferred revenue		(6,925)
Other net liabilities		(818)
Total	$	278,123

The acquired customer relationships, purchased software, and trademarks are being amortized over useful lives of 11 years, 10 years, and 10 years, respectively, based on the expected economic 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 expanding our ALM offerings, which are complementary to our PLM offerings offerings.

Arena

On January 15, 2021, we acquired Arena Holdings, Inc. (“Arena”) pursuant to an Agreement and Plan of Merger dated as of December 12, 2020 by and among PTC, Arena, Astronauts Merger Sub, Inc., and the Representative named therein. We paid approximately $715 million, net of cash acquired of $11.1 million, for Arena, which amount was financed with cash on hand and $600 million borrowed under our existing credit facility. Arena had approximately 170 employees on the close date. The acquisition of Arena added revenue of approximately $29.8 million in FY'21, which was net of approximately $9.1 million in fair value adjustments related to purchase accounting for the acquisition.

The acquisition of Arena was accounted for as a business combination. Assets acquired and liabilities assumed were 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 following table sets forth the purchase price over the tangible assets, identifiable intangible assets and assumed liabilities was recorded as goodwill. allocation for Arena.

(in thousands)		
Goodwill	$	562,838
Customer relationships		155,000
Purchased software		38,300
Accounts receivable		11,392
Trademarks		4,200
Net tax liability		(41,256)
Deferred revenue		(15,500)
Other net liabilities		(369)
Total	$	714,605

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The purchase price allocation resulted in $562.8 million of goodwill, $155.0 million of customer relationships, $38.3 million of purchased software, $4.2 million of trademarks, $41.3 million of deferred tax liabilities, $15.5 million of deferred revenue, $11.4 million of accounts receivable, and $0.4 million of other net liabilities. The acquired customer relationships, purchased software, and trademarks are being amortized over useful lives of 13 years, 9 years, and 12 years, respectively, based on the expected economic 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 participation in expected future growth of the PLM SaaS market and expansion into the mid-market for PLM, where SaaS solutions are becoming the standard.

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PLM Services Business Disposition

On June 1, 2022, we sold a portion of our PLM services business to ITC Infotech India Limited pursuant to a Strategic Partner Agreement dated as of April 20, 2022 by and between PTC and ITC Infotech. Consideration received from ITC Infotech for the sale was approximately $60.4 million, consisting of $32.5 million cash paid on closing and $28.0 million of services to be provided by ITC Infotech to PTC for no additional charge.

We recognized a gain on the sale of $29.8 million, which is included within Other income, net. The recognized gain consists of $60.4 million of consideration received, less net assets of the business of $30.6 million. Net assets include

$33.0 million of goodwill allocated to the business, less $2.4 million of liabilities associated with approximately 160 employees who transferred to ITC Infotech. Goodwill was allocated to the sold business based on a relative fair value allocation of total goodwill of the Professional Services segment.

Additional future contingent consideration of up to $20 million may be received by PTC based on certain performance milestones. We have elected to defer the recognition of gains associated with contingent consideration until they become realizable.

7. Goodwill and Acquired Intangible Assets

We have two operating and reportable segments: (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, 2022, goodwill and acquired intangible assets in the aggregate attributable to our Software Products segment was $2,725.2 million and attributable to our Professional Services segment was $11.2 million. As of September 30, 2021, goodwill and acquired intangible assets in the aggregate attributable to our Software Products segment was $2,525.7 million and attributable to our Professional Services segment was $45.2 million.

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Goodwill and acquired intangible assets consisted of the following:

(in thousands)	September 30, 2022			September 30, 2021			September 30, 2023			September 30, 2022		
	Gross Carrying Amount	**Accumulated Amortization**	**Net Book Value**	**Gross Carrying Amount**	**Accumulated Amortization**	**Net Book Value**	**Gross Carrying Amount**	**Accumulated Amortization**	**Net Book Value**	**Gross Carrying Amount**	**Accumulated Amortization**	**Net Book Value**
Goodwill (not amortized)			$ 2,353,654			$ 2,191,887			$ 3,358,511			$ 2,353,654

Intangible assets with finite lives (amortized)(1):												
Purchased software	$ 502,859	$ 355,857	$ 147,002	$ 483,771	$ 338,542	$ 145,229	$ 615,915	$ 395,109	$ 220,806	$ 502,859	$ 355,857	$ 147,002
Capitalized software	22,877	22,877	—	22,877	22,877	—	22,877	22,877	—	22,877	22,877	—
Customer lists and relationships	594,970	369,390	225,580	574,516	350,648	223,868	1,116,117	413,125	702,992	594,970	369,390	225,580
Trademarks and trade names	27,546	17,410	10,136	26,906	17,036	9,870	36,851	19,400	17,451	27,546	17,410	10,136
Other	3,766	3,766	—	4,000	4,000	—	3,867	3,867	—	3,766	3,766	—
	$ 1,152,018	$ 769,300	$ 382,718	$ 1,112,070	$ 733,103	$ 378,967	$ 1,795,627	$ 854,378	$ 941,249	$ 1,152,018	$ 769,300	$ 382,718

Total goodwill and acquired intangible assets	$ 2,736,372	$ 2,570,854	$ 4,299,760	$ 2,736,372

(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 11 years, 11 17 years, and 12 11 years, respectively. The weighted-average useful life for all intangible assets in total is 15 years.

The changes in the carrying amounts of goodwill from September 30, 2021 September 30, 2022 to September 30, 2022 September 30, 2023 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, 2020	$ 1,583,316	$ 42,470	$ 1,625,786	
Arena acquisition	563,620	—	563,620	
Other acquisitions	181	400	581	
Foreign currency translation adjustments	1,851	49	1,900	
Balance, September 30, 2021	$ 2,148,968	$ 42,919	$ 2,191,887	$ 2,191,887
Intland Software acquisition	240,971	—	240,971	240,971
Other acquisitions	691	—	691	691
Divestiture of business	—	(32,992)	(32,992)	(32,992)
Foreign currency translation adjustments	(46,611)	(292)	(46,903)	(46,903)
Balance, September 30, 2022	$ 2,344,019	$ 9,635	$ 2,353,654	$ 2,353,654
ServiceMax acquisition				974,850
Other acquisitions				—
Foreign currency translation adjustments				30,007
Balance, September 30, 2023				$ 3,358,511

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The aggregate amortization expense for intangible assets with finite lives recorded for the years ended September 30, 2022 September 30, 2023, 2021 2022 and 2020 2021 was reflected in our Consolidated Statements of Operations as follows:

(in thousands)	Year ended September 30,			Year ended September 30,		
	2022	**2021**	**2020**	**2023**	**2022**	**2021**
Amortization of acquired intangible assets	$ 34,970	$ 29,396	$ 28,713	$ 40,022	$ 34,970	$ 29,396
Cost of software revenue	25,578	29,769	27,391			
Cost of revenue				35,694	25,578	29,769
Total amortization expense	$ 60,548	$ 59,165	$ 56,104	$ 75,716	$ 60,548	$ 59,165

The estimated aggregate future amortization expense for intangible assets with finite lives remaining as of September 30, 2022 September 30, 2023 is $56.4 million for 2023, $48.3 79.8 million for 2024, $42.1 76.6 million for 2025, $38.7 76.5 million for 2026, $36.2 75.9 million for 2027, $72.8 million for 2028 and $161.0 559.6 million thereafter.

8. Income Taxes

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

(in thousands)	Year ended September 30,		
	2022	**2021**	**2020**
Domestic	$ 97,460	$ 41,199	$ (73,865)
Foreign	299,638	350,556	208,571
Total income before income taxes	$ 397,098	$ 391,755	$ 134,706

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(in thousands)	Year ended September 30,		
	2023	**2022**	**2021**
Domestic	$ (49,193)	$ 97,460	$ 41,199
Foreign	381,759	299,638	350,556
Total income before income taxes	$ 332,566	$ 397,098	$ 391,755

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

(in thousands)	Year ended September 30,			Year ended September 30,		
	2022	**2021**	**2020**	**2023**	**2022**	**2021**
Current:						

Federal	$ 767	$ 4,774	$ 2,187	$ 7,311	$ 767	$ 4,774
State	6,675	1,609	1,266	10,020	6,675	1,609
Foreign	33,612	66,554	25,199	53,019	33,612	66,554
	41,054	72,937	28,652	70,350	41,054	72,937
Deferred:						
Federal	25,730	(152,311)	(26,811)	(11,821)	25,730	(152,311)
State	(3,177)	(27,228)	(4,063)	(10,028)	(3,177)	(27,228)
Foreign	20,410	21,434	6,233	38,525	20,410	21,434
	42,963	(158,105)	(24,641)	16,676	42,963	(158,105)
Provision (benefit) for income taxes	$ 84,017	$ (85,168)	$ 4,011	$ 87,026	$ 84,017	$ (85,168)

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

(in thousands)	Year ended September 30,					
	2022		2021		2020	
Statutory federal income tax rate	$ 83,391	21 %	$ 82,268	21 %	$ 28,288	21 %
Change in valuation allowance	—	—	(134,695)	(34)%	(16,489)	(12)%
State income taxes, net of federal tax benefit	6,518	2 %	(28,768)	(8)%	(2,998)	(2)%
Federal research and development credits	(7,477)	(2)%	(5,764)	(2)%	(5,483)	(4)%
Uncertain tax positions	2,418	1 %	3,398	1 %	3,072	2 %
Foreign tax credit	(9,078)	(2)%	(35,368)	(9)%	—	—
Foreign rate differences	(8,982)	(2)%	(34,584)	(9)%	(22,074)	(16)%
Foreign tax on U.S. provision	9,078	2 %	5,931	2 %	4,523	3 %
Excess tax benefits from restricted stock	(8,278)	(2)%	(6,141)	(2)%	(1,743)	(1)%
Audits and settlements	—	—	33,370	9 %	—	—
U.S. permanent items	15,304	3 %	18,389	5 %	6,590	5 %
Base Erosion Anti-Abuse Tax (BEAT)	—	—	2,936	1 %	(1,759)	(1)%
GILTI, net of foreign tax credits	2,705	1 %	18,217	4 %	14,899	11 %
Foreign-Derived Intangible Income (FDII)	(6,848)	(2)%	(4,428)	(1)%	(2,461)	(2)%
Sale of a portion of the PLM services business	6,844	2 %	—	—	—	—
Other, net	(1,578)	(1)%	71	—	(354)	(1)%
Provision (benefit) for income taxes	$ 84,017	21 %	$ (85,168)	(22)%	$ 4,011	3 %

(in thousands)	Year ended September 30,		
	2023	2022	2021

Statutory federal income tax rate	$ 69,839	21 %	$ 83,391	21 %	$ 82,268	21 %
Change in valuation allowance	—	—	—	—	(134,695)	(34)%
State income taxes, net of federal tax benefit	577	0 %	6,518	2 %	(28,768)	(8)%
Federal research and development credits	(7,751)	(2)%	(7,477)	(2)%	(5,764)	(2)%
Uncertain tax positions	23,302	7 %	2,418	1 %	3,398	1 %
Foreign tax credit	(11,415)	(3)%	(9,078)	(2)%	(35,368)	(9)%
Foreign rate differences	(20,829)	(6)%	(8,982)	(2)%	(34,584)	(9)%
Foreign tax on U.S. provision	11,415	3 %	9,078	2 %	5,931	2 %
Excess tax benefits from restricted stock	(6,963)	(2)%	(8,278)	(2)%	(6,141)	(2)%
Audits and settlements	—	—	—	—	33,370	9 %
U.S. permanent items	5,341	2 %	3,453	—	7,449	2 %
Non-deductible compensation	8,344	3 %	11,851	3 %	10,940	3 %
Base Erosion Anti-Abuse Tax (BEAT)	—	—	—	—	2,936	1 %
GILTI, net of foreign tax credits	17,861	5 %	2,705	1 %	18,217	4 %
Foreign-Derived Intangible Income (FDII)	(8,987)	(3)%	(6,848)	(2)%	(4,428)	(1)%
Non-deductible imputed interest	6,292	2 %	—	—	—	—
Sale of a portion of the PLM services business	—	—	6,844	2 %	—	—
Other, net	—	(1)%	(1,578)	(1)%	71	—
Provision (benefit) for income taxes	$ 87,026	26 %	$ 84,017	21 %	$ (85,168)	(22)%

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In 2023, 2022, 2021, and 2020, 2021, our effective tax rate is impacted by our corporate structure in which our foreign taxes are at a net effective tax rate lower than the U.S. rate. A significant amount of our foreign earnings is generated by our subsidiaries organized in Ireland and the Cayman Islands. In 2023, 2022, 2021, and 2020, 2021, the foreign rate differential predominantly relates to these earnings. In addition to the foreign rate differential, our tax rate differed from the U.S. statutory federal income tax due to the net effects of the Global Intangible Low-Taxed Income (GILTI) and Foreign Derived Intangible Income (FDII) regimes (together referred to as U.S. Tax reform), and the excess tax benefit related to stock-based compensation.

Additionally in 2023, our results include tax expense of $21.8 million relating to an uncertain tax position regarding transfer pricing in a foreign jurisdiction where we are currently under audit. Our rate was also impacted by non-deductible imputed interest related to the deferred payment on the acquisition of ServiceMax, Inc.

In 2022, our results include tax expense relating to the book over tax basis difference in goodwill disposed of as part of the sale of a portion of the PLM services business. As a result of the net effect of these items in 2022, our effective tax rate did not differ significantly from the U.S. federal income tax rate.

In 2021, our tax rate includes a benefit due to the release of the valuation allowance on the majority of our U.S. net deferred tax assets.

In 2020, we recorded benefits for assets and the reduction of the U.S. valuation allowance as a result of the Onshape acquisition. A further reduction tax impact related to the valuation allowance was also recorded to reflect effects of a tax matter in the impact from the scheduling Republic of the reversal of existing temporary differences resulting in deferred tax liabilities that cannot be offset against deferred tax assets. Korea (South Korea).

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At September 30, 2022 September 30, 2023 and 2021, 2022, income taxes payable and income tax accruals recorded on the accompanying Consolidated Balance Sheets were $30.4 million ($14.9 million in Accrued income taxes, $4.8 million in Accrued expenses and other current liabilities and $10.7 million in Other liabilities) and $17.3 million ($5.1 million in Accrued income taxes, $5.6 million in Other Accrued expenses and other current liabilities and $6.6 million in Other liabilities) and $15.7 million ($5.0 million in Accrued income taxes, $0.8 million in Other current liabilities and $9.9 million in Other liabilities), respectively. At September 30, 2022 September 30, 2023 and 2021, 2022, prepaid taxes recorded in Prepaid expenses on the accompanying Consolidated Balance Sheets were $25.8 22.7 million and $15.4 25.8 million, respectively. We made net income tax payments of $65.9 million, $55.0 million and $56.0 million in 2023, 2022 and $52.6 million in 2022, 2021, and 2020, respectively.

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

(in thousands)	September 30,		September 30,	
	2022	**2021**	**2023**	**2022**
Deferred tax assets:				
Net operating loss carryforwards	$ 40,419	$ 65,383	$ 22,272	$ 40,419
Foreign tax credits	14,527	36,287	3,750	14,527
Capitalized research and development	23,274	27,546	83,748	23,274
Pension benefits	7,639	14,097	5,327	7,639
Prepaid expenses	15,886	12,540	15,040	15,886
Deferred revenue	2,146	2,274	5,902	2,146

Stock-based compensation	19,486	15,822	19,684	19,486
Other reserves not currently deductible	14,689	16,796	19,604	14,689
Amortization of intangible assets	130,825	147,385	90,888	130,825
Research and development and other tax credits	78,862	74,846	64,618	78,862
Lease liabilities	46,672	51,471	50,102	46,672
Fixed assets	78,249	53,025	83,796	78,249
Capital loss carryforward	3,955	35,156	3,700	3,955
Other	1,256	2,269	2,279	1,256
Gross deferred tax assets	477,885	554,897	470,710	477,885
Valuation allowance	$ (22,283)	(52,085)	$ (21,695)	$ (22,283)
Total deferred tax assets	455,602	502,812	449,015	455,602
Deferred tax liabilities:				
Acquired intangible assets not deductible	$ (118,360)	(108,746)	$ (263,178)	$ (118,360)
Lease assets	(36,940)	(37,273)	(37,332)	(36,940)
Pension prepayments	(2,622)	(2,834)	(1,808)	(2,622)
Deferred revenue	(35,193)	(2,662)	(17,400)	(35,193)
Depreciation	(6,937)	(7,121)	(5,779)	(6,937)
Unbilled accounts receivable	-	(6,391)		
Deferred income	(5,991)	(21,744)	(8,656)	(5,991)
Prepaid commissions	(13,356)	(16,990)	(13,757)	(13,356)
Other	(8,508)	(5,427)	(7,294)	(8,508)
Total deferred tax liabilities	(227,907)	(209,188)	(355,204)	(227,907)
Net deferred tax assets	$ 227,695	$ 293,624	$ 93,811	$ 227,695

We reassess our valuation allowance requirements each financial reporting period. We assess available positive and negative evidence to estimate whether sufficient future taxable income will be generated to use our existing deferred tax assets. In the assessment for the period ended September 30, 2021, we concluded that it was more likely than not that our deferred tax assets related to U.S. federal and state income would be realizable, and therefore, the U.S. federal and the majority of the state valuation allowances were released, which resulted in non-cash federal and state tax benefits of $109.4 million and $24.8 million, respectively, to earnings in 2021. That determination was based, in part, on the Company's cumulative profits before tax and permanent differences from the past three years, which became profitable during 2021, and projections of profits before tax and permanent differences in future years. In 2022, we continue to maintain this conclusion.

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, 2022 September 30, 2023, we had U.S.

federal tax effected NOL carryforwards from acquisitions of $22.5 6.4 million, of which $1.6 1.2 million expire in 2023 2025 to 2034. The remaining carryforwards of $20.9 5.2 million do not expire. The use 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, 2022 September 30, 2023, we had federal R&D credit carryforwards of $60.9 46.7 million, which expire beginning in 2025 and ending in 2042,2043, and Massachusetts R&D credit carryforwards of $26.1 27.3 million, which expire beginning in 20232024 and ending in 2037.2038. We also had foreign tax credits of $14.5 3.7 million, which expire beginning in 2027 2030 and ending in 2032.2033.

We also have tax effected NOL carryforwards in non-U.S. jurisdictions totaling $7.2 6.8 million, the majority of which do not expire, and non-U.S. tax credit carryforwards of $4.0 2.3 million that expire beginning in 2030 and ending in 2041. Additionally, we have tax effected amortization carryforwards of $118.5 85.3 million in a foreign jurisdiction. There are limitations imposed on the use of such attributes that could restrict the recognition of any tax benefits.

As of September 30, 2022 September 30, 2023, we have a valuation allowance of $17.8 17.4 million against net deferred tax assets in the United States and a valuation allowance of $4.5 4.3 million against net deferred tax assets in certain foreign jurisdictions. The $17.8 17.4 million U.S. valuation allowance relates to Massachusetts tax credit carryforwards which we do not expect to realize a benefit from prior to expiration. The valuation allowance recorded against net deferred tax assets of certain foreign jurisdictions is established primarily

for our capital loss carryforwards, the majority of which do not expire. However, there are limitations imposed on the utilization of such capital losses that could restrict the recognition of any tax benefits.

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

(in thousands)	Year ended September 30,			Year ended September 30,		
	2022	**2021**	**2020**	**2023**	**2022**	**2021**
Valuation allowance, beginning of year	52,08 $ 5	205,42 $ 3	177,6 $ 63	22,28 $ 3	52,08 $ 5	205,42 $ 3
Net release of valuation allowance(1)	—	(134,2 35)	—	—	—	(134,2 35)
Net increase (decrease) in deferred tax assets with a full valuation allowance(2)	(29,80 2)	(19,10 3)	27,76 0			

Net decrease in deferred tax assets with a full valuation allowance(2)				(588)	(29,802)	(19,103)
Valuation allowance, end of year	$ 22,283	$ 52,085	$ 205,423	$ 21,695	$ 22,283	$ 52,085

(1) In 2021, this is attributable to the release in the United States.
(2) In 2022, this change included the loss of foreign attributes upon liquidation of a foreign subsidiary. In 2021, this change includes the loss of state attrib upon merger of two wholly-owned subsidiaries. In 2020, this change is largely attributed to the Onshape acquisition, the adoption of ASC 842 and the impact to the change in scheduling of the reversal of existing temporary differences.

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 2023, 2022 2021 and 2020 2021 we recorded interest expense of $0.5 million, $0.2 million and $2.2 million, and $0.3 million, respectively. In 2022 2023 and 2020 2022 we had no penalty expenses in our income tax provision. In 2021 we had $2.0 million tax penalty expense in our income tax provision. As of September 30, 2022 September 30, 2023 and 2021, 2022, we had accrued $0.9 1.4 million and $0.7 0.9 million of net estimated interest expense, respectively. We had no accrued tax penalties as of September 30, 2022 September 30, 2023, 2021 2022 or 2020. 2021.

	Year ended September 30,			Year ended September 30,		
Unrecognized tax benefits *(in thousands)*	**2022**	**2021**	**2020**	**2023**	**2022**	**2021**
Unrecognized tax benefit, beginning of year	$ 21,166	$ 16,107	$ 11,484	$ 23,923	$ 21,166	$ 16,107
Tax positions related to current year:						
Additions	3,144	4,844	2,173	7,075	3,144	4,844
Tax positions related to prior years:						
Additions	785	30,130	2,452	20,855	785	30,130
Reductions	(1,172)	(478)	(2)	—	(1,172)	(478)
Settlements	—	(29,437)	—	—	—	(29,437)
Statute expirations				(1,111)	—	—
Unrecognized tax benefit, end of year	$ 23,923	$ 21,166	$ 16,107	$ 50,742	$ 23,923	$ 21,166

If all of our unrecognized tax benefits as of September 30, 2022 September 30, 2023 were to become recognizable in the future, we would record a benefit to the income tax provision of $23.9 50.7 million (which would be partially offset by an increase in the U.S. valuation allowance of $5.2 5.7 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 $5 26 million as audits close and statutes of limitations expire.

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Our results for the year ended September 30, 2021 include a charge of $37.3 million related to the effects of a tax matter in the Republic of Korea (South Korea) of $34.4 million, and the resulting impact on U.S. income taxes of $2.9 million, and additional payments of approximately $20 million to South Korea in settlement of the amounts previously accrued.

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In the normal course of business, PTC and its subsidiaries are examined by various taxing authorities, including the IRS in the United States. 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. jurisdictions, including Germany, Ireland, and Italy. 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, 2022 September 30, 2023, we remained subject to examination in the following major tax jurisdictions for the tax years indicated:

Major Tax Jurisdiction	**Open Years**
United States	2018 2020 through 2022 2023
Germany	2015 through 2022 2023
France	2019 2020 through 2022 2023
Japan	2017 2018 through 2022 2023
Ireland	2018 2019 through 2022 2023

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 used in later periods.

We incurred expenses related to stock-based compensation in 2023, 2022 and 2021 and 2020 of $206.5 million, $174.9 million $177.3 million and $115.1 177.3 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 $33.4 million, $27.1 million and $39.9 million in 2023, 2022 and $13.4 million in 2022, 2021, and 2020, respectively. Upon vesting of the stock-based awards, 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 2023, 2022 2021 and 2020, 2021, net windfall tax benefits of $5.2 7.8 million, $9.9 5.2 million and $1.3 9.9 million were recorded to the tax provision.

Prior to the passage of the U.S. Tax Cuts and Jobs Act in December of 2017 (the Tax Act), we asserted that substantially all of the undistributed earnings of our foreign subsidiaries were considered indefinitely reinvested 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 United States 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.

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9. Debt

As of September 30, 2022 September 30, 2023 and 2021, 2022, we had the following short- and long-term debt obligations:

(in thousands)	September 30,	
	2022	**2021**
4.000% Senior notes due 2028	$ 500,000	$ 500,000
3.625% Senior notes due 2025	500,000	500,000
Credit facility revolver(1)	359,000	450,000
Total debt	1,359,000	1,450,000
Unamortized debt issuance costs for the senior notes(2)	(8,372)	(10,529)
Total debt, net of issuance costs(3)	$ 1,350,628	$ 1,439,471

(in thousands)	September 30,	
	2023	**2022**
4.000% Senior Notes due 2028	$ 500,000	$ 500,000
3.625% Senior Notes due 2025	500,000	500,000
Credit facility revolver line(1)(2)	202,000	359,000
Credit facility term loan(1)(2)	500,000	—
Total debt	1,702,000	1,359,000

Unamortized debt issuance costs for the Senior Notes(3)	(6,215)	(8,372)
Total debt, net of issuance costs(4)	$ 1,695,785	$ 1,350,628

(1) Unamortized debt issuance costs related to the credit facility were $2.7 2.3 million included in Other current assets and $3.8 7.5 million as of September 30, 2022 and 2021, respectively, and were included in Other assets on the Consolidated Balance Sheets. Sheet as of September 30, 2023 and $2.7 million included in Other assets on the Consolidated Balance Sheet as of September 30, 2022.

(2) Of Both the revolving line and the term loan will mature and all amounts then outstanding will become due and payable on January 3, 2028, unless the 2025 notes have not been either refinanced to mature on or after April 3, 2028 or repaid, in which case the amounts will become due on November 16, 2024. The term loan will begin amortizing in March 2024, with payments of $14.1 9.4 million in financing costs incurred 2024, $21.9 million in connection with the issuance of the 2028 2025, $25.0 million in 2026 and 2025 notes, unamortized 2027, and $418.7 million in 2028.

(3) Unamortized debt issuance costs were $8.4 million and $10.5 million as of September 30, 2022 and 2021, respectively, and for the Senior Notes were included in Long-term debt on the Consolidated Balance Sheet.Sheets.

(3) (4)As of September 30, 2023, $9.4 million of debt associated with the credit facility term loan was classified as short term with the remaining balance classified as long term. As of September 30, 2022 and 2021 , all debt was classified as long term.

Senior Unsecured Notes

In February 2020, we issued $500 million in aggregate principal amount of 4.0% senior, unsecured long-term debt at par value, due in 2028 (the 2028 notes) and $500 million in aggregate principal amount of 3.625% senior, unsecured long-term debt at par value, due in 2025 (the 2025 notes).

As of September 30, 2022 September 30, 2023, the total estimated fair value of the 2028 and 2025 senior notes was approximately $436.3 450.2 million and $468.7 480.6 million, respectively, based on quoted prices for the notes on that date.

We were in compliance with all the covenants for all of our senior notes Senior Notes as of September 30, 2022 September 30, 2023.

Terms of the 2028 and 2025 Notes

Interest on the 2028 and 2025 notes is payable semi-annually on February 15 and August 15. The debt indenture for the 2028 and 2025 notes 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 may, on one or more occasions, redeem the 2028 and 2025 notes in whole or 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 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 notes upon such event may be limited by law, by the indenture associated with the 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 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.

Credit Agreement

In February 2020, January 2023, we entered into a Third Amended an amended and Restated Credit Agreement with JPMorgan Chase Bank, N.A., as Administrative Agent, restated credit agreement for a new secured multi-currency bank credit facility with a syndicate of banks. We use Pursuant to the agreement, all revolving commitments under the prior credit agreement were replaced with the revolving commitments under the new credit facility. The new credit facility for general corporate purposes, including acquisitions consists of businesses, share repurchases (i) a $1.25 billion revolving credit facility, (ii) a $500 million term loan credit facility, and working capital requirements.(iii) an incremental facility pursuant to which we may incur additional term loan tranches or increase the revolving credit facility. As of September 30, 2023, unused

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The credit facility consists of a $1 billion revolving credit facility, which may be increased by up to an additional $500 million in the aggregate if the existing or additional lenders are willing to make such increased commitments. As of September 30, 2022, unused commitments under our credit facility were approximately $641.0 1,048.0 million and amounts available for borrowing were $384.6 million. The maturity date of the credit facility is

February 13, 2025, when all remaining amounts outstanding will be due and payable. 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. As of September 30, 2022 September 30, 2023, the fair value of our credit facility approximates its book value.

PTC Inc. 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 ServiceMax, Inc. was the only subsidiary guarantors of the obligations under the credit facility. guarantor. Any borrowings by eligible foreign subsidiary borrowers would be guaranteed by PTC Inc. and any subsidiary guarantors. guarantors and secured, subject to exceptions, by a first priority perfected security interest in substantially all existing and after-acquired personal property owned by PTC Inc. and its material domestic subsidiaries (except for certain indirect material domestic subsidiaries). As of September 30, 2023, all funds borrowed under the filing of this Form 10-K, no funds revolving credit facility 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 Subsequent to first priority perfected liens in favor of the lenders under this credit facility. September 30, 2023, we borrowed an additional $100 739.8% 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 million under the revolving credit facility. facility, including $650.0 million to finance the deferred payment related to the ServiceMax acquisition and $89.8 million borrowed by the subsidiary borrower for our acquisition of pure-systems. Refer to *Note 18. Subsequent Events* for more detail.

Loans under the credit facility bear interest at variable rates which that reset every 30to 180 days days depending on the base rate (for USD borrowings, either the adjusted Daily Simple RFR or adjusted Term SOFR) and period selected by PTC as described below. us. The spread over the base rate depends on our total leverage ratio. As of September 30, 2022 September 30, 2023, the annual rate for borrowings outstanding was 4.14 7.18%. Interest rates on borrowings outstanding under the credit facility range from 1.25% to 1.75% above an adjusted LIBO rate (or an agreed successor rate) for Euro currency borrowings or 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. A quarterly revolving commitment fee on the undrawn portion of the revolving credit facility is required, ranging from 0.175% to 0.30 0.325% per annum, based upon PTC's our total leverage ratio.

The credit facility limits PTC's and its subsidiaries' our ability to, among other things: incur additional indebtedness; 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 Inc. and its material domestic subsidiaries may not invest cash or property in, or loan amounts to, PTC's PTC Inc.'s foreign subsidiaries in aggregate amounts exceeding $100 million for any purpose and an additional $200 million for purposes other than acquisitions of businesses. In addition, under the The credit facility PTC and its subsidiaries must also requires that we maintain the following certain financial ratios:

- 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;
- 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
- Interest coverage ratio, defined as the ratio of consolidated trailing four quarters EBITDA to consolidated trailing four quarters of cash basis interest expense, of not less than 3.00 to 1.00 as of the last day of any fiscal quarter.

ratios. As of September 30, 2022 September 30, 2023, our total leverage ratio was 1.79 to 1.00, our senior secured leverage ratio was 0.49 to 1.00, our interest coverage ratio was 14.21 to 1.00 and we were in compliance with all financial and operating covenants of the credit facility.

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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.

In 2020, 2023, we incurred $2.0 13.4 million in financing costs in connection with the February 2020 January 2023 credit facility and related arrangements, of which $1.0 4.2 million (related to a since-extinguished bridge loan) was expensed in connection with a November 2019 amendment to our prior credit facility. These origination costs are the period and $9.2 million was recorded as deferred debt issuance costs and are included in Other assets. Financing assets and Other current assets on the Consolidated Balance Sheet. Deferred debt issuance costs are expensed over the remaining term of the obligations.

Interest

In 2023, 2022 2021 and 2020, 2021, we incurred interest expense of $54.3 129.4 million, $50.5 54.3 million, and $76.4 50.5 million, respectively, and paid $48.5 89.8 million, $45.2 48.5 million and $60.6 45.2 million, respectively, of interest on our debt. Additionally, Interest expense in the third quarter of 2020, we paid year ended 2023 includes $15.0 30.0 million in penalties for of interest imputed on the early redemption of $650.0 million deferred acquisition payment related to the 2024 notes. ServiceMax acquisition. The average interest rate on borrowings outstanding during 2023, 2022 2021 and 2020 2021 was approximately 3.4 4.9%, 3.3 3.4% and 4.3 3.3%, respectively.

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10. Commitments and Contingencies

As of September 30, 2022 September 30, 2023 and 2021, 2022, we had letters of credit and bank guarantees outstanding of $15.0 13.1 million (of which $0.5 million was collateralized) and $16.3 15.0 million (of which $0.5 million was collateralized), respectively, primarily related to our corporate headquarters lease.

Legal and Regulatory Matters

Legal Proceedings

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.

401(k) Plan

On September 17, 2020, three individual plaintiffs filed a putative class action lawsuit against PTC, the Investment Committee for the PTC Inc. 401(k) Plan (the “Plan”), and the PTC Board of Directors (collectively, the “PTC Defendants”) in the U.S. District Court for the District of Massachusetts alleging that the defendants breached their fiduciary duties under the Employee Retirement Income Security Act of 1974 in the oversight of the Plan. On September 22, 2021, the plaintiffs and the PTC Defendants reached an agreement in principle to settle the lawsuit for a gross settlement amount of $1.725 million. The Court issued an Order of final approval of the settlement on October 18, 2022. The settlement amount will be funded by PTC’s insurer and paid into the Qualified Settlement Fund for the benefit of the class members.

Other Legal Proceedings

In addition to the matter listed above, we We are subject to legal proceedings and claims against us in the ordinary course of business. As of September 30, 2022 September 30, 2023, we estimate that the range of possible outcomes for such matters is immaterial and we do not believe that resolving them 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 reporting period could be adversely affected.

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Guarantees and Indemnification Obligations

We enter into standard indemnification agreements with our customers and business partners in the ordinary course of our business. Under such agreements, we typically indemnify, hold harmless, and agree to reimburse the indemnified party for losses suffered or incurred by the indemnified party, in connection with patent, copyright or other intellectual property infringement claims by any third party with respect to our products. Indemnification may also cover other types of claims, including claims relating to certain data breaches. Except for intellectual property infringement indemnification, these These agreements typically limit our liability with respect to indemnification claims other indemnification than intellectual property infringement claims. Historically, our costs to defend lawsuits or settle claims relating to such indemnity agreements have been minimal and, accordingly, we 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 during the term of the license/subscription. license. Additionally, we generally warrant that our consulting services will be performed consistent with generally accepted industry standards and, in the case of fixed price services, the agreed-upon specifications. 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. Of these shares, 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 had authorized us to repurchase up to $1 billion of our common stock in the period October 1, 2020 through September 30, 2023. We use used cash from operations and borrowings under our credit facility to make such repurchases. All shares of our common stock repurchased are were automatically restored to the status of authorized and unissued.

We did not repurchase any shares in 2023. In 2022 and 2021, we repurchased 1.05 million shares for $125 million and 0.23 million shares for $30 million, respectively. We did not repurchase any shares in 2020.

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12. Equity Incentive Plans

We have two equity incentive plans, – our 2000 Equity Incentive Plan and our 2016 Employee Stock Purchase Plan (ESPP).

Our 2000 Equity Incentive 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 (RSUs) 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 RSU represents the contingent right to receive one share of our common stock.

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Our ESPP 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.

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

(in thousands)	Year ended September 30,			Year ended September 30,		
	2022	**2021**	**2020**	**2023**	**2022**	**2021**

Cost of license revenue	$ 272	$ 100	$ 47	$ 145	$ 272	$ 100
Cost of support and cloud services revenue	11,022	9,900	6,910	12,801	11,022	9,900
Cost of professional services revenue	11,481	9,263	7,012	7,928	11,481	9,263
Sales and marketing	49,467	53,712	37,351	56,394	49,467	53,712
Research and development	41,944	34,272	27,005	58,931	41,944	34,272
General and administrative	60,677	70,042	36,824	70,260	60,677	70,042
Total stock-based compensation expense	$ 174,863	$ 177,289	$ 115,149	$ 206,459	$ 174,863	$ 177,289

Stock-based compensation expense in 2023, 2022 and 2021 and 2020 includes $6.8 million, $6.4 million, $7.3 million, and $5.8 7.3 million respectively, related to our ESPP.

2000 Equity Incentive Plan Accounting and Stock-Based Compensation Expense

The fair value of RSUs granted in 2023, 2022 2021 and 2020 2021 was based on the fair market value of our stock on the date of grant for service- and certain performance- based RSUs and based on a Monte Carlo simulation model for relative total shareholder return (rTSR) performance RSUs. The weighted average fair value per share of RSUs granted in 2023, 2022 2021 and 2020 2021 was $114.31 130.64, $111.48 114.31 and $77.57 111.48, respectively.

We account for forfeitures as they occur, rather than estimate expected forfeitures.

As of September 30, 2022 September 30, 2023, total unrecognized compensation cost related to unvested RSUs expected to vest was approximately $201.5 204.4 million and the weighted average remaining recognition period for unvested RSUs was 17 months. As of September 30, 2023, the weighted average remaining vesting term for outstanding awards is 1.0 years.

As of September 30, 2022 September 30, 2023, 2.8 7.3 million shares of common stock were available for grant under the equity incentive plan and 2.8 2.6 million shares of common stock were reserved for issuance upon vesting of RSUs granted and outstanding.

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Restricted stock unit activity for the year ended September 30, 2022 *(in thousands, except grant date fair value data)*	**Shares**	**Weighted Average Grant Date Fair Value**	**Aggregate Intrinsic Value**
Balance of outstanding RSUs at October 1, 2021	3,217	$ 92.46	

Granted(1)	1,659	$	114.31		
Vested	(1,736)	$	92.70		
Forfeited or not earned	(386)	$	100.05		
Balance of outstanding RSUs at September 30, 2022	2,754	$	105.07	$	288,068

The following table sets forth the restricted stock unit activity for the year ended September 30, 2023.

(in thousands, except grant date fair value data)	Shares		Weighted Average Grant Date Fair Value		Aggregate Intrinsic Value
Balance of outstanding RSUs at October 1, 2022	2,754	$	105.07		
Granted(1)	1,767	$	130.64		
Vested	(1,800)	$	104.00		
Forfeited or not earned	(140)	$	114.67		
Balance of outstanding RSUs at September 30, 2023	2,581	$	122.82	$	365,619

(1) RSUs granted includes 37 38 shares from prior period rTSR awards that were earned upon achievement of the performance criteria and vested in November 2021 2022 and 87 61 shares from prior period performance-based awards that were earned upon achievement of the performance criteria and vested in November 2021. 2022.

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The following table presents the number of RSU awards granted by award type:

(in thousands)	Twelve months ended September 30, 2022	Year ended | Sep

	tember 30, 2023
Performance-based RSUs(1)	106 69
Service-based RSUs(2)	1,353 1,530
Relative Total Shareholder Return RSUs(3)	76 69

(1) The performance-based RSUs are primarily made up of RSUs granted to our executives and are eligible to vest based upon annual increasing performance measures over a three-year period. To the extent earned, those performance-based RSUs will vest in three substantially equal installments on November 15, 2022 November 15, 2023, November 15, 2023 November 15, 2024, and November 15, 2024 November 15, 2025, or the date the Compensation Committee determines the extent to which the applicable performance criteria have been achieved for each performance period. Up to a maximum of two times the number of RSUs can be earned (up to a maximum aggregate of 152 RSUs). earned.

(2) The service-based RSUs were granted to employees, including our executive officers. Substantially all service-based RSUs will vest in three substantially equal annual installments on or about the anniversary of the date of grant.

(3) The rTSR RSUs were granted to our executives and are eligible to vest based on the performance of PTC stock relative to the stock performance of an index of PTC peer companies established as of the grant date, as determined at the end of the measurement period ending on September 30, 2024 September 30, 2025. The RSUs earned will vest on November 15, 2024 November 15, 2025. Up to a maximum of two times the number of rTSR RSUs eligible to be earned for the period (up to a maximum aggregate of 152 RSUs) may vest. If the return to PTC shareholders is negative for stock price as of the beginning of the period but still meets or exceeds is below the peer group indexed return, stock price at the end of the period, a maximum of 100% of the rTSR RSUs may vest.

As of September 30, 2022, weighted average remaining vesting term for outstanding awards is 1.0 year.

The weighted-average fair value of the rTSR RSUs was $136.43 179.60 per target RSU on the grant date. The fair value of the rTSR RSUs was determined using a Monte Carlo simulation model, a generally accepted statistical technique used to simulate a range of possible future stock prices for PTC and the peer group. The method uses a risk-neutral framework to model future stock price movements based upon the risk-free rate of return, the historical volatility of each entity, and the pairwise correlations of each entity being modeled. The fair value for each simulation is the product of the payout percentage determined by PTC's rTSR rank against the peer group, the projected price of PTC stock, and a discount factor based on the risk-free rate.

The significant assumptions used in the Monte Carlo simulation model were as follows:

Average volatility of peer group	34.67 %
Risk-free interest rate	0.81 %
Dividend yield	— %

	2023	2022	2021
Average volatility of peer group	41.54 %	34.67 %	41.52 %
Risk-free interest rate	4.12 %	0.81 %	0.21 %
Dividend yield	— %	— %	— %
Expected term (in years)	2.87	2.87	2.87

Total value on vest date of RSUs vested are as follows:follows:

(in thousands)	Year ended September 30,			Year ended September 30,		
Value of stock option and stock-based award activity	**2022**	**2021**	**2020**			
				2023	**2022**	**2021**
Total value of restricted stock unit awards at vest	$ 199,738	$ 171,316	$ 103,265	$ 240,066	$ 199,738	$ 171,316

In 2023, shares issued upon vesting of restricted stock units were net of 0.6 million shares retained by us to cover employee tax withholdings of $82.8 million. In 2022, shares issued upon vesting of restricted stock units were net of 0.6 million shares retained by us to cover employee tax withholdings of $69.0 million. In 2021, shares issued upon vesting of restricted stock units were net of 0.5 million shares retained by us to cover employee tax withholdings of $53.1 million. In 2020, 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 $33.7 53.1 million.

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As of September 30, 2023, we had liability-classified awards related to stock-based compensation based on a fixed monetary amount of $44.9 million.

13. Employee Benefit Plan

We offer a savings plan to eligible U.S. employees. The plan is qualified 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 immediately. We made matching contributions of $7.8 8.6 million, $7.8 million and $6.7 7.8 million in 2023, 2022 2021 and 2020, 2021, respectively.

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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:

	2022	2021	2020	2023	2022	2021
Weighted average assumptions used to determine benefit obligations at September 30 measurement date:						
Discount rate	3.7 %	1.0 %	1.1 %	4.2 %	3.7 %	1.0 %
Rate of increase in future compensation	3.6 %	2.8 %	2.8 %	3.0 %	3.6 %	2.8 %
Weighted average assumptions used to determine net periodic pension cost for fiscal years ended September 30:						
Discount rate	1.0 %	1.1 %	0.9 %	3.7 %	1.0 %	1.1 %
Rate of increase in future compensation	2.8 %	2.8 %	2.8 %	3.6 %	2.8 %	2.8 %
Rate of return on plan assets	5.0 %	5.0 %	5.4 %	4.8 %	5.0 %	5.0 %

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. The discount rate is based on yield curves for highly rated corporate fixed income securities matched against cash flows for each future year.

The weighted long-term rate of return assumption, together with the assumptions used to determine the benefit obligations as of September 30, 2022 September 30, 2023 in the table above, will be used to determine our 2023 2024 net periodic pension income, cost, which we expect to be approximately $0.4 0.1 million.

As of September 30, 2022 September 30, 2023, the weighted average interest crediting credit rate used in our only two cash balance pension plan plans is 4.1 4.2%.

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All non-service net periodic pension costs are presented in Other income, net on the Consolidated Statement of Operations. 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,			Year ended September 30,		
	2022	2021	2020	2023	2022	2021
Interest cost of projected benefit obligation	$ 550	$ 692	$ 527	$ 2,126	$ 550	$ 692
Service cost	1,016	1,127	1,426	690	1,016	1,127
Expected return on plan assets	(3,712)	(3,643)	(3,878)	(3,541)	(3,712)	(3,643)
Amortization of prior service cost	(4)	(5)	(5)	—	(4)	(5)
Recognized actuarial loss	1,425	4,139	3,854	241	1,425	4,139
Settlement gain	(82)	—	—	—	(82)	—
Net periodic pension (benefit) cost	$ (807)	$ 2,310	$ 1,924	$ (484)	$ (807)	$ 2,310

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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,		Year ended September 30,	
	2022	2021	2023	2022
Change in benefit obligation:				
Projected benefit obligation, beginning of year	$ 96,512	$ 97,832	$ 58,129	$ 96,512
Service cost	1,016	1,127	690	1,016

Interest cost	550	692	2,126	550
Actuarial loss (gain)	(22,616)	1,100		
Actuarial gain			(1,589)	(22,616)
Foreign exchange impact	(12,949)	(1,562)	3,714	(12,949)
Participant contributions	96	109	96	96
Benefits paid	(2,343)	(2,786)	(2,968)	(2,343)
Plan amendments			235	—
Divestiture of business	(1,184)	—	—	(1,184)
Settlements	(953)	—	—	(953)
Projected benefit obligation, end of year	$ 58,129	$ 96,512	$ 60,433	$ 58,129
Change in plan assets and funded status:				
Plan assets at fair value, beginning of year	$ 78,385	$ 72,063	$ 67,581	$ 78,385
Actual return on plan assets	2,348	7,383		
Actual return (loss) on plan assets			(1,919)	2,348
Employer contributions	3,007	3,049	1,343	3,007
Participant contributions	96	109	96	96
Foreign exchange impact	(12,959)	(1,433)	4,593	(12,959)
Settlements	(953)	—	—	(953)
Benefits paid	(2,343)	(2,786)	(2,968)	(2,343)
Plan assets at fair value—end of year	67,581	78,385		
Plan amendments			149	—
Plan assets at fair value, end of year			68,875	67,581
Projected benefit obligation, end of year	58,129	96,512	60,433	58,129
Underfunded status	$ (9,782)	$ (18,982)	$ (10,693)	$ (9,782)
Overfunded status	$ 19,234	$ 855	$ 19,135	$ 19,234
Accumulated benefit obligation, end of year	$ 57,310	$ 95,090	$ 59,602	$ 57,310
Amounts recognized in the balance sheet:				
Non-current asset	$ 19,234	$ 855	$ 19,135	$ 19,234
Non-current liability	$ (9,434)	$ (18,615)	$ (10,419)	$ (9,434)
Current liability	$ (348)	$ (367)	$ (274)	$ (348)
Amounts in accumulated other comprehensive loss:				
Unrecognized actuarial loss	$ 5,408	$ 30,213	$ 9,573	$ 5,408

As of September 30, 2022 September 30, 2023 and 2021, 2022, two of our pension plans had project projected benefit obligations and accumulated benefit obligations in excess of plan assets. Three international plans were overfunded.

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The following table shows the change in accumulated Accumulated other comprehensive loss:

(in thousands)	Year ended September 30,		Year ended September 30,	
	2022	**2021**	**2023**	**2022**
Accumulated other comprehensive loss, beginning of year	$ 30,213	$ 37,175	$ 5,408	$ 30,213
Recognized during year - net actuarial losses	(1,421)	(4,135)	(241)	(1,421)
Occurring during year - settlement gain	82	—	—	82
Occurring during year - net actuarial gains	(21,253)	(2,640)		
Occurring during year - net actuarial losses (gains)			3,871	(21,253)
Plan amendments			91	—
Foreign exchange impact	(2,213)	(187)	444	(2,213)
Accumulated other comprehensive loss, end of year	$ 5,408	$ 30,213	$ 9,573	$ 5,408

In 2023, our actuarial losses were impacted by volatility in capital markets and the impact of rising interest rates. In 2022, our actuarial gains were impacted by the change in discount rate from 1.0% in 2021 to 3.7% in 2022. In 2021, our net actuarial gains were driven by the asset performance.

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

	September 30,		September 30,	
Asset category	**2022**	**2021**	**2023**	**2022**
Equity securities	33 %	35 %	31 %	33 %
Fixed income securities	33 %	34 %	42 %	33 %
Commodities	1 %	11 %	7 %	1 %
Insurance company funds	10 %	12 %	10 %	10 %
Options	2 %	1 %	0 %	2 %
Cash	21 %	7 %	10 %	21 %
	100 %	100 %	100 %	100 %

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We periodically review the pension plans’ investments in the various asset classes. For the CoCreate plan plans 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 equity and fixed income securities.

In 2023, 2022 2021 and 2020 2021, our actual return (loss) on plan assets was $(1.9) million, $2.3 million and $7.4 million and $(3.0) million, respectively.

Based on actuarial valuations and additional voluntary contributions, we contributed $3.0 1.3 million, $3.0 million and $2.6 3.0 million in 2023, 2022 2021 and 2020, 2021, respectively, to the plans. We In 2024, we expect to pay $3.1 million in contributions in 2023, of which contribute $0.6 million will be paid directly to the plans. plans and to directly pay $3.2 million in benefits.

As of September 30, 2022 September 30, 2023, benefit payments expected to be paid over the next ten years are as follows:

(in thousands)	Future Benefit Payments	Future Benefit Payments
2023	$ 3,410	
2024	4,068	$ 4,158
2025	3,793	3,782
2026	3,830	3,898
2027	4,216	4,485
2028 to 2032	20,680	
2028		4,694
2029 to 2033		23,443

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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 equities and 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.

(in thousands)	September 30, 2023			
	Level 1	**Level 2**	**Level 3**	**Total**
Fixed income securities:				
Government	$ 27,322	$ —	$ —	$ 27,322
Corporate investment grade	1,632	—	—	1,632
Large capitalization stocks	20,864	—	—	20,864
Commodities	4,977	—	—	4,977
Insurance company funds(1)	—	7,102	—	7,102
Cash	6,978	—	—	6,978
Total plan assets	$ 61,773	$ 7,102	$ —	$ 68,875

(in thousands)	September 30, 2022			
	Level 1	**Level 2**	**Level 3**	**Total**
Fixed income securities:				
Government	$ 20,430	$ —	$ —	$ 20,430
Corporate investment grade	2,038	—	—	2,038
Large capitalization stocks	22,379	—	—	22,379
Commodities	599	—	—	599
Insurance company funds(1)	—	6,823	—	6,823
Options	1,430	—	—	1,430
Cash	13,882	—	—	13,882
Total plan assets	$ 60,758	$ 6,823	$ —	$ 67,581

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(in thousands)	September 30, 2021			
	Level 1	**Level 2**	**Level 3**	**Total**
Fixed income securities:				
Government	$ 24,013	$ —	$ —	$ 24,013
Corporate investment grade	2,924	—	—	2,924

Large capitalization stocks	27,078	—	—	27,078
Commodities	8,558	—	—	8,558
Insurance company funds(1)	—	9,105	—	9,105
Options	1,122	—	—	1,122
Cash	5,585	—	—	5,585
Total plan assets	$ 69,280	$ 9,105	$ —	$ 78,385

(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.

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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 forward contracts is the institutional market in an over-the-counter environment with a relatively high level of price transparency. The market participants usually are large financial institutions. Our foreign currency forward contracts' derivatives' 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.

Our significant financial assets and liabilities measured at fair value on a recurring basis as of September 30, 2022 September 30, 2023 and 2021 2022 were as follows:

(in thousands)	September 30, 2023			
	Level 1	**Level 2**	**Level 3**	**Total**
Financial assets:				
Cash equivalents(1)	$ 72,754	$ —	$ —	$ 72,754
Convertible note	—	—	2,000	2,000
Forward contracts	—	7,340	—	7,340
	$ 72,754	$ 7,340	$ 2,000	$ 82,094
Financial liabilities:				
Forward contracts	—	3,158	—	3,158

	Level 1	Level 2	Level 3	Total
	$ —	$ 3,158	$ —	$ 3,158

(in thousands)	September 30, 2022			
	Level 1	Level 2	Level 3	Total
Financial assets:				
Cash equivalents(1)	$ 102,313	$ —	$ —	$ 102,313
Convertible note	—	—	2,000	2,000
Forward contracts	—	9,058	—	9,058
	$ 102,313	$ 9,058	$ 2,000	$ 113,371
Financial liabilities:				
Forward contracts	—	2,908	—	2,908
	$ —	$ 2,908	$ —	$ 2,908

(in thousands)	September 30, 2021			
	Level 1	Level 2	Level 3	Total
Financial assets:				
Cash equivalents(1)	$ 114,375	$ —	$ —	$ 114,375
Convertible note	—	—	2,000	2,000
Equity securities	—	—	77,540	77,540
Forward contracts	—	5,363	—	5,363
	$ 114,375	$ 5,363	$ 79,540	$ 199,278
Financial liabilities:				
Forward contracts	—	3,318	—	3,318
	$ —	$ 3,318	$ —	$ 3,318

(1) Money market funds and time deposits.

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Level 3 Investments

Convertible Note

In the fourth quarter of 2021, we invested $2.0 million in a non-marketable convertible note. This debt security is classified as available-for-sale and is included in Other assets on the Consolidated Balance Sheet. Sheets. There were no changes in the fair value of this level 3 investment in the twelve months ended September 30, 2022 September 30, 2023.

Non-Marketable Equity Investments

The carrying value of our non-marketable equity investments is recorded in Other assets on the Consolidated Balance Sheets and totaled $1.0 million as of September 30, 2022 and $2.2 million as of September 30, 2021. In 2022, PTC sold a non-marketable equity investment for $4.2 million, which had been held at a cost of $1.2 million. The $3.0 million gain recognized on the sale is included in Other income, net for the twelve months ended September 30, 2022

Equity Securities

As of September 30, 2022, PTC held no remaining shares in Matterport, Inc., a publicly traded company, as we sold all previously held shares during the three months ended March 31, 2022. The shares sold included those held as of September 30, 2021, as well as additional shares which PTC earned during the second quarter of FY'22 based on contingent earn-outs achieved in January 2022. Shares related to the original investment were restricted from sale until January 2022 (six months after Matterport became a public company). At expiration of this lock-out, we sold all shares held from the original investment for $39.1 million at an average price of $9.1 per share. In February 2022, we sold all remaining shares held for $3.6 million at an average share price of $7.6 per share. Due to the decline in the price per share during the first six months of fiscal 2022, we recognized a loss of $34.8 million in Other income, net on the Consolidated Statements of Operations. No additional gains or losses were recognized in 2022 and the aggregate realized gain from the original investment of $8.7 million was $34.0 million.

The following table presents changes in fair value of our Level 3 investment in the Matterport, Inc. shares from October 1, 2021 to September 30, 2022:

(in thousands)	**September 30, 2022**
	Fair Values
Balance, October 1, 2021	$ 77,540
Realized loss	(38,468)
Sale of investment	(39,072)
Balance, September 30, 2022	$ —

16. Marketable Securities

We did not hold any marketable securities as of September 30, 2022 or 2021. In December 2020, we sold all our marketable securities to partially fund the Arena acquisition, resulting in proceeds of $56.2 million. Neither gross realized gains nor gross realized losses related to the sale were material.

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17. 16. Derivative Financial Instruments

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

(in thousands)	Fair Value of Derivatives Designated As Hedging Instruments		Fair Value of Derivatives Not Designated As Hedging Instruments	
	September 30,			
	2023	2022	2023	2022
Derivative assets:(1)				
Forward contracts	$ 3,770	$ 1,960	$ 3,570	$ 7,098
Derivative liabilities:(2)				
Forward contracts	$ —	$ —	$ 3,158	$ 2,908

(1) As of September 30, 2023 and 2022, current derivative assets of $7.3 million and $9.1 million, respectively, are recorded in Other current assets on the Consolidated Balance Sheets.

(2) As of September 30, 2023 and 2022, current derivative liabilities of $3.2 million and $2.9 million, respectively, are recorded in Accrued expenses and other current liabilities on the Consolidated Balance Sheets.

Non-Designated Hedges

As of September 30, 2022 September 30, 2023 and 2021, 2022, 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,		September 30,	
	2022	**2021**	**2023**	**2022**
Canadian / U.S. Dollar	$ 2,731	$ 4,894		
Canadian Dollar / U.S. Dollar			$ 5,135	$ 2,731
Euro / U.S. Dollar	316,869	387,466	383,227	316,869
British Pound / U.S. Dollar	7,368	23,141	6,058	7,368
Israeli Shekel / U.S. Dollar	12,052	10,475	11,852	12,052
Japanese Yen / U.S. Dollar	25,566	46,450	4,770	25,566
Swiss Franc / U.S. Dollar	25,559	18,039	32,766	25,559
Swedish Krona / U.S. Dollar	35,713	34,196	35,085	35,713
Singapore Dollar / U.S. Dollar	3,637	3,498	—	3,637
Chinese Renminbi / U.S. Dollar	23,965	23,297	16,660	23,965
New Taiwan Dollar / U.S. Dollar	13,906	3,369	11,855	13,906
Russian Ruble/ U.S. Dollar	—	2,614		
Korean Won/ U.S. Dollar	4,919	—		
Danish Krone/ U.S. Dollar	3,192	2,380		
Australian Dollar/ U.S. Dollar	3,269	2,086		
Korean Won / U.S. Dollar			6,157	4,919

Danish Krone / U.S. Dollar			6,731	3,192
Australian Dollar / U.S. Dollar			452	3,269
All other	4,432	2,016	2,888	4,432
Total	$ 483,178	$ 563,921	$ 523,636	$ 483,178

The following table shows the effect of our non-designated hedges, all of which were including forward contracts and options, on the Consolidated Statements of Operations for the years ended September 30, 2022 September 30, 2023, 2021 2022 and 2020: 2021:

(in thousands)		Year ended September 30,				Year ended September 30,		
	Location of gain (loss)	**2022**	**2021**	**2020**	**Location of Gain (Loss)**	**2023**	**2022**	**2021**
Net realized and unrealized gain (loss), excluding the underlying foreign currency exposure being hedged	Other income, net	$ 11,950	$ (3,758)	$ 3,518	Other income, net	$ (11,757)	$ 14,603	$ (6,055)

In 2023, 2022 and 2021, foreign currency losses, net were $2.1 million, $0.9 million and $8.0 million, respectively.

Net Investment Hedges

As of September 30, 2022 September 30, 2023 and 2021, 2022, we had outstanding forward contracts designated as net investment hedges with notional amounts equivalent to the following:

	September 30,		September 30,	
Currency Hedged *(in thousands)*	**2022**	**2021**	**2023**	**2022**
Euro / U.S. Dollar	$ 110,466	$ 128,103	$ 337,923	$ 110,466
Japanese Yen / U.S. Dollar			10,285	—
Total			$ 348,208	$ 110,466

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The following table shows the effect of our derivative instruments designated as net investment hedges all of which were forward contracts, on the Consolidated Statements of Operations for the years ended September 30, 2022 September 30, 2023, 2021, 2022, and 2020: 2021:

(in thousands)		Year ended September 30,		
	Location of gain (loss)	**2022**	**2021**	**2020**
Gain (loss) recognized in OCI—effective portion	OCI	$ (1,478)	$ 695	$ (5,483)

Gain (loss) reclassified from OCI—effective portion	OCI	$ (17,466)	$ 2,723	$ 109
Gain recognized—portion excluded from effectiveness testing	Other income, net	$ 1,862	$ 1,249	$ 3,506

(in thousands)		Year ended September 30,		
	Location of Gain (Loss)	**2023**	**2022**	**2021**
Gain (loss) recognized in OCI	OCI	$ (10,033)	$ 23,379	$ 1,660
Gain (loss) reclassified from OCI to earnings	n/a	$ -	$ -	$ -
Gain recognized, excluded portion	Other income, net	$ 4,241	$ 1,797	$ 1,249

As of September 30, 2022 September 30, 2023, 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.

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

(in thousands)	**Fair Value of Derivatives Designated As Hedging Instruments**		**Fair Value of Derivatives Not Designated As Hedging Instruments**	
	September 30,			
	2022	**2021**	**2022**	**2021**
Derivative assets:(1)				
Forward contracts	$ 1,960	$ 1,641	$ 7,098	$ 3,722
Derivative liabilities:(2)				
Forward contracts	$ —	$ —	$ 2,908	$ 3,318

(1) As of September 30, 2022 and 2021, current derivative assets of $9.1 million and $5.4 million, respectively, are recorded in Other current assets on the Consolidated Balance Sheets.

(2) As of September 30, 2022 and 2021, current derivative liabilities of $2.9 million and $3.3 million, respectively, are recorded in Accrued expenses and other current liabilities on the Consolidated Balance Sheets.

Offsetting Derivative Assets and Liabilities

We have entered into master netting arrangements for our forward contracts that 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, 2022 September 30, 2023:

(in thousands)	Gross Amounts Offset in the Consolidated Balance Sheets			Gross Amounts Not Offset in the Consolidated Balance Sheets			Gross Amounts Offset in the Consolidated Balance Sheets			Gross Amounts Not Offset in the Consolidated Balance Sheets		
As of September 30, 2022	**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**						
As of September 30, 2023							**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**
Forward Contracts	$ 9,058	$ —	$ 9,058	$ (2,908)	$ —	$ 6,150	$ 7,340	$ —	$ 7,340	$ (3,158)	$ —	$ 4,182

The following table sets forth the offsetting of derivative liabilities as of September 30, 2022 September 30, 2023:

(in thousands)	**Gross Amounts Offset in the Consolidated Balance Sheets**			**Gross Amounts Not Offset in the Consolidated Balance Sheets**			**Gross Amounts Offset in the Consolidated Balance Sheets**			**Gross Amounts Not Offset in the Consolidated Balance Sheets**		
As of September 30, 2022	**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**						
As of September 30, 2023							**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**

Forward Contracts	$ 2,908	$ —	$ 2,908	$ (2,908)	$ —	$ —	$ 3,158	$ —	$ 3,158	$ (3,158)	$ —	$ —

Net gains and losses on foreign currency exposures, including realized and unrealized gains and losses on forward contracts, included in Other income, net, were netlosses of $0.9 million, $8.0 million and $1.7 million in 2022, 2021 and 2020, respectively. Net realized and unrealized gains and losses on forward contracts included in Other income, net were a net gain of $16.4 million and $7.0 million in 2022 and 2020, and net loss of $4.9 million in 2021.

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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 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 and 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 or report asset information by reportable segment.

(in thousands)	Year ended September 30,		
	2022	**2021**	**2020**
Software Products			
Revenue	$ 1,770,253	$ 1,649,341	$ 1,314,617
Operating costs(1)	494,035	451,734	393,803
Profit	1,276,218	1,197,607	920,814

Professional Services			
Revenue	163,094	157,818	143,798
Operating costs(2)	140,470	135,981	128,678
Profit	22,624	21,837	15,120
Total segment revenue	1,933,347	1,807,159	1,458,415
Total segment costs	634,505	587,715	522,481
Total segment profit	1,298,842	1,219,444	935,934
Unallocated operating expenses:(3)			
Sales and marketing expenses	435,780	464,067	398,100
General and administrative expenses	130,870	120,954	114,386
Intangibles amortization	60,548	59,165	56,104
Restructuring and other charges, net	36,234	2,211	32,716
Stock-based compensation	174,863	177,289	115,149
Other unallocated operating expenses(4)	13,185	15,010	8,616
Total operating income	447,362	380,748	210,863
Interest expense	(54,268)	(50,478)	(76,428)
Other income, net	4,004	61,485	271
Income before income taxes	$ 397,098	$ 391,755	$ 134,706

(1) Operating costs for the Software Products segment include all costs of software revenue and research and development costs, excluding stock-based compensation and intangible amortization. Operating costs for the Software Products segment include depreciation of $4.9 million, $4.0 million and $4.2 million in 2022, 2021 and 2020, respectively.

(2) Operating costs for the Professional Services segment include all costs of professional services revenue, excluding stock-based compensation, and intangible amortization. The Professional Services segment includes depreciation of $0.9 million, $1.1 million and $1.1 million in 2022, 2021 and 2020, respectively.

(3) Unallocated departments include depreciation of $21.4 million, $21.0 million and $19.4 million in 2022, 2021 and 2020, respectively.

(4) Other unallocated operating expenses include acquisition and transaction-related costs.

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For 2022, 2021 and 2020, we reported revenue by the following three product groups:

(in thousands)	**Year ended September 30,**

	2022	2021	2020
Digital Thread - Core	$ 1,318,857	$ 1,257,817	$ 1,025,709
Digital Thread - Growth	279,566	273,949	215,353
Digital Thread - FSG	251,621	233,268	210,101
Digital Thread (Total)	1,850,044	1,765,034	1,451,163
Velocity	83,303	42,125	7,252
Total revenue	$ 1,933,347	$ 1,807,159	$ 1,458,415
Product lifecycle management (PLM)	1,137,016	1,012,120	807,016
Computer-aided design (CAD)	796,331	795,039	651,399
Total revenue	$ 1,933,347	$ 1,807,159	$ 1,458,415

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 region. Intercompany sales and transfers between geographic areas are accounted for at prices that are designed to be representative of unaffiliated party transactions. Our material long-lived assets primarily reside in the United States in 2022, 2021 and 2020. 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)	Year ended September 30,		
	2022	2021	2020
Revenue:			
Americas(1)	$ 895,095	$ 766,021	$ 649,383
Europe(2)	714,216	722,977	543,779
Asia Pacific	324,036	318,161	265,253
Total revenue	$ 1,933,347	$ 1,807,159	$ 1,458,415

(1) Includes revenue in the United States totaling $864.7 million, $741.3 million, and $621.8 million for 2022, 2021 and 2020, respectively.

(2) Includes revenue in Germany totaling $318.5 million, $290.7million, and $198.7 million for 2022, 2021 and 2020, respectively.

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19. 17. Leases

Our operating leases expire at various dates through 2037 and are primarily for office space, automobiles, servers, and office equipment.

Our headquarters are located at 121 Seaport Boulevard, Boston, Massachusetts (the Boston lease). Massachusetts. The Boston lease is for approximately 250,000 square feet and runs through June 30, 2037. We have subleased a portion of the leased space through January 31, 2024. Base rent for the first year of the lease was $11.0 million and increases by $1 per square foot per year thereafter ($0.3 million per year). Base rent first became payable on July 1, 2020. In addition to the base rent, we are required to pay our pro rata portions of building operating costs and real estate taxes (together, “Additional Rent”). Annual Additional Rent is estimated to be approximately $7.1 8.1 million. The lease provides for $25 million in landlord funding for leasehold improvements ($100 per square foot). The leasehold improvement funding provision was fully utilized by us and was reflected as a derecognition adjustment to the right-of-use asset.

In February 2019, we subleased a portion of the Boston location through June 30, 2022, and received approximately $9.1 million in sublease income over the term of the sublease. In March 2022, we extended the sublease through June 30, 2023 and we will receive $2.9 million in sublease income over the term of the extension.

The components of lease cost reflected in the Consolidated Statement Statements of Operations for the year years ended September 30, 2022 September 30, 2023, 2022, and 2021 were as follows:

(in thousands)	**Year ended September 30, 2022**	**Year ended September 30,**		
		2023	**2022**	**2021**
Operating lease cost	$ 34,346	$ 32,402	$ 34,346	$ 37,295
Short-term lease cost	2,653	5,411	2,653	2,452
Variable lease cost	10,095	10,945	10,095	9,808
Sublease income	(4,600)	(4,749)	(4,600)	(4,438)
Total lease cost	$ 42,494	$ 44,009	$ 42,494	$ 45,117

Supplemental cash flow and right-of use assets information for the year years ended September 30, 2022 September 30, 2023, 2022, and 2021 was as follows:

(in thousands)	**Year ended September 30, 2022**			
		2023	**2022**	**2021**
Cash paid for amounts included in the measurement of lease liabilities:				
Operating cash flows from operating leases	$ 38,709	$ 36,038	$ 38,709	$ 50,299
Financing cash flows from operating leases	$ 297			
Financing cash flows from financing leases		$ 536	$ 297	$ 354
Right-of-use assets obtained in exchange for new lease obligations:				
Operating leases (1)	$ 15,431	$ 28,257	$ 15,431	$ 9,576
Financing leases (2)	$ —	$ 40	$ —	$ 1,146

(1) In the year ended September 30, 2023, operating lease additions included $4.0 million related to the ServiceMax acquisition.
(2) In the year ended September 30, 2023, all financing lease additions related to the ServiceMax acquisition.

Supplemental balance sheet information related to the leases as of September 30, 2022 September 30, 2023 and 2022 was as follows:

	As of September 30, 2022
Weighted-average remaining lease term - operating leases	11.8 years
Weighted-average remaining lease term - financing leases	2 years
Weighted-average discount rate - operating leases	5.4 %
Weighted-average discount rate - financing leases	3.0 %

	2023	2022
Weighted-average remaining lease term - operating leases	10.9 years	11.8 years
Weighted-average remaining lease term - financing leases	1 year	2 years
Weighted-average discount rate - operating leases	5.2 %	5.4 %
Weighted-average discount rate - financing leases	3.7 %	3.0 %

Maturities of lease liabilities as of September 30, 2022 September 30, 2023 are as follows:

(in thousands)	Operating Leases
2022	$ 31,612
2023	26,907
2024	23,495
2025	19,487
2026	16,662
Thereafter	143,236
Total future lease payments	261,399
Less: imputed interest	(71,824)
Total	$ 189,575

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(in thousands)	Operating Leases
2024	$ 34,247
2025	28,490
2026	23,523
2027	19,738
2028	17,874

Thereafter		134,033
Total future lease payments		257,905
Less: imputed interest		(64,713)
Total lease liability	$	193,192

As of September 30, 2022 September 30, 2023, we had operating leases that had not yet commenced. The leases will commence in FY'23 2024 with a lease term of 10 7.75 years and we will make future lease payments of approximately $11.6 2.4 million.

Exited (Restructured) Facilities F-41

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18. Subsequent Events

As In October 2023, we made a payment of September 30, 2022 $650 million to settle the ServiceMax deferred acquisition payment liability, of which $620 million is purchase consideration and $30 million is imputed interest. To finance this payment, we borrowed the full amount under the revolving line of our existing credit facility.

In October 2023, we acquired pure-systems GmbH, a leading provider of product and software variant management solutions, for approximately $98 million. We borrowed EUR 85 million, the USD equivalent of which was approximately $90 million, under the revolving line of our existing credit facility to fund the acquisition.

Subsequent to September 30, 2023, we have net liabilities of $0.3 million related to excess facilities (compared to $3.6 million at September 30, 2021), representing lease obligations classified as short term.

In determining the amount of right-of-use assets for restructured facilities, we are required to estimate such factors as future vacancy rates, the time required to sublet properties, and sublease rates. Updates to these estimates may result in revisions to the value of right-of-use assets recorded. The amounts recorded are based on the net present value of estimated sublease income. As of September 30, 2022, There was no committed sublease income included in the right-of-use assets for exited facilities and there was no uncommitted sublease income. As a result of changes in our sublease income assumptions and an incremental obligation to exit a portion of our former headquarters facility early in the year ended September 30, 2022, we recorded a facility impairment charge of $1.3 million.

In the year ended September 30, 2022, we made aggregate payments of $2.0 45 million related to lease costs for exited facilities. on the revolving credit facility.

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Exhibit 10.1.12

PTC Inc.

2000 Equity Incentive Plan

Restricted Stock Unit Certificate

Grant No. %%OPTION_NUMBER%-%

PTC Inc. (the "Company"), a Massachusetts corporation, hereby grants to the person named below restricted stock units ("Restricted Stock Units" or "RSUs") representing the right to receive shares of Common Stock, $0.01 par value, of the Company (the "Award") under and subject to the Company's 2000 Equity Incentive Plan (the "Plan") on the terms and conditions set forth below and in the Plan. By accepting this award, the Employee agrees to those terms and conditions and reaffirms the terms and conditions of the most recent of any Proprietary Invention Agreement or Nondisclosure Agreement he or she may have entered into with the Company, including without limitation any non-solicitation, non-interference and noncompetition obligations set forth in such agreement.

Name of Holder:	%%FIRST_NAME%-% %%LAST_NAME%-%
Employee ID Number:	%%EMPLOYEE_IDENTIFIER%-%
Number of Restricted Stock Units:	%%TOTAL_SHARES_GRANTED,'999,999,999'%-%
Date of Grant:	%%OPTION_DATE,'Month DD, YYYY'%-%
Vesting Schedule:	on %%VEST_DATE_PERIOD1,'Month DD, YYYY'%-%, %%SHARES_PERIOD1,'999,999,999'%-% RSUs; on %%VEST_DATE_PERIOD2,'Month DD, YYYY'%-%, %%SHARES_PERIOD2,'999,999,999'%-% RSUs; on %%VEST_DATE_PERIOD3,'Month DD, YYYY'%-%, %%SHARES_PERIOD3,'999,999,999'%-%RSUs;

The shares issuable upon vesting of this Award will not be released until all applicable withholding taxes have been collected from the Holder or otherwise provided for.

PTC Inc.

By: ________________________________

James E. Heppelmann

Chief Executive Officer

Exhibit 3.2

PTC INC.Inc. 2000 EQUITY INCENTIVE PLAN

AMENDED AND RESTATED BY - LAWS

Restricted Stock Unit Terms and Conditions

Article 1 1.- Plan Incorporated by ReferenceStockholders . This Award is issued pursuant to the terms of the Plan and may be amended as provided in the Plan. Capitalized terms used and not otherwise defined in this certificate have the meanings given to them in the Plan. This certificate does not set forth all the terms and conditions of the Plan, which are incorporated herein by reference. The Committee administers the Plan and its determinations regarding the operation of the Plan are final and binding. Copies of the Plan may be obtained upon written request without charge from the Legal Department of the Company.

1.1 2.Place of Meetings; Participation by Remote Communications Restricted Stock Units. Meetings Each Restricted Stock Unit represents the right to receive one share of stockholders shall be held at Common Stock, subject to the principal office fulfillment of the corporation or such different place as is fixed by the Board of Directors or the Chief Executive Officer and stated in the notice of the meeting. The corporation may permit stockholders and proxyholders not physically present at a meeting of stockholders to participate in and be deemed present in person and vote at the meeting by means of remote communications, provided that (a) the corporation shall have implemented reasonable measures (i) to provide such stockholders and proxyholders a reasonable opportunity to read or hear the proceedings of the meeting substantially concurrently with such proceedings and (ii) to verify that each person deemed present and permitted to vote at the meeting by means of remote communication is a stockholder or proxyholder and (b) the corporation shall maintain a record of each vote cast or other action taken at the meeting by means of remote communication. vesting conditions.

1.2 3.Annual Meeting Vesting of Restricted Stock Units; Issuance of Common Stock. The annual meeting Subject to Sections 5, 6 and 9 below, upon each vesting of stockholders shall be held on the date (which shall not be a legal holiday in the place where the meeting is to be held) and at the time fixed by the Board of Directors or the Chief Executive Officer and stated in the notice of the meeting. The annual meeting shall be held for the purpose of electing directors and such other purposes as are specified in the notice of meeting. To the extent a stockholder is entitled as a matter of law independent of these By-Laws to propose nominations or other business to be considered at an annual meeting, such stockholder may do so only in compliance with these By-Laws and any other applicable requirements. If no annual meeting is held Restricted Stock Unit in accordance with the foregoing provisions, vesting schedule set forth on the face of this certificate (each, a special meeting may be held "Vest Date"), the Company shall issue to the Holder one share of Common Stock for each Restricted Stock Unit that vests on such Vest Date (the "Shares") as soon as practicable after such Vest Date, but in lieu no event later than March 15 of the annual meeting, following calendar year.

4. Award and Restricted Stock Units Not Transferable. This Award and the Restricted Stock Units are not transferable by the Holder.

5. Termination of Employment or Engagement. If the Holder's status as an employee or consultant of the Company and all Affiliates is terminated for any action taken at reason (voluntary or involuntary), other than death, all Restricted Stock Units that special meeting remain unvested, and, for the avoidance of doubt, all underlying Shares in respect of such Restricted Stock Units, shall have thereupon immediately and irrevocably terminate and be forfeited. Notwithstanding the same effect foregoing, if the Holder is on military, sick leave or other leave of absence approved by the Company, his or her employment or engagement with the Company (or its Affiliate) will be treated as continuing intact if it had been taken at the annual meeting, and in period of such case all references in these By-Laws leave does not exceed ninety (90) days, or, if longer, so long as the Holder's right to reemployment or the annual meeting survival of stockholders shall his or her service arrangement with the Company (or its Affiliate) is guaranteed either by statute or by contract; otherwise, the Holder's employment or engagement will be deemed to refer have terminated on the 91st day of such leave. If the Holder's status as an employee or consultant of the Company and all Affiliates terminates due to such special meeting. Holder's death, all unvested Restricted Stock Units shall automatically vest as of the date of such Holder's death.

1.3 6.Special Meetings Covered Retirement. Special meetings Notwithstanding Section 5, if the Holder's status as an employee of stockholders may the Company and all Affiliates terminates by reason of a Covered Retirement, all unvested Restricted Stock Units will remain outstanding and continue to vest and be called settled on each remaining Vest Date without regard to the requirement that the Holder be employed by the Chief Executive Officer Company and all Affiliates. Upon the Holder's death after a Covered Retirement, all then unvested Restricted Stock Units shall automatically vest as of the date of such Holder's death. For purposes hereof, a “Covered Retirement” is the voluntary termination of a Retirement Eligible Individual who has provided the Company not less than six months’ prior notice of such employee’s intent to retire from the Company or an Affiliate. A “Retirement Eligible Individual” means an employee of the Company or an Affiliate who is 60 years of age or older and has at least 10 years of credited employment service with the Company and/or all Affiliates.

7. No Right to Shares or as a Stockholder. The Holder shall not have any right in, to or with respect to any of the Shares (including voting rights or rights with respect to dividends paid on the Common Stock) issuable under the Award until the Award is settled by issuance of such Shares to the Board Holder.

8. Payment of Directors. Upon written application, Taxes. (a) The Holder shall pay to the Company, or make provision satisfactory to the Committee for payment of, any taxes required by law to be withheld with respect to the Shares no later than the date of the event creating the tax liability and in any event before any Shares are delivered to the Holder. The Company and its Affiliates may, to the extent permitted by law, deduct any such tax obligations from any payment of any kind due to the Holder. The Company may, in its discretion, withhold from the Shares delivered to the Holder for any Vest Date such number of Shares as the Company determines is necessary to satisfy the minimum tax obligations required by law to be withheld or paid in connection with the issuance of such Shares, valued at their Fair Market Value on the date of issuance.
(b) With respect to a Retirement Eligible Individual, the Company may, in its discretion, accelerate the vesting and settlement of a portion of the Restricted Stock Units to the extent necessary to pay the Federal Insurance Contributions Act (FICA) tax imposed under Sections 3101, 3121(a) and 3121(v)(2) of the Code and to pay the income tax at source on wages imposed under Section 3401 of the Code or the corresponding withholding provision of applicable state, local or foreign tax laws as a result of the payment of the FICA tax, and to pay the additional income tax at source on wages attributable to the pyramiding section 3401 wages and taxes; provided that the total payment under this acceleration provision cannot exceed the aggregate of the FICA tax amount, and the income tax withholding related to such FICA amount (as permitted under Treasury Regulation Section 1.409A-3(j)(4)(vi); and provided further that any RSUs vested and settled in accordance with these By-Laws this Section will reduce, share-for-share, that portion of the Award that would vest on the immediately following Vest Date.

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9. Specified Employee Delay under Section 409A of the Code. The Company shall delay the issuance of any Shares upon any Vest Date to the extent necessary to comply with Section 409A(a)(2)(B)(i) of the Code (relating to payments made to “specified employees” as a result of their separation from service) to the date that is six months and one day following the date of the Holder’s separation from service (or shorter period ending on the date of the Holder’s death following such separation).

10. Change in Control. In order to preserve Holder’s rights under this Award in the event of a change in control of the Company (as defined by the Committee), the Committee in its discretion may at any other applicable requirements, of time take one or more stockholders who are entitled of the following actions: (i) provide for the acceleration of any Vest Date, (ii) provide for payment to vote the Holder of cash or other property with a Fair Market Value equal to the amount that would have been received with respect to the Shares had the Award fully vested upon the change in control, (iii) adjust the terms of this Award in a manner determined by the Committee to reflect the change in control, (iv) cause the Award to be assumed, or new rights substituted therefor, by another entity, or (v) make such other provision as the Committee may consider equitable to the Holder and who hold at least 10% (or 40% in the event best interests of the corporation has Company.

11. Securities and Other Laws. It shall be a class condition to the Holder’s right to receive the Shares hereunder that the Company may, in its discretion, require (a) that the Shares shall have been duly listed, upon official notice of voting stock registered issuance, upon any national securities exchange or automated quotation system on which the Company’s Common Stock may then be listed or quoted, (b) that either (i) a registration statement under the Securities Exchange Act of 1934, as amended) 1933 with respect to the Shares shall be in effect, or (ii) in the opinion of counsel for the Company, the proposed

issuance and delivery of the capital stock entitled Shares to vote at the meeting, special meetings Holder shall be called exempt from registration under that Act and the Holder shall have made such undertakings and agreements with the Company as the Company may reasonably require, and (c) that such other steps, if any, as counsel for the Company shall consider necessary to comply with any law applicable to the issue of such Shares by the Secretary, Company shall have been taken by the Company or in the case of the death, absence, incapacity Holder, or refusal of the Secretary, by any other officer. both.

1.4 12.Notice of Meetings; Waiver No Right to Employment. A No person shall have any claim or right to be granted an Award. Each employee of the Company or any of its Affiliates is an employee-at-will (that is to say that either the Holder or the Company or any Affiliate may terminate the employment relationship at any time for any reason or no reason at all) unless, and only to the extent, provided in a written employment agreement for a specified term executed by the chief executive officer of the Company or his duly authorized designee or the authorized signatory of any Affiliate. Neither the adoption, maintenance, nor operation of the Plan nor any Award thereunder shall confer upon any employee of the Company or of any Affiliate any right with respect to the continuance of his or her employment by the Company or any such Affiliate nor shall they interfere with the right of the Company (or Affiliate) to terminate any employee at any time or otherwise change the terms of employment, including, without limitation, the right to promote, demote or otherwise re-assign any employee from one position to another within the Company or any Affiliate.

13. Miscellaneous. The Holder agrees that the obligations imposed on the Holder in this Agreement will apply during Holder's employment with PTC and will survive the termination of Holder's employment. The Holder further agrees that any change in Holder's position, title or responsibilities while employed by PTC will not invalidate or otherwise affect the validity or enforceability of this Agreement.

FORM OF RESTRICTED STOCK UNIT CERTIFICATE (U.S. SECTION 16 and EVP PB)

Exhibit 10.1.13

PTC Inc.

2000 Equity Incentive Plan

Restricted Stock Unit Certificate

Grant No. %%OPTION_NUMBER%-%

PTC Inc. (the "Company"), a Massachusetts corporation, hereby grants to the person named below restricted stock units ("Restricted Stock Units" or "RSUs") representing the right to receive shares of Common Stock, $0.01 par value, of the Company (the "Award") under and subject to the Company's 2000 Equity Incentive Plan (the "Plan") on the terms and conditions set forth below and in the Plan.

Name of Holder:	%%FIRST_NAME_MIDDLE_NAME_LAST_NAME%-%
Employee ID Number:	%%EMPLOYEE_IDENTIFIER%-%
Number of Restricted Stock Units:	%%TOTAL_SHARES_GRANTED,'999,999,999'%-%
Date of Grant:	%%OPTION_DATE,'Month DD, YYYY'%-%

Vesting Schedule: See Schedule 1: Performance Criteria and Vesting

The shares issuable upon vesting of this Award will not be released until all applicable withholding taxes have been collected from the Holder or otherwise provided for.

PTC INC.

By:

James E. Heppelmann

Chief Executive Officer

PTC INC. 2000 EQUITY INCENTIVE PLAN

Restricted Stock Unit Terms and Conditions

1. Plan Incorporated by Reference. This Award is issued pursuant to the terms of the Plan and may be amended as provided in the Plan. Capitalized terms used and not otherwise defined in this certificate have the meanings given to them in the Plan. This certificate does not set forth all the terms and conditions of the Plan, which are incorporated herein by reference. The Committee administers the Plan and its determinations regarding the operation of the Plan are final and binding. Copies of the Plan may be obtained upon written request without charge from the Legal Department of the Company.

2. Restricted Stock Units. Each Restricted Stock Unit represents the right to receive one share of Common Stock, subject to the fulfillment of the vesting conditions.

3. Vesting of Restricted Stock Units; Issuance of Common Stock. Subject to the terms and conditions set forth herein, upon each vesting of a Restricted Stock Unit in accordance with the vesting schedule set forth on the face of this certificate (each, a "Vest Date"), the Company shall issue to the Holder one share of Common Stock for each Restricted Stock Unit that vests on such Vest Date (the "Shares") as soon as practicable after such Vest Date, but in no event later than March 15 of the following calendar year.

4. Award and Restricted Stock Units Not Transferable. This Award and the Restricted Stock Units are not transferable by the Holder.

5. Termination of Employment or Engagement. If the Holder's status as an employee or consultant of the Company and all Affiliates is terminated for any reason (voluntary or involuntary, other than death), all Restricted Stock Units that remain unvested, and, for the avoidance of doubt, all underlying Shares in respect of such Restricted Stock Units, shall immediately and irrevocably terminate and be forfeited. Notwithstanding the foregoing, if the Holder is on military, sick leave or other leave of absence approved by the Company, his or her employment or engagement with the Company (or its Affiliate) will be treated as continuing intact if the period of such leave does not exceed ninety (90) days, or, if longer, so long as the Holder's right to reemployment or the survival of his or her service arrangement with the Company (or its Affiliate) is guaranteed either by statute or by contract; otherwise, the Holder's employment or engagement will be deemed to have terminated on the 91st day of such leave. If the Holder's status as an employee or consultant of the Company and all Affiliates terminates due to such Holder's death, all unvested Restricted Stock Units shall automatically vest as of the date of such Holder's death.

6. Covered Retirement. Notwithstanding Section 5, if the Holder's status as an employee of the Company and all Affiliates terminates by reason of a Covered Retirement, all unvested Restricted Stock Units will remain outstanding and continue to vest and be settled on each remaining Vest Date without regard to the requirement that the Holder be employed by the Company and all Affiliates. Upon the Holder's death after a Covered Retirement, all then unvested Restricted Stock Units shall automatically vest as of the date of such Holder's death. For purposes hereof, a "Covered Retirement" is the voluntary termination of a Retirement Eligible Individual who has provided the Company not less than six months' prior notice of each meeting such employee's intent to retire from the Company or an Affiliate. A

“Retirement Eligible Individual” means an employee of stockholders, stating the place, date Company or an Affiliate who is 60 years of age or older and hour thereof, and has at least 10 years of credited employment service with the purposes Company and/or all Affiliates.

7. No Right to Shares or as a Stockholder. The Holder shall not have any right in, to or with respect to any of the Shares (including voting rights or rights with respect to dividends paid on the Common Stock) issuable under the Award until the Award is settled by issuance of such Shares to the Holder.

8. Payment of Taxes. (a) The Holder shall pay to the Company, or make provision satisfactory to the Committee for which the meeting is payment of, any taxes required by law to be held, shall be given by withheld with respect to the Secretary, Assistant Secretary or other person calling Shares no later than the meeting at least seven, date of the event creating the tax liability and no more than sixty, days in any event before any Shares are delivered to the meeting Holder. The Company and its Affiliates may, to each stockholder entitled to vote at the meeting and to each stockholder who extent permitted by law, by the Articles of Organization or by these By-Laws is entitled to deduct any such notice, by leaving such notice with him or at his residence or usual place of business, by mailing it postage prepaid and addressed to him at his address as it appears in the records of the corporation, or by electronic transmission. Whenever tax obligations from any notice is required to be given to a stockholder by law, by the Articles of Organization or by these By-Laws, no such notice need be given if a written (including electronically transmitted) waiver of notice, payment

executed before of any kind due to the Holder. The Company may, in its discretion, withhold from the Shares delivered to the Holder for any Vest Date such number of Shares as the Company determines is necessary to satisfy the minimum tax obligations required by law to be withheld or after paid in connection with the meeting issuance of such Shares, valued at their Fair Market Value on the date of issuance.

(b) With respect to a Retirement Eligible Individual, the Company may, in its discretion, accelerate the vesting and settlement of a portion of the Restricted Stock Units to the extent necessary to pay the Federal Insurance Contributions Act (FICA) tax imposed under Sections 3101, 3121(a) and 3121(v)(2) of the Code and to pay the income tax at source on wages imposed under Section 3401 of the Code or the corresponding withholding provision of applicable state, local or foreign tax laws as a result of the payment of the FICA tax, and to pay the additional income tax at source on wages attributable to the pyramiding section 3401 wages and taxes; provided that the total payment under this acceleration provision cannot exceed the aggregate of the FICA tax amount, and the income tax withholding related to such FICA amount (as permitted under Treasury Regulation Section 1.409A-3(j)(4)(vi); and provided further that any RSUs vested and settled in accordance with this Section will reduce, share-for-share, that portion of the Award that would vest on the immediately following Vest Date.

9. Specified Employee Delay under Section 409A of the Code. The Company shall delay the issuance of any Shares upon any Vest Date to the extent necessary to comply with Section 409A(a)(2)(B)(i) of the Code (relating to payments made to “specified employees” as a result of their separation from service) to the date that is six months and one day following the date of the Holder’s separation from service (or shorter period ending on the date of the Holder’s death following such separation).

10. Change in Control.

(a) In order to preserve Holder's rights under this Award in the event of a change in control of the Company (as defined by the stockholder Committee), the Committee in its discretion may at any time take one or his authorized attorney, is filed with the records more of the meeting. A stockholder's attendance at following actions: (i) provide for the acceleration of any Vest Date, (ii) provide for payment to the Holder of cash or other property with a meeting (i) waives objection Fair Market Value equal to lack of notice or defective notice of the meeting, unless the stockholder at the beginning of the meeting objects to holding the meeting or transacting business at the meeting and (ii) waives objection to consideration of a particular matter at the meeting amount that is not within the purpose or purposes described in the meeting notice, unless the stockholder objects to considering the matter when it is presented.

1.5 Quorum. Unless the Articles of Organization otherwise provide, the holders of a majority of the shares of stock issued, outstanding and entitled to vote on any matter shall constitute a quorum would have been received with respect to the Shares had the Award fully vested upon the change in control, (iii) adjust the terms of this Award in a manner determined by the Committee to reflect the change in control, (iv) cause the Award to be assumed, or new rights substituted therefor, by another entity, or (v) make such other provision as the Committee may consider equitable to the Holder and in the best interests of the Company.

(b) Notwithstanding anything to the contrary in any agreement between the Holder and the Company, including any Executive Agreement that matter, except provides for certain treatment of outstanding equity in connection with a change in control of the Company, this Section 10(b) rather than the provisions of any such agreement shall control with respect to this Award in the event of a change in control of the Company. In the event of a change in control of the Company:

(i) Upon such change in control, (A) any performance criteria applicable to this Award shall be deemed to have been met at the greater of (x) the Target performance level or (y) the estimated achievement level as of the date of the change in control (such greater level, the "CIC Level") for each of the open performance measurement periods and any RSUs that could have been earned for achievement above the CIC Level shall be automatically cancelled, (B) such CIC Level RSUs shall remain unvested and shall vest in accordance with the vesting schedule; provided that if two this Award is not assumed or a cash payment of equivalent value is not substituted therefor (in either case with vesting terms no more voting groups are restrictive than those of this Award) by any acquirer of or successor to the Company, then this Award shall become vested at the CIC Level upon such change in control, and (C) this Award shall be deemed amended to provide that, notwithstanding any provision of the Plan, this Award may not be terminated or forfeited without the Holder's written consent (provided that this shall not prevent termination (1) of any unvested portion hereof that is terminated or forfeited upon termination of the Holder's employment (other than a change in control termination covered by this Section 10(b)), or (2) upon payment of a cash payment equivalent to the value of this Award at the CIC Level); and

(ii) Upon a change in control termination (as such term may be defined in any existing agreement), all unvested CIC Level RSUs shall immediately become vested and distributable in full, and, if such change in control termination would entitle the Holder to a Make-Up Payment (as such term may be defined in any existing agreement) with respect to this Award under any existing agreement, then the Holder shall be entitled to vote separately such Make-Up Payment with respect to this Award.

11. Securities and Other Laws. It shall be a condition to the Holder's right to receive the Shares hereunder that the Company may, in its discretion, require (a) that the Shares shall have been duly listed, upon official notice of issuance, upon any national securities exchange or automated quotation system on which the Company's Common Stock may then be listed or quoted, (b) that either (i) a registration statement under the Securities Act of 1933 with respect to the Shares shall be in the case of each such voting group, a quorum shall consist of the holders of a majority of the votes entitled to be cast on the matter by the voting group. Shares owned directly or indirectly by the corporation shall not be counted in determining the total number of shares outstanding for this purpose. Shares once represented for any purpose at a meeting are deemed present for quorum purposes for the remainder of the meeting and for any adjournment of that meeting unless (i) the stockholder attends solely to object to lack of notice, defective notice or the conduct of the meeting on other grounds and does not vote the shares or otherwise consent that such shares are to be deemed present, effect, or (ii) in the case opinion of an adjournment, a new record date is or counsel for the Company, the proposed issuance and delivery of the Shares to the Holder shall be set exempt from registration under that Act and the Holder shall have made such undertakings and agreements with the Company as the Company may reasonably require, and (c) that such other steps, if any, as counsel for that adjourned meeting. the Company shall consider necessary to comply with any law applicable to the issue of such Shares by the Company shall have been taken by the Company or the Holder, or both.

1.6 12. Postponements; Adjournments No Right to Employment. Any meeting No person shall have any claim or right to be granted an Award. Each employee of stockholders the Company or any of its Affiliates is an employee-at-will (that is to say that either the Holder or the Company or any Affiliate may before it is called to order, be postponed terminate the employment relationship at any time for any reason or no reason at all) unless, and only to the extent, provided in a written employment agreement for a specified term executed by the Board chief executive officer of Directors the Company or Chief his or her duly authorized designee or the authorized signatory of any Affiliate. Neither the adoption, maintenance, nor operation of the Plan nor any Award thereunder shall confer upon the Holder or any employee of the Company or of any Affiliate any right with respect to the continuance of his or her employment by the Company or any such Affiliate nor shall they interfere with the right of the Company (or Affiliate) to terminate him or her at any time or otherwise change the terms of employment, including, without limitation, the right to promote, demote or otherwise re-assign him or her from one position to another within the Company or any Affiliate.

13. Cancellation of Award; Recoupment of Amounts Realized. The Holder agrees that, pursuant to the Company's Executive Officer Compensation Recoupment Policy as in effect on the date of this Award (the "Policy"), the Company may (a) cancel this Award and all or any portion of the Restricted Stock Units, (b) reacquire for any or no consideration all or any portion of the Shares following issuance (if such Shares are then held by the Holder or any person to whom the Holder transferred Shares other than for fair market value (a "Covered Transferee")), and/or (c) recoup any other date, time amounts realized by the Holder and/or any Covered Transferee with respect to the Shares. The Holder agrees that he or she will, promptly upon request by the Company pursuant to the Policy, (x) return to the Company for cancellation any certificate representing the Shares and/or (y) pay to the Company up to the total amount realized by the Holder and/or any Covered Transferee with respect to the Shares, and place at which a meeting that the Company and/or any of stockholders its affiliates may, to the extent permitted by law, deduct any such amount from any payment of any kind due to the Holder. All determinations by the Committee hereunder shall be final and binding on all interested parties. Any dispute with respect to the terms of this Award or any such recoupment shall be resolved by confidential, binding arbitration in Boston, Massachusetts before the American Arbitration Association, under its Commercial Arbitration Rules.

14. Effect of Death or Disability. Notwithstanding anything to the contrary in any agreement between the Holder and the Company, including any Executive Agreement that provides for certain treatment of outstanding equity in connection with the Holder's death or disability, this Section 14 rather than the provisions of any such agreement shall control with respect to this Award in the event of Holder's death or disability. In the event of Holder's death or Disability (as such term may be held under these By-Laws. Any meeting of stockholders may defined in such an agreement), (i) any performance criteria applicable to this Award shall be adjourned deemed to any other date, time and place at which a meeting of stockholders may be held under these By-Laws by the stockholders present or represented have been met at the meeting, although less than a quorum, or by Target level for each of the open performance measurement periods and any officer entitled to preside or to act as clerk of such meeting, if no stockholder is present. It shall not be necessary to notify any stockholder of any adjournment. Any business RSUs that could have been transacted at any meeting earned in excess of the stockholders as originally called Target RSUs shall automatically be cancelled, and (ii) all of the unvested Target RSUs shall immediately become vested and distributable in full.

15. Miscellaneous. The Holder agrees that the obligations imposed on the Holder in this Agreement will apply during Holder's employment with PTC and will survive the termination of Holder's employment. The Holder further agrees that any change in Holder's position, title or responsibilities while employed by PTC will not invalidate or otherwise affect the validity or enforceability of this Agreement.

Schedule 1: Performance Criteria and Vesting

FORM OF RESTRICTED STOCK UNIT CERTIFICATE (U.S. SECTION 16 and EVP PB rTSR)

Exhibit 10.1.14

PTC Inc.

2000 Equity Incentive Plan

Restricted Stock Unit Certificate

Grant No. %%OPTION_NUMBER%-%

PTC Inc. (the "Company"), a Massachusetts corporation, hereby grants to the person named below restricted stock units ("Restricted Stock Units" or "RSUs") representing the right to receive shares of Common Stock, $0.01 par value, of the Company (the "Award") under and subject to the Company's 2000 Equity Incentive Plan (the "Plan") on the terms and conditions set forth below and in the Plan.

Name of Holder:	%%FIRST_NAME_MIDDLE_NAME_LAST_NAME%-%
Employee ID Number:	%%EMPLOYEE_IDENTIFIER%-%
Number of Restricted Stock Units:	%%TOTAL_SHARES_GRANTED,'999,999,999'%-%
Date of Grant:	%%OPTION_DATE,'Month DD, YYYY'%-%

Vesting Schedule: See Schedule 1: Performance Criteria and Vesting

The shares issuable upon vesting of this Award will not be released until all applicable withholding taxes have been collected from the Holder or otherwise provided for.

PTC INC.

By:

James E. Heppelmann

Chief Executive Officer

PTC INC. 2000 EQUITY INCENTIVE PLAN

Restricted Stock Unit Terms and Conditions

1. Plan Incorporated by Reference. This Award is issued pursuant to the terms of the Plan and may be transacted at any postponement or adjournment amended as provided in the Plan. Capitalized terms used and not otherwise defined in this certificate have the meanings given to them in the Plan. This certificate does not set forth all the terms and conditions of the meeting. Plan, which are incorporated herein by reference. The Committee administers the Plan and its determinations regarding the operation of the Plan are final and binding. Copies of the Plan may be obtained upon written request without charge from the Legal Department of the Company.

1.7 2. Voting and Proxies Restricted Stock Units. Each stockholder Restricted Stock Unit represents the right to receive one share of Common Stock, subject to the fulfillment of the vesting conditions.

3. Vesting of Restricted Stock Units; Issuance of Common Stock. Subject to the terms and conditions set forth herein, upon each vesting of a Restricted Stock Unit in accordance with the vesting schedule set forth on the face of this certificate (each, a “Vest Date”), the Company shall have issue to the Holder one vote share of Common Stock for each share Restricted Stock Unit that vests on such Vest Date (the “Shares”) as soon as practicable after such Vest Date, but in no event later than March 15 of stock entitled to vote held of record by such stockholder the following calendar year.

4. Award and a proportionate vote for each fractional share so held, unless otherwise provided Restricted Stock Units Not Transferable. This Award and the Restricted Stock Units are not transferable by the Articles Holder.

5. Termination of Organization. Stockholders may vote either in person Employment or by written proxy dated not more than eleven months before Engagement. If the meeting named in the proxy. Proxies shall be filed with the clerk Holder’s status as an employee or consultant of the meeting, Company and all Affiliates is terminated for any reason (voluntary or involuntary, other than death), all Restricted Stock Units that remain unvested, and, for the avoidance of any adjourned meeting, before being voted. Except as otherwise limited by their terms, a proxy shall entitle the persons named doubt, all underlying Shares in the proxy to vote at any adjournment respect of such meeting. A stockholder may give a proxy by electronic transmission under procedures Restricted Stock Units, shall immediately and irrevocably terminate and be forfeited. Notwithstanding the foregoing, if the Holder is on military, sick leave or other leave of absence approved by the Board Company, his or her employment or engagement with the Company (or its Affiliate) will be treated as continuing intact if the period of Directors such leave does not exceed ninety (90) days, or, if longer, so long as the Holder’s right to reemployment or the Chief Executive Officer designed survival of his or her service arrangement with the Company (or its Affiliate) is guaranteed either by statute or by contract; otherwise, the Holder’s employment or engagement will be deemed to permit determination have terminated on the 91st day of such leave. If the Holder’s status as an employee or consultant of the Company and all Affiliates terminates due to such Holder’s death, all unvested Restricted Stock Units shall automatically vest as of the date of such Holder’s death.

6. Covered Retirement. Notwithstanding Section 5, if the Holder’s status as an employee of the Company and all Affiliates terminates by reason of a Covered Retirement, all unvested Restricted Stock Units will remain

outstanding and continue to vest and be settled on each remaining Vest Date without regard to the requirement that such transmission was authorized the Holder be employed by the stockholder. Company and all Affiliates. Upon the Holder's death after a Covered Retirement, all then unvested Restricted Stock Units shall automatically vest as of the date of such Holder's death. For purposes hereof, a "Covered Retirement" is the voluntary termination of a Retirement Eligible Individual who has provided the Company not less than six months' prior notice of such employee's intent to retire from the Company or an Affiliate. A proxy "Retirement Eligible Individual" means an employee of the Company or an Affiliate who is 60 years of age or older and has at least 10 years of credited employment service with the Company and/or all Affiliates.

7. No Right to Shares or as a Stockholder. The Holder shall not have any right in, to or with respect to stock held in the name of two or more persons shall be valid if executed by any one of them, unless at or prior to exercise of the proxy Shares (including voting rights or rights with respect to dividends paid on the corporation receives a specific written notice Common Stock) issuable under the Award until the Award is settled by issuance of such Shares to the contrary Holder.

8. Payment of Taxes. (a) The Holder shall pay to the Company, or make provision satisfactory to the Committee for payment of, any taxes required by law to be withheld with respect to the Shares no later than the date of the event creating the tax liability and in any event before any Shares are delivered to the Holder. The Company and its Affiliates may, to the extent permitted by law, deduct any such tax obligations from any one of them. A proxy purported to be executed by or on behalf of a stockholder shall be deemed valid unless challenged at or prior to its exercise.

1.8 Action at Meeting. When a quorum is present at any meeting, the holders of a majority of the stock present or represented and voting on a matter (or if there are two or more voting groups entitled to vote separately, then, in the case of each such voting group, the holders of a majority of the votes present or represented and voting on a matter), shall decide any matter to be voted on by the stockholders, except when a larger vote is required by law, payment

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of any kind due to the Articles Holder. The Company may, in its discretion, withhold from the Shares delivered to the Holder for any Vest Date such number of Organization Shares as the Company determines is necessary to satisfy the minimum tax obligations required by law to be withheld or these By-Laws. Any election by stockholders shall be determined by paid in connection with the issuance of such Shares, valued at their Fair Market Value on the date of issuance.

(b) With respect to a plurality Retirement Eligible Individual, the Company may, in its discretion, accelerate the vesting and settlement of a portion of the votes cast by Restricted Stock Units to the stockholders entitled extent necessary to vote at pay the election. No ballot shall be necessary for such election unless requested by a stockholder present or represented at the meeting Federal Insurance Contributions Act (FICA) tax imposed under Sections 3101, 3121(a) and entitled to vote in the election or required by the chairman 3121(v)(2) of the meeting. The corporation shall not directly or indirectly vote any share of its own stock.

1.9 Action without Meeting. Any action required or permitted Code and to be taken pay the income tax at any meeting source on wages imposed under Section 3401 of the stockholders may be taken without Code or the corresponding withholding provision of applicable state, local or foreign tax laws as a meeting if all stockholders entitled result of the payment of the FICA tax, and to vote pay the additional income tax at source on the matter consent wages attributable to the action in writing pyramiding section 3401 wages and taxes; provided that the total payment under this acceleration provision cannot exceed the aggregate of the FICA tax amount, and the written consents are filed with the records of the meetings of stockholders. Each income tax withholding related to such consent shall be treated for all purposes as a vote at a meeting.

1.10 Advance Notice of Business at Meetings of Stockholders.

(a) To the extent a stockholder is entitled as a matter of law or another provision of these By-Laws to propose a matter to be considered at FICA amount (as permitted under Treasury Regulation Section 1.409A-3(j)(4)(vi); and provided further that any meeting of the stockholders (other than the nomination of directors, which is addressed in Section 2.3), such matter may be proposed only by a person who is a stockholder of record of the corporation at the time of giving the notice provided for in this Section 1.10, who is entitled to vote at the applicable meeting, RSUs vested and who (in addition to complying with any other applicable requirements) has given timely written notice thereof settled in accordance with this Section 1.10 will reduce, share-for-share, that portion of the Award that would vest on the immediately following Vest Date.

9. Specified Employee Delay under Section 409A of the Code. The Company shall delay the issuance of any Shares upon any Vest Date to the Secretary at the principal executive offices extent necessary to comply with Section 409A(a)(2)(B)(i) of the corporation. Code (relating to payments made to "specified employees" as a result of their separation from service) to the date that is six months and one day following the date of the Holder's separation from service (or shorter period ending on the date of the Holder's death following such separation).

(B) 10.Change in Control.

(a) In order to preserve Holder's rights under this Award in the event of a change in control of the Company (as defined by the Committee), the Committee in its discretion may at any time take one or more of the following actions: (i) provide for the acceleration of any Vest Date, (ii) provide for payment to the Holder of cash or other property with a Fair Market Value equal to the amount that would have been received with respect to an annual meeting, the Shares had the Award fully vested upon the change in control, (iii) adjust the terms of this Award in a stockholder's notice must be received manner determined by the Secretary not less than ninety (90) days nor more than one hundred twenty (120) days before Committee to reflect the anniversary change in control, (iv) cause the Award to be assumed, or new rights substituted therefor, by another entity, or (v) make such other provision as the Committee may consider equitable to the Holder and in the best interests of the date on which Company.

(b) Notwithstanding anything to the corporation first transmitted to stockholders its proxy materials contrary in any agreement between the Holder and the Company, including any Executive Agreement that provides for certain treatment of outstanding equity in connection with a change in control of the immediately preceding annual meeting of stockholders; provided that, if the annual meeting is not held within thirty (30) days before or after the anniversary of such preceding annual meeting, such stockholder's notice to be timely must be so received not later Company, this Section 10(b) rather than the close provisions of business on any such agreement shall control with respect to this Award in the later event of a change in control of the Company. In the event of a change in control of the Company:

(i) Upon such change in control, (A) any performance criteria applicable to this Award shall be deemed to have been met at the one hundred twentieth (120th) day before greater of (x) the date of such annual meeting Target performance level or (ii) (y) the tenth (10th) day after the day on which notice estimated achievement level as of the date of the annual meeting was transmitted to stockholders or other public disclosure change in control (such greater level, the “CIC Level”) for each of the date of open performance measurement periods and any RSUs that could have been earned for achievement above the annual meeting was made, whichever occurs first. Notwithstanding the foregoing, the postponement or adjournment of any annual meeting for which notice has been provided to stockholders shall not commence a new time period for giving the stockholder’s notice.

(c) To be timely with respect to a special meeting, a stockholder’s notice must be received by the Secretary not less than ninety (90) days nor more than one hundred twenty (120) days before the date of the special meeting; provided that, if the first day on which notice of the special meeting is transmitted to stockholders or on which public disclosure of the date of the special meeting is made is less than one hundred (100) days before the date of the special meeting, such stockholder’s notice to be timely must be so received not later than the close of business on the tenth (10th) day after the day on which notice of the date of the special meeting was transmitted to stockholders or other public disclosure of the date of the special meeting was made, whichever occurs first. Notwithstanding the foregoing, the postponement or adjournment of any special meeting for which notice has been transmitted to stockholders shall not commence a new time period for giving the stockholder’s notice.

(d) A stockholder’s notice shall set forth as to each matter the stockholder proposes to bring before the meeting (i) a brief description of the business desired to be brought before the meeting and the reasons for conducting such business at the meeting, (ii) the name

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and record address of the stockholder proposing such business and the name and address of the beneficial owner, if any, on whose behalf the proposal is made, (iii) details of all the following that are held and/or beneficially owned, directly or indirectly, including through any entity, by such stockholder and by such beneficial owner, if any: (A) the class and number of shares of the corporation, (B) any option, warrant, convertible security, stock appreciation right, or similar right with an exercise or conversion privilege or a settlement payment or mechanism at a price related to any class or series of shares of the corporation or with a value derived in whole or in part form the value of any class or series of shares of the corporation, whether or not such instrument or right CIC Level shall be subject to settlement in the underlying class or series of capital stock of the corporation or otherwise (a "Derivative Instrument") automatically cancelled, (B) such CIC Level RSUs shall remain unvested and any other direct or indirect opportunity of any such person to profit or share in any profit derived from any increase or decrease in the value of shares of the corporation, (C) any proxy, contract, arrangement, understanding, or relationship pursuant to which such stockholder or such other beneficial owner, if any, has a right to vote any shares of any security of the corporation, (D) any short interest in any security of the corporation (for purposes of this By-Law a person shall be deemed to have a short interest in a security if such person directly or indirectly, through any contract, arrangement, understanding relationship or otherwise, has the opportunity to profit or share in any profit derived from any decrease in the value of the subject security), (E) any rights to dividends on the shares of the corporation that are separated or separable from the underlying shares of the corporation, and (F) any performance-related fees (other than an asset-based fee) that such stockholder or such beneficial owner, if any, is entitled to based on any increase or decrease in the value of shares of the corporation or Derivative Instruments, if any, as of the date of such notice, including without limitation any such interest held by members of such stockholder's immediate family sharing the same household (which information shall be supplemented by such stockholder and beneficial owner, if any, not later than ten (10) days after the record date for the meeting to disclose such ownership as of the record date), (iv) a description of any material interest of the stockholder and of such beneficial owner, if any, in such business, (v) a description of any agreement, arrangement or understanding such stockholder or such beneficial owner, if any, has with any other person(s) relating to the subject matter of such business, and (vi) the basis upon which the stockholder is entitled to make the proposal.

(e) Notwithstanding anything in these By-Laws to the contrary, no business proposed by a stockholder shall be conducted at any meeting of stockholders except vest in accordance with the procedures set forth in this Section, whether or not the stockholder (if otherwise permitted by applicable law) seeks inclusion of such proposal in the corporation's proxy statement for the meeting; vesting schedule; provided that if this Award is not assumed or a cash payment of equivalent value is not substituted therefor (in either case with vesting terms no more restrictive than those of this Award) by any stockholder proposal that complies with Rule 14a-8 (or any acquirer of or successor provision) of to the proxy rules promulgated under Company, then this Award shall become vested at the Securities Exchange Act of 1934, as amended, CIC Level upon such change in control, and is included in the corporation's proxy statement for the applicable stockholders meeting (C) this Award shall be deemed amended to comply with the requirements for the timing and content of notices hereunder.

(f) The chairman provide that, notwithstanding any provision of the respective stockholders meeting Plan, this Award may not be terminated or forfeited without the Holder's written consent (provided that this shall if not prevent termination (1) of any unvested portion hereof that is terminated or forfeited upon termination of the facts warrant, determine and declare Holder's employment (other than a change in control termination covered by this Section 10(b)), or (2) upon payment of a cash payment equivalent to the meeting that business was not properly brought before the meeting in accordance with the provisions value of this Section 1.10, Award at the CIC Level); and

(ii) Upon a change in control termination (as such term may be defined in any existing agreement), all unvested CIC Level RSUs shall immediately become vested and distributable in full, and, if he should so determine, he shall so declare such change in control termination would entitle the Holder to the meeting and a Make-Up Payment (as such term may be defined in any such business not properly brought before the meeting shall not be transacted.

Article 2

- Directors

2.1 <u>Powers</u>. The business of the corporation shall be managed by a Board of Directors, who may exercise all the powers of the corporation except as otherwise provided by law, by the Articles of Organization or by these By-Laws. In the event of a vacancy in the Board of Directors, the remaining Directors, except as otherwise provided by law, may exercise the powers of the full Board until the vacancy is filled.

2.2 <u>Number, Election and Qualification</u>. The number of Directors which shall constitute the whole Board of Directors shall be determined by vote of the stockholders or the Board of Directors, but shall consist of not less than three Directors (except that whenever there shall be only two stockholders the number of Directors shall be not less than two and whenever there shall be only one stockholder, there shall be at least one Director). The number of Directors may be decreased at any time and from time to time either by the stockholders or by a majority of the Directors then in office, but only to eliminate vacancies existing by reason of the death, resignation, removal or expiration of the term of one or more Directors. Directors need not be stockholders of the corporation. Notwithstanding the foregoing provisions, if the corporation is a "public corporation" within the meaning of Section 8.06 of the Massachusetts Business Corporation Act and has not elected, pursuant to paragraph (c) of such Section 8.06, to be exempt from the provisions of paragraph (b) of such Section 8.06, then:

(i) In accordance with paragraph (e), clause (4) of such Section 8.06, the number of directors shall be fixed only by vote of the Board of Directors.

(ii) In accordance with paragraph (b) of such Section 8.06, the Directors of the corporation shall be classified agreement) with respect to this Award under any existing agreement, then the time for which they severally hold office, into three classes, as nearly equal in number as possible; the term of office of those of the first class ("Class I Directors") to continue until the first annual meeting following the date the corporation becomes subject to such paragraph (a) and until their successors are duly elected and qualified; the term of office of those of the second class ("Class II Directors") to continue until the second annual meeting following the date the corporation becomes subject to such paragraph (a) and until their successors are duly elected and qualified; and the term of office of those of the third class ("Class III Directors") to continue until the third annual meeting following the date the corporation becomes subject to such paragraph (a) and until their successors are duly elected and qualified. At each annual meeting of the corporation, the successors to the class of directors whose term expires at that meeting shall be elected to hold office for a term continuing until the annual meeting held in the third year following the year of their election and until their successors are duly elected and qualified.

2.3 Nomination of Directors.

(a) Only persons who are nominated in accordance with this Section 2.3 shall be eligible for election as directors at any annual or special meeting of stockholders. Nominations of persons for election as directors may be made only (i) by or at the direction of the Board of Directors or (ii) by any person who is a stockholder of record of the corporation at the time of giving the notice provided for in this Section 2.3, who is entitled to vote for the election of directors at the applicable meeting, and who (in addition to any other applicable requirements) has given timely written notice thereof in accordance with this Section 2.3 to the Secretary at the principal executive offices of the corporation.

(b) To be timely with respect to an annual meeting, a stockholder's notice must be received by the Secretary not less than ninety (90) days nor more than one hundred twenty

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(120) days before the anniversary of the date on which the corporation first transmitted to stockholders its proxy materials for the immediately preceding annual meeting of stockholders; provided that, if the annual meeting is not held within thirty (30) days before or after the anniversary of such preceding annual meeting, such stockholder's notice to be timely must be so received not later than the close of business on the later of (i) the one hundred twentieth (120th) day before the date of such annual meeting or (ii) the tenth (10th) day after the day on which notice of the date of the annual meeting was transmitted to stockholders or other public disclosure of the date of the annual meeting was made, whichever occurs first. Notwithstanding the foregoing, the postponement or adjournment of any annual meeting for which notice has been provided to stockholders shall not commence a new time period for giving the stockholder's notice.

(c) To be timely with respect to a special meeting, a stockholder's notice must be received by the Secretary not less than ninety (90) days nor more than one hundred twenty (120) days before the date of the special meeting; provided that, if the first day on which notice of the special meeting is transmitted to stockholders or on which public disclosure of the date of the special meeting is made is less than one hundred (100) days before the date of the special meeting, such stockholder's notice to be timely must be so received not later than the close of business on the tenth (10th) day after the day on which notice of the date of the special meeting was transmitted to stockholders or other public disclosure of the date of the special meeting was made, whichever occurs first. Notwithstanding the foregoing, the postponement or adjournment of any special meeting for which notice has been provided to stockholders shall not commence a new time period for giving the stockholder's notice.

(d) Such stockholder's notice shall set forth (a) as to each person whom the stockholder proposes to nominate for election or re-election as a director: (i) the name, age, business address and residence address of the person, (ii) the principal occupation or employment of the person, (iii) the class and number of shares of capital stock of the corporation that are beneficially owned by the person, (iv) whether or not the person is currently "independent" from the corporation under the independence standards of the principal national securities exchange on which the corporation's shares are then traded and all facts that currently prevent the person from being independent under such standards, if applicable, and (v) any other information relating to the person that is required to be disclosed in solicitations for proxies for election of directors pursuant to Regulation 14A under the Securities Exchange Act of 1934, as amended; (b) as to the stockholder giving the notice: (i) the name and record address of such stockholder and the name and address of the beneficial owner, if any, on whose behalf the proposal is made and (ii) the information described in Section 1.10(d)(iii); and (c) a description of all familial, compensatory, financial and/or other relationships, arrangements and transactions, existing at any time within the preceding three years or currently proposed, between the person proposed to be nominated as a director and such stockholder or such beneficial owner, if any, or any of their respective affiliates and associates. The corporation may require any proposed nominee to furnish such other information as it may reasonably require to determine the proposed nominee's eligibility, or lack thereof, to serve as an independent director of the corporation.

(e) The chairman of the meeting shall, if the facts warrant, determine and declare to the meeting that a nomination was not made in accordance with this Section 2.3, and if he should so determine, he shall so declare to the meeting and the defective nomination shall be disregarded.

2.4 Enlargement of the Board. Subject to Section 2.2 above, the number of Directors may be increased at any time and from time to time by the stockholders or by a majority of the Directors then in office.

2.5 Tenure. Subject to Section 2.2 above, each Director shall hold office until the next annual meeting of stockholders and until his successor is elected and qualified or until his earlier death, resignation or removal.

2.6 Vacancies.

(a) Unless and until filled by the stockholders, any vacancy in the Board of Directors, however occurring, including a vacancy resulting from an enlargement of the Board, may be filled by vote of a majority of the Directors present at any meeting of Directors at which a quorum is present. Each such successor shall hold office for the unexpired term of his predecessor and until his successor is chosen and qualified or until his earlier death, resignation or removal.

(b) Notwithstanding the foregoing provisions, if the corporation is a "public corporation" within the meaning of Section 8.06 of the Massachusetts Business Corporation Act and has not elected, pursuant to paragraph (c) of such Section 8.06, to be exempt from the provisions of paragraph (b) of such Section 8.06, then (i) vacancies and newly created directorships, whether resulting from an increase in the size of the Board of Directors, from the death, resignation, disqualification or removal of a director or otherwise, shall be filled solely by the affirmative vote of a majority of the remaining Directors then in office, even though less than a quorum of the Board of Directors, and (ii) any Director elected in accordance with clause (i) shall hold office for the remainder of the full term of the class of Directors in which the vacancy occurred or the new directorship was created and until such Director's successor shall have been elected and qualified or until his earlier death, resignation or removal.

2.7 Resignation. Any Director may resign by delivering his written resignation to the corporation at its principal office or to the Chairman of the Board, the Chief Executive Officer or Secretary. Such resignation shall be effective upon receipt unless it is specified to be effective at some other time or upon the happening of some other event.

2.8 Removal.

(a) A Director may be removed from office with or without cause by vote of the holders of a majority of the shares entitled to vote in the election of Directors. However, the Directors elected by the holders of a particular class or series of stock may be removed from office with or without cause only by vote of the holders of a majority of the outstanding shares of such class or series. In addition, a Director may be removed from office for cause by vote of a majority of the Directors then in office. A Director may be removed for cause only after reasonable notice and opportunity to be heard before the body proposing to remove him.

(b) Notwithstanding the foregoing provisions, if the corporation is a “public corporation” within the meaning of Section 8.06 of the Massachusetts Business Corporation Act and has not elected, pursuant to paragraph (c) of such Section 8.06, to be exempt from the provisions of paragraph (b) of such Section 8.06, then stockholders may effect, by the affirmative vote of a majority of the shares outstanding and entitled to vote in the election of Directors, the removal of any Director or Directors or the entire Board of Directors only for cause, as defined in paragraph (f) of such Section 8.06.

2.9 Regular Meetings. Regular meetings of the Directors may be held without call or notice at such places, within or without Massachusetts, and at such times as the Directors may from time to time determine, provided that any Director who is absent when such determination is made shall be given notice of the determination. A regular meeting of the Directors may be held without a call or notice immediately after and at the same place as the annual meeting of stockholders.

2.10 Special Meetings. Special meetings of the Directors may be held at any time and place, within or without Massachusetts, designated in a call by the Chairman of the Board, Chief Executive Officer, Treasurer, two or more Directors or by one Director in the event that there is only a single Director in office.

2.11 Meetings by Telephone Conference Calls or Other Electronic Communication. Directors or members of any committee designated by the Directors may participate in a meeting of the Directors or such committee by means of a conference telephone or other electronic communications equipment by means of which all persons participating in the meeting can hear each other at the same time and participation by such means shall constitute presence in person at a meeting.

2.12 Notice of Special Meetings. Notice of any special meeting of the Directors shall be given to each Director by the Secretary or by the officer or one of the Directors calling the meeting. Notice shall be duly given to each Director (i) by notice given to such Director in person or by telephone at least 48 hours in advance of the meeting, (ii) by sending an electronic communication, or by delivering written notice by hand, to his last known business or home address at least 48 hours in advance of the meeting, or (iii) by mailing written notice to his last known business or home address at least 72 hours in advance of the meeting. Notice need not be given to any Director if a written waiver of notice, executed by him before or after the meeting, is filed with the records of the meeting, or to any Director who attends the meeting without protesting prior to the meeting or at its commencement the lack of notice to him. A notice or waiver of notice of a Directors’ meeting need not specify the purposes of the meeting. If notice is given in person or by telephone, an affidavit of the Secretary, officer or Director who gives such notice that the notice has been duly given shall, in the absence of fraud, be conclusive evidence that such notice was duly given.

2.13 Quorum. At any meeting of the Board of Directors, a majority of the Directors then in office shall constitute a quorum. Less than a quorum may adjourn any meeting from time to time without further notice.

2.14 Action at Meeting. At any meeting of the Board of Directors at which a quorum is present, the vote of a majority of those present shall be sufficient to take any action, unless a different vote is specified by law, by the Articles of Organization or by these By-Laws.

2.15 Action by Consent. Any action required or permitted to be taken at any meeting of the Board of Directors may be taken without a meeting if all the Directors consent to the action in writing, signed by each director or delivered to the corporation by electronic transmission, and the written consents are filed with the records of the Directors' meetings. Each such consent shall be treated for all purposes as a vote at a meeting.

2.16 Committees. The Board of Directors may, by vote of a majority of the Directors then in office, elect from their number an executive committee or other committees and may by like vote delegate to committees so elected some or all of their powers to the extent permitted by law. Except as the Board of Directors may otherwise determine, any such committee may make rules for the conduct of its business, but unless otherwise provided by the Directors or in such rules, its business shall be conducted as nearly as possible in the same manner as is provided by these By-Laws for the Directors. The Board of Directors shall have the power at any time to fill vacancies in any such committee, to change its membership or to discharge the committee.

2.17 Chairman of the Board and Vice-Chairman of the Board. The Board of Directors may appoint a Chairman of the Board. If the Board of Directors appoints a Chairman of the Board, he shall preside at meetings of the Directors and the stockholders and shall perform such other duties and possess such powers as are assigned to him by the Board of Directors. If the Board of Directors appoints a Vice-Chairman of the Board, he shall, in the absence or disability of the Chairman of the Board, perform the duties and exercise the powers of the Chairman of the Board and shall perform such other duties and possess such other powers as may from time to time be vested in him by the Board of Directors.

2.18 Compensation of Directors. Directors may be paid such compensation for their services and such reimbursement for expenses of attendance at meetings as the Board of Directors may from time to time determine. No such payment shall preclude any Director from serving the corporation in any other capacity and receiving compensation therefor.

ARTICLE 3- Officers

3.1 Enumeration. The officers of the corporation shall consist of a Chief Executive Officer, a President, a Treasurer, a Secretary and such other officers with such other titles as the Board of Directors or the Chief Executive Officer may determine, including, but not limited to one or more Vice Presidents, Assistant Treasurers, and Assistant Secretaries.

3.2 Election. The Chief Executive Officer, President, Treasurer and Secretary shall be elected annually by the Board of Directors at their first meeting following the annual meeting of stockholders. Other officers may be chosen or appointed by or under the authority of the Board of Directors.

3.3 Qualification. No officer need be a director or stockholder. Any two or more offices may be held by the same person. Any officer may be required by the Directors to give bond for the faithful performance of his duties to the corporation in such amount and with such sureties as the Directors may determine. The premiums for such bonds may be paid by the corporation.

3.4 Tenure. Except as otherwise provided by law, by the Articles of Organization or by these By-Laws, the Chief Executive Officer, President, Treasurer and Secretary shall hold office until the first meeting of the Directors following the next annual meeting of stockholders and until their respective successors are chosen and qualified, or until their earlier death, resignation or removal; and all other officers shall serve at the pleasure of the Directors.

3.5 Resignation and Removal.

(a) Any officer may resign by delivering his written resignation to the corporation at its principal office or to the Chief Executive Officer or Secretary. Such resignation shall be effective upon receipt unless it is specified to be effective at some other time or upon the happening of some other event.

(b) An officer may be removed at any time, with or without cause, by or under the authority of the Board of Directors.

(c) Except as the Board of Directors may otherwise determine, no officer who resigns or is removed shall have any right to any compensation as an officer for any period following his resignation or removal, or any right to damages on account of such removal, whether his compensation be by the month or the year or otherwise, unless such compensation is expressly provided in a duly authorized written agreement with the corporation.

3.6 Vacancies. Any vacancy occurring in any office for any reason may be filled by or under the authority of the Board of Directors, which may, in its discretion, leave unfilled for such period as it may determine any offices other than those of President, Treasurer and Secretary. Each such successor shall hold office for the unexpired term of his predecessor and until his successor is chosen and qualified, or until he sooner dies, resigns or is removed.

3.7 Chief Executive Officer. The Chief Executive Officer shall, subject to the direction of the Board of Directors, have general charge and supervision of the business of the corporation. Unless a separate Chairman of the Board has been appointed, or except as otherwise provided by the Board of Directors, he shall preside at all meetings of the stockholders and, if he is a Director, at all meetings of the Board of Directors.

3.8 President. The President shall, subject to the direction of the Chief Executive Officer, have general charge and supervision of the business of the corporation and shall perform such other duties and shall possess such other powers as the Chief Executive Officer may from time to time prescribe. If no other Chief Executive Officer has been appointed, or in the event of the absence, inability or refusal to act of the Chief Executive Officer, the President shall perform the duties of the Chief Executive Officer and when so performing shall have all the powers of and be subject to all the restrictions upon the Chief Executive Officer.

3.9 Vice Presidents. Any Vice President shall perform such duties and possess such powers as the Board of Directors, the Chief Executive Officer or the President may from time to time prescribe. The Board of Directors or the Chief Executive Officer may assign to any Vice President the title of Executive Vice President, Senior Vice President or any other title.

3.10 Treasurer and Assistant Treasurers.

(a) The Treasurer shall perform such duties and shall have such powers as may from time to time be assigned to him by the Board of Directors or the Chief Executive Officer. In addition, the Treasurer shall perform such duties and have such powers as are incident to the office of treasurer, including without limitation the duty and power to keep and be responsible for all funds and securities of the corporation, to deposit funds of the corporation in depositories selected in accordance with these By-Laws, to disburse such funds as ordered by the Board of Directors, to make proper accounts of such funds, and to render as required by the Board of Directors statements of all such transactions and of the financial condition of the corporation.

(b) The Assistant Treasurers shall perform such duties and possess such powers as the Board of Directors, the Chief Executive Officer or the Treasurer may from time to time prescribe. In the event of the absence, inability or refusal to act of the Treasurer, the Assistant Treasurer (or if there shall be more than one, the Assistant Treasurers in the order determined by the Board of Directors) shall perform the duties and exercise the powers of the Treasurer.

3.11 Secretary and Assistant Secretaries.

(a) The Secretary shall perform such duties and shall possess such powers as the Board of Directors or the Chief Executive Officer may from time to time prescribe. In addition, the Secretary shall perform such duties and have such powers as are incident to the office of the

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clerk, including without limitation the duty and power to give notices of all meetings of stockholders and special meetings of the Board of Directors, to attend all meetings of stockholders and the Board of Directors and keep a record of the proceedings, to maintain a stock ledger and prepare lists of stockholders and their addresses as required, to be custodian of corporate records and the corporate seal and to affix and attest to the same on documents.

(b) Any Assistant Secretary shall perform such duties and possess such powers as the Board of Directors, the Chief Executive Officer or the Secretary may from time to time prescribe. In the event of the absence, inability or refusal to act of the Secretary, the Assistant Secretary (or if there shall be more than one, the Assistant Secretaries in the order determined by the Board of Directors) shall perform the duties and exercise the powers of the Secretary.

(c) In the absence of the Secretary or any Assistant Secretary at any meeting of stockholders or Directors, the person presiding at meeting shall designate a temporary Secretary to keep a record of the meeting.

3.12 Salaries. Officers of the corporation Holder shall be entitled to such salaries, compensation or reimbursement as shall be fixed or allowed from time to time by the Board of Directors.

ARTICLE 4- Capital Stock

4.1 Issue of Capital Stock. Unless otherwise voted by the stockholders, the whole or any part of any unissued balance of the authorized capital stock of the corporation or the whole or any part of the capital stock of the corporation held in its treasury may be issued or disposed of by vote of the Board of Directors, in such manner, for such consideration and on such terms as the Directors may determine.

4.2 Certificate of Stock; Uncertificated Shares.

(a) Shares of the corporation’s capital stock may be represented by certificates or may be uncertificated as prescribed from time to time by or under the authority of the Directors. Certificates for shares shall be signed by the Chief Executive Officer, the President or a Vice President, and by the Treasurer or an Assistant Treasurer, but when a certificate is countersigned by a transfer agent or a registrar, other than a Director, officer or employee of the corporation, such signature may be a facsimile. In case any officer who has signed or whose facsimile signature has been placed upon such certificate shall have ceased to be such officer before such certificate is issued, it may be issued by the corporation with the same effect as if he were such officer at the time of its issue.

(b) Every certificate for shares of stock which are subject to any restriction on transfer pursuant to the Articles of Organization, the By-Laws, applicable securities laws or any agreement to which the corporation is a party, shall have conspicuously noted on the face or back of the certificate either the full text of the restriction or a statement of the existence of such restrictions and a statement that the corporation will furnish a copy of the restrictions to the holder of such certificate upon written request and without charge. Every certificate issued when the corporation is authorized to issue more than one class or series of stock shall set forth on its face or back either the full text of the preferences, voting powers, qualifications and special and relative rights of the shares of each class and series authorized to be issued or a statement of the existence of such preferences, powers, qualifications and rights and a statement that the corporation will furnish a copy thereof to the holder of such certificate upon written request and without charge. Holders of uncertificated shares shall be provided with a

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statement of the information set forth above as applicable and as required by the Massachusetts Business Corporation Act.

4.3 Transfers. Subject to the restrictions, if any, stated or noted on the stock certificates or provided to the holder of uncertificated shares, shares of stock may be transferred on the books of the corporation by (a) the surrender to the corporation or its transfer agent of the certificate representing such shares properly endorsed or accompanied by a written assignment or power of attorney properly executed or (b) proper transfer instructions from the registered owner of uncertificated shares, in each case with such proof of authority or the authenticity of signature as the corporation or its transfer agent may reasonably require. Except as may be otherwise required by law, by the Articles of Organization or by these By-Laws, the corporation shall be entitled to treat the record holder of stock as shown on its books as the owner of such stock for all purposes, including the payment of dividends and the right to vote Make-Up Payment with respect thereto, regardless of any transfer, pledge or other disposition of such stock until the shares have been transferred on the books of the corporation in accordance with the requirements of these By-Laws. to this Award.

11. Securities and Other Laws. It shall be a condition to the duty Holder's right to receive the Shares hereunder that the Company may, in its discretion, require (a) that the Shares shall have been duly listed, upon official notice of each stockholder to notify the corporation of his post office address and of his taxpayer identification number.

4.4 Record Date.

(a) The Board of Directors may fix in advance a time not more than 70 days preceding the date of issuance, upon any meeting of stockholders national securities exchange or the date for the payment of any dividend or the making of any distribution to stockholders or the last day automated quotation system on which the consent Company's Common Stock may then be listed or dissent of stockholders may be effectively expressed for any purpose, as the record date for determining the stockholders having the right to notice of and to vote at such meeting, and any adjournment, or the right to receive such dividend or distribution or the right to give such consent or dissent. In such case only stockholders of record on such record date shall have such right, notwithstanding any transfer of stock on the books of the corporation after the record date. Without fixing such record date the Directors may for any of such purposes close the transfer books for all or any part of such period.

quoted, (b) If no record date is fixed and the transfer books are not closed, the record date for determining the stockholders having the right to notice of or to vote at that either (i) a meeting of stockholders shall be at the close of business on the day before the day on which notice is given, and the record date for determining the stockholders for any other purpose shall be at the close of business on the day on which the Board of Directors acts with respect to such purpose.

(c) A determination of stockholders entitled to notice of or to vote at a meeting of stockholders is effective for any postponement or adjournment of the meeting unless the meeting is postponed or adjourned to a date more than one hundred twenty days after the date fixed for the original meeting, in which case the Board of Directors shall fix a new record date.

4.5 Replacement of Certificates. In case of the alleged loss or destruction or the mutilation of a certificate of stock, a duplicate certificate or uncertificated shares may be issued in place of the lost, destroyed or mutilated certificate, upon such terms as the Directors may prescribe, including the presentation of reasonable evidence of such loss, destruction or mutilation and the giving of such indemnity as the Directors may require for the protection of the corporation or any transfer agent or registrar.

ARTICLE 5- Miscellaneous Provisions

5.1 Fiscal Year. Except as otherwise set forth in the Articles of Organization or as otherwise determined from time to time by the Board of Directors, the fiscal year of the corporation shall in each year end on September 30.

5.2 Seal. The seal of the corporation shall, subject to alteration by the Directors, bear its name, the word "Massachusetts" and the year of its incorporation.

5.3 Voting of Securities. The Chief Executive Officer, the President, the Chief Financial Officer, the Treasurer, the Secretary or any other person the Board of Directors may designate may waive notice of, and act as, or appoint any person or persons to act as, proxy or attorney-in-fact for this corporation (with or without power of substitution) at, any meeting of or other action by stockholders, shareholders or members of any other corporation or organization, the securities of which may be held by this corporation.

5.4 Corporate Records. The corporation shall keep, in Massachusetts at the principal office of the corporation, or at an office of its transfer agent or of the Secretary, such records as are required by the Massachusetts Business Corporation Act. These copies and records need not all be kept in the same office. They shall be available for inspection by stockholders for any proper purpose and in conformity with said Act.

5.5 Evidence of Authority. A certificate by the Secretary or an Assistant or temporary Secretary as to any action taken by the stockholders, Directors, any committee or any officer or representative of the corporation shall as to all persons who rely on the certificate in good faith be conclusive evidence of such action.

5.6 Articles of Organization. All references in these By-Laws to the Articles of Organization shall be deemed to refer to the Articles of Organization of the corporation, as amended and in effect from time to time.

5.7 Severability. Any determination that any provision of these By-Laws is for any reason inapplicable, illegal or ineffective shall not affect or invalidate any other provision of these By-Laws.

5.8 Pronouns. All pronouns used in these By-Laws shall be deemed refer to the masculine, feminine or neuter, singular or plural, as the identity of the person or persons may require.

5.9 Forum for Adjudication of Disputes. Unless the corporation consents in writing to the selection of an alternative forum, the sole and exclusive forum for (i) any derivative action or proceeding brought on behalf of the corporation, (ii) any action asserting a claim of breach of a fiduciary duty owed by any director or officer or other employee of the corporation to the corporation or the corporation's stockholders, (iii) any action asserting a claim against the corporation or any director or officer or other employee of the corporation arising pursuant to any provision of the Massachusetts Business Corporation Act or the corporation's Articles of Organization or By-Laws (as either may be amended from time to time), or (iv) any action asserting a claim against the corporation or any director or officer or other employee of the corporation governed by the internal affairs doctrine shall, in all cases subject to such court's having personal jurisdiction over the indispensable parties named as defendants, be either the Business Litigation Session of the Superior Court of Suffolk County, Massachusetts or, if such venue is not permissible, another Massachusetts state court located in Suffolk or Norfolk County, or a federal court located in Massachusetts. Unless the corporation consents in writing to the

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selection of an alternative forum, the federal district courts of the United States of America shall be the sole and exclusive forum for resolving any complaint asserting a cause of action arising registration statement under the Securities Act of 1933 with respect to the Shares shall be in effect, or (ii) in the opinion of counsel for the Company, the proposed issuance and delivery of the Shares to the Holder shall be exempt from registration under that Act and the Holder shall have made such undertakings and agreements with the Company as amended. Any the Company may reasonably require, and (c) that such other steps, if any, as counsel for the Company shall consider necessary to comply with any law applicable to the issue of such Shares by the Company shall have been taken by the Company or the Holder, or both.

12. No Right to Employment. No person shall have any claim or entity purchasing right to be granted an Award. Each employee of the Company or any of its Affiliates is an employee-at-will (that is to say that either the Holder or the Company or any Affiliate may terminate the employment relationship at any time for any reason or no reason at all) unless, and only to the extent, provided in a written employment agreement for a specified term executed by the chief executive officer of the Company or his or her duly authorized designee or the authorized signatory of any Affiliate. Neither the adoption, maintenance, nor operation of the Plan nor any Award thereunder shall confer upon the Holder or any employee of the Company or of any Affiliate any right with respect to the continuance of his or her employment by the Company or any such Affiliate nor shall they interfere with the right of the Company (or Affiliate) to terminate him or her at any time or otherwise acquiring change the terms of employment, including, without limitation, the right to promote, demote or otherwise re-assign him or her from one position to another within the Company or any interest Affiliate.

13. Cancellation of Award; Recoupment of Amounts Realized. The Holder agrees that, pursuant to the Company's Executive Compensation Recoupment Policy as in shares effect on the date of capital stock this Award (the "Policy"), the Company may (a) cancel this Award and all or any portion of the corporation Restricted Stock Units, (b) reacquire for any or no consideration all or any portion of the Shares following issuance (if such Shares are then held by the Holder or any person to whom the Holder transferred Shares other than for fair market value (a "Covered Transferee")), and/or (c) recoup any amounts realized by the Holder and/or any Covered Transferee with respect to the Shares. The Holder agrees that he or she will, promptly upon request by the Company pursuant to the Policy, (x) return to the Company for cancellation any certificate representing the Shares and/or (y) pay to the Company up to the total amount realized by the Holder and/or any Covered Transferee with respect to the Shares, and that the Company and/or any of its affiliates may, to the extent permitted by law, deduct any such amount from any payment of any kind due to the Holder. All determinations by the Committee hereunder shall be final and binding on all interested parties. Any dispute

with respect to the terms of this Award or any such recoupment shall be resolved by confidential, binding arbitration in Boston, Massachusetts before the American Arbitration Association, under its Commercial Arbitration Rules.

14. Effect of Death or Disability. Notwithstanding anything to the contrary in any agreement between the Holder and the Company, including any Executive Agreement that provides for certain treatment of outstanding equity in connection with the Holder's death or disability, this Section 14 rather than the provisions of any such agreement shall control with respect to this Award in the event of Holder's death or disability. In the event of Holder's death or Disability (as such term may be defined in such an agreement), (i) any performance criteria applicable to this Award shall be deemed to have notice been met at the Target level for each of the open performance measurement periods and consented to any RSUs that could have been earned in excess of the provisions Target RSUs shall automatically be cancelled, and (ii) all of the unvested Target RSUs shall immediately become vested and distributable in full.

15. Miscellaneous. The Holder agrees that the obligations imposed on the Holder in this Agreement will apply during Holder's employment with PTC and will survive the termination of Holder's employment. The Holder further agrees that any change in Holder's position, title or responsibilities while employed by PTC will not invalidate or otherwise affect the validity or enforceability of this Section 5.9.

ARTICLE 6- Amendments Agreement.

These By-Laws may be amended by vote of the holders of a majority of the shares of each class of the capital stock at the time outstanding and entitled to vote at any annual or special meeting of stockholders, if notice of the substance of the proposed amendment is stated in the notice of such meeting. If authorized by the Articles of Organization, the Directors, by a majority of their number then in office, may also make, amend or repeal these By-Laws, in whole or in part, except with respect to (a) the provisions of these By- Laws governing (i) the removal of directors and (ii) the amendment of these By-Laws and (b) any provision of these By-Laws which by law, the Articles of Organization or these By-Laws requires action by the stockholders.

Not later than the time of giving notice of the meeting of stockholders next following the making, amending or repealing by the Directors of any By-Law, notice stating the substance of such change shall be given to all stockholders entitled to vote on amending the By-Laws.

Any By-Law adopted by the Directors may be amended or repealed by the stockholders entitled to vote on amending the By-Laws.

As amended through June 24, 2021

Exhibit 10.6 10.5

EXECUTIVE AGREEMENT

This Executive Agreement ("Agreement") dated as of September 23, 2021 is by and between PTC Inc., a Massachusetts corporation (the "Company"), and Catherine Kniker [NAME] (the "Executive").

WHEREAS, the Executive is the [TITLE] of the Company;

WHEREAS, the Executive Vice President, Chief Strategy Officer; and has executed a Restrictive Covenant Agreement with the Company;

WHEREAS, the Company wishes to make the following arrangements with the Executive concerning certain payments and benefits to be provided to the Executive in the event of a Change in Control of the Company or if the Executive's employment with the Company is terminated without Cause or if in certain other events circumstances specified herein occur; herein;

NOW, THEREFORE, the Company and the Executive hereby agree as follows:

1. <u>Definitions.</u>Definitions

For the purposes of this Agreement:

(a) "Board" "Board" means the Company's board of directors.

(b) "Code" means the U.S. Internal Revenue Code of 1986, as amended.

(c) "Cause" means means:

(i)

the Executive's willful and continued failure to substantially perform the Executive's duties to the Company (other than any such failure resulting from the Employee's incapacity due to physical or mental illness), provided that the Company has delivered a written demand for performance to the Executive specifically identifying the manner in which the Company believes that the Executive has not substantially performed the Executive's duties and the Executive does not cure such failure within thirty (30) days after such demand;

(ii)

willful conduct by the Executive which is demonstrably and materially injurious to the Company;

(iii)

the Executive's conviction of, or pleading of guilty or nolo contendere to, a felony;

(iv)

the Executive's entry in the Executive's personal capacity into a consent decree relating to the business of the Company with any government body; or

(v)

the Executive’s willful violation of any material provision of the Executive’s Non-Disclosure, Non-Competition and Invention Agreement with the Company; Restrictive Covenant Agreement; provided that, if such violation can be cured, the Executive has not, within thirty (30) days after written demand by the Company, cured such violation.

For purposes of this definition, no act or failure to act on the Executive’s part shall be deemed “willful” unless done or omitted to be done by the Executive not in good faith and without reasonable belief that the Executive’s action or omission was in the best interests of the Company.

(d) “Change in Control” means the occurrence of any of the following events:

(i) any “person,” as such term is used in Sections 13(d) and 14(d) of the Securities Exchange

Act of 1934, as amended (the “Exchange Act”) (other than the Company, any trustee or other fiduciary holding securities under an employee benefit plan of the Company, or any corporation owned directly or indirectly by the stockholders of the Company in substantially the same proportion as their ownership of stock in the Company) is or becomes the “beneficial owner” (as defined in Rule 13d-3 under the Exchange Act), directly or indirectly, of securities of the Company representing fifty percent (50%) or more of the combined voting power of the Company’s then outstanding securities (other than as a result of acquisitions of such securities from the Company);

(ii)

individuals who constitute the Board as of the date hereof constitute the Board (the “Incumbent Board”) cease for any reason to constitute at least a majority of the Board, provided that any person becoming a director subsequent to the date hereof whose election, or nomination for election by the Company’s stockholders, was approved by a vote of at least a majority of the directors then comprising the Incumbent Board (other than an election or nomination of an individual whose initial assumption of office is in connection with an actual or threatened election contest relating to the election of the directors of the Company) shall be, for purposes of this Agreement, considered to be a member of the Incumbent Board;

(iii)

the consummation of a merger, share exchange or consolidation of the Company or any subsidiary of the Company with any other entity (each a “Business Combination”), other than (A) a Business Combination that would result in the voting securities of the Company outstanding immediately prior thereto continuing to represent (either by remaining outstanding or by being converted into voting securities of another entity) beneficial ownership, directly or indirectly, of a majority of the combined voting power of the Company or the surviving entity (including any person that, as a result of such transaction, owns all or substantially all of the Company’s assets either directly or through one or more subsidiaries) outstanding immediately after such Business Combination or (B) a merger, share exchange or consolidation effected to implement a recapitalization of the Company (or similar transaction) in which no “person” (as defined above) is or becomes the beneficial owner of fifty percent (50%) or more of the combined voting power of the Company’s then outstanding securities; or

(iv)

the stockholders of the Company approve (A) a plan of complete liquidation of the Company; or (B) an agreement for the sale or disposition by the Company of all or substantially all of the Company's assets but excluding a sale assets;

(v) the liquidation or spin-off of a product line, business unit or line of business dissolution of the Company if the remaining business is significant as determined by the Company's board of directors in its sole discretion.

(e) "Change in Control Termination" means any of the following terminations of the Executive's employment:

employment:

(i)termination of the Executive's employment by the Company during the period from the date of a Change in Control through the second anniversary thereof, other than for Cause or as a result of the Executive's death or Disability;

(ii)

resignation by the Executive for Good Reason during the period from the date of a Change in Control through the second anniversary thereof; or

(iii)

termination of the Executive's employment by the Company within one hundred eighty (180) days prior to a Change in Control, other than for Cause or as a result of the Executive's death or Disability, if it is reasonably demonstrated by the Executive that such termination of employment (A) was at the request of a third party that has taken steps reasonably calculated to effect the Change in Control or (B) was otherwise related to or in anticipation of the Change in Control. A Change in Control Termination under this Section 1(e)(iii) shall be deemed to have occurred when the Change in Control occurs.

(f) "Disability" means such physical or mental incapacity as to make the Executive unable to perform

the essential functions of the Executive's employment duties for a period of at least sixty (60) consecutive days with or without reasonable accommodation. If any question shall arise as to whether during any period the Executive is so disabled as to be unable to perform the essential functions of the Executive's employment duties with or without reasonable accommodation, the Executive may, and at the request of the Company shall, submit to the Company a certification in reasonable detail by a physician selected by the Company to whom the Executive or the Executive's guardian has no reasonable objection as to whether the Executive is so disabled or how long such disability is expected to continue, and such certification shall for the purposes of this Agreement be conclusive of the issue. The Executive shall cooperate with any reasonable request of the physician in connection with such certification. If such question shall arise and the Executive shall fail to submit such certification, the Company's determination of such issue shall be binding on the Executive.

(g) “Equity Award” means any stock option, stock appreciation right, restricted stock unit, restricted stock or other equity award issued under any Stock Plan, but excludes any Target Annual Incentive Bonus that may be payable in the form of equity.

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(h) “Good Reason” means the occurrence, without the Executive’s consent and without Cause, of any of the following events after or in connection with a Change in Control (provided that the Executive shall have given the Company written notice describing such event within ninety (90) days of its initial existence and the matter shall not have been fully remedied by the Company within thirty (30) days after receipt of such notice) notice (the “Cure Period”) and the Executive terminates employment within sixty (60) days after the end of the Cure Period):

(i)

any reduction of the Executive’s annual base salary or target bonus as in effect at the date of the Change in Control; provided that any such reduction (not exceeding fifteen percent (15%) of either (A) such base salary or (B) the sum of such base salary and such target bonus) that is consistent with similar actions taken with respect to the base salaries and/or target bonuses of the other senior executives of the Company shall not constitute Good Reason;

(ii)

any material reduction in the aggregate benefits for which the Executive is eligible under the Company’s benefit plans, including medical, dental, vision, basic life insurance, retirement, paid time off, long□term long-term disability and short-term disability plans; provided that any such reduction or other action that is consistent with similar actions taken with respect to comparable benefits of the Company employees generally shall not constitute Good Reason;

(iii)

a material diminution in the substantive responsibilities or the scope of the Executive’s position, taking into consideration, without limitation, the dollar amount of the budget and the number of employees for which the Executive has responsibility (and a reduction of more than ten percent (10%) in such dollar amount or such number from that which was applicable at the date of the Change in Control shall be deemed a “material diminution” unless it is comparable to similar reductions then applicable to the Company’s executive officers generally);

(iv)

any breach by the Company of its material obligations under this Agreement;

(v)

any failure by the Company to obtain the assumption of this Agreement by any successor or assign of the Company; or

(vi)

any requirement that the Executive relocate to a primary work site that would increase the Executive's one-way commute distance by more than fifty (50) miles from the Executive's then principal residence.

(i) "Restrictive Covenant Agreement" means the most recent agreement executed by the Executive in favor of the Company that contains restrictions on competition with the Company and its subsidiaries and/or solicitation of employees and customers of the Company and its subsidiaries and/or disparagement of the Company and its subsidiaries and/or use or disclosure of confidential information of the Company and its subsidiaries.

(j) "Stock Plan" means any stock option or equity compensation plan of the Company in effect at any

time, including without limitation the 2000 Equity Incentive Plan.

(j)(k) "Target Annual Incentive Bonus" means an Annual Incentive Bonus (stated as a cash amount even

if it may be payable in the form of equity) payable under a Corporate Incentive Plan of the Company for achievement of performance measure(s) at the Target Level. "Corporate Incentive Plan" means any incentive program of the Company in effect at the respective time to the extent it provides for compensation upon achievement of one or more performance measures with a performance period of one year or less and service-based vesting with a vesting term of less than fifteen (15) months ("Annual Incentive Bonus").

(l) "Target Level" means the level at which 100% of a the Target Annual Incentive Bonus becomes payable. payable or at which 100% of the target value of performance-based Equity Award for the applicable performance period vests. Any upside bonus, upside equity, or other amounts that may be earned for achievement of performance measures beyond above the Target Level under the Corporate Incentive Plan and any discretionary or other bonus are not considered part of the Target Annual Incentive Bonus. "Bonus Equity" Bonus or any performance-based Equity Awards.

(m) "Termination Date" means any Equity Award granted the last date of the Executive's employment with the Company, a subsidiary, an affiliate or a successor. A transfer of the Executive's employment within the Company and its subsidiaries and affiliates or to the Executive under the Corporate Incentive Plan that may a successor shall not be earned upon achievement deemed a termination of one or more performance measures. employment.

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2. **<u>Termination of Employment by the Company without Cause. Cause</u>**

If the Company terminates the Executive's employment without Cause other (other than a termination constituting a Change in Control Termination or a termination due to the Executive's Disability, death or Disability), effective upon the later of the Termination Date or the effectiveness of the Release executed in connection with such termination and subject to the Executive satisfying all the conditions to Payment of Severance (as set forth in Section 11 below), the Executive shall be entitled to the following:

(a)a lump sum payment in an amount equal to one times 100% of the highest annual base salary in effect with respect to the Executive during the six-month period immediately preceding the termination date, Termination Date, payable within forty-five (45) days after the termination date;

(b)

a lump sum payment in an amount equal to one times 100% of the Target Annual Incentive Bonus, if any, for which the Executive is eligible for the fiscal year in which the termination date Termination Date occurs, payable within forty-five (45) days after the termination date; Termination Date;

(c) acceleration of vesting of the portion of each Equity Award that would have vested within one year after the Termination Date, with any performance measure applicable to any such portion of an outstanding Equity Award held by the Executive to be deemed to have been met at the Target Level, provided that, if such Termination Date occurs on or after October 1 and

(c) before November 15, any performance measure applicable to any such portion of any outstanding Equity Award held by the Executive shall be deemed to have been met at the actual performance level achieved for the fiscal year ended September 30 of the calendar year in which the Termination Date occurs; and

(d) continued participation in the Company's medical, dental, vision and basic life insurance vision benefit plans (the "Benefit Plans"), subject to the terms and conditions of the respective plans and applicable law and the Executive's election of continued coverage under COBRA, for a period of one year following the termination date; Termination Date; provided that, to the extent that any of the Benefit Plans does not permit such continuation of the Executive's participation following the Executive's termination or any such plan Benefit Plan is terminated, the Company shall pay the Executive an amount which is sufficient for the Executive to purchase substantially equivalent benefits, such amount to be paid quarterly in advance; provided further, however, that to the extent the Executive becomes eligible to receive medical, dental, vision and/or basic life insurance vision benefits under a plan provided by another employer, the Executive's entitlement to participate in the corresponding Benefit Plan or Benefit Plans or to receive such corresponding alternate payments shall cease as of the date the Executive is eligible to participate in such other plan, and the Executive shall promptly notify the Company of the Executive's eligibility under such plan.

3. Change in Control. Control

(a) Equity Awards. Effective upon a Change in Control that occurs during the Executive's

employment, and except as provided in any Equity Award documentation that explicitly or implicitly excludes such Equity Award from the effects of this Section 3, the following shall occur:

(i)

any performance measure(s) applicable to any outstanding Equity Award held by the Executive shall be deemed to have been met at the Target Level (which deemed performance will not affect any service-based vesting schedule for such Equity Award); and

(ii)

each outstanding Equity Award held by the Executive shall be deemed amended automatically to provide that, notwithstanding any provision of any Stock Plan, such Equity Award may not be terminated or forfeited without the Executive's written consent (provided that this shall not prevent termination of (A) any unvested portion thereof that is terminated or forfeited upon termination of the Executive's employment as provided in the respective Stock Plan or in any agreement or certificate executed in connection with such Equity Award, (B) a stock option the termination of which is covered by Section 8(i) of the Company's 2000 Equity Incentive Plan, or (C) an Equity Award upon payment of a cash payment with a Fair Market Value (as defined in the applicable Stock Plan) equal to the amount that would have been received upon the exercise or payment of the Equity Award had the Equity Award been exercised or paid upon the Change in Control).

The foregoing notwithstanding, this Section 3(a) shall not apply to any Bonus Equity held by the Executive, which shall be treated as provided in Section 3(b)(ii). 4

(b) Annual Incentive Bonus. Bonus. Effective upon (x) a Change in Control that occurs during the

Executive's employment or (y) a Change in Control Termination under Section 1(e)(iii):

(i), the Executive shall be entitled to payment of an amount equal to a pro-rata portion of the Target Annual Incentive Bonus, if any, for which the Executive is eligible for the fiscal year in which the Change in Control occurs, based on the percentage of the performance period completed through the date of the Change in Control, for the purposes of which any performance measure(s) applicable to such Target Annual Incentive Bonus shall be deemed to have been met at the Target Level, which payment shall be made in one lump sum within forty-five (45) days of the date of the Change in Control; provided, however, that this Section 3(b)(i) shall not apply if the Executive holds Bonus Equity for the applicable fiscal year performance period and Section 3(b)(ii) shall apply instead; or

(ii) Control.a pro-rata portion of any Bonus Equity held by the Executive, having performance measures applicable to the fiscal year, or any portion thereof, in which the Change in Control occurs, that could be earned at the Target Level, based on the percentage of the applicable fiscal year or applicable portion completed through the date of the Change in Control, shall thereupon be vested and subject to no further restrictions,

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exercisable or distributable, as the case may be, and the portion not so vested shall thereupon automatically be cancelled and forfeited to the Company.

(c) Change in Control Termination Benefits.

(i) Equity Awards. Awards. Effective upon the later of a Change in Control Termination or the effectiveness of the Release executed in connection with such Change in Control Termination and subject to the Executive satisfying all the conditions to Payment of Severance (as set forth in Section 11 below), the following shall occur:

occur:

(A)all outstanding Equity Awards held by the Executive (other than any Bonus Equity) shall immediately become vested and exercisable or distributable in full; and

(B)

all restrictions applicable to restricted stock issued under any Stock Plan and held by the Executive (other than any Bonus Equity) shall immediately lapse.

(ii) Make-Up Payment. Payment Effective upon. Upon determination that a Change in Control Termination under

Section 1(e)(iii) has occurred (the "Determination Date"), the Company shall pay the Executive in a lump sum in the amount equal to the sum of:

(x)

(A) the excess, if any, of (A) the product of (1) the number of additional shares of the Company's Common Stock that were subject to Equity Awards that would have become vested and exercisable and/or as to which the restrictions would have lapsed, in each case solely as a result of Section 3(c)(i), and for which the Executive would have been entitled to receive consideration in the Change in Control (on the same basis as other holders of the Company's Common Stock), had the Executive remained employed on through the date of the Change in Control and was deemed to have exercised all the stock options that would then have become exercisable under Section 3(c)(i)(A) times (2) the amount per share of the Company's Common Stock (if any) received by the Company's stockholders generally pursuant to the Change in Control (the "Shareholder Price") over (B) the aggregate exercise price of all such additional stock options that the Executive would then have become able to exercise upon the Change in Control as a result of Section 3(c)(i)(A) (whereupon all such Equity Awards shall terminate and shall no longer be exercisable); and

(y)

(B) the excess, if any, of (A) the product of (1) the number of shares of the Company's Common Stock that the Executive (a) held on the date of termination of the Executive's employment Termination Date or could have acquired upon exercise of stock options held on such date and (b) sold before the consummation of the Change in Control (the "Pre-Sold Shares") times (2) the Shareholder Price over (B) the aggregate amount received by the Executive in the sale(s) of the Pre-Sold Shares.

The Company shall pay this lump sum payment within forty-five (45) days following the Executive's termination date. Determination Date.

(iii) Salary, Annual Incentive Bonus and Benefits. Benefits. Effective upon the later of a Change in Control

Termination or the effectiveness of the Release executed in connection with such Change in Control Termination and subject to the Executive satisfying all the conditions to Payment of Severance (as set forth in Section 11 below), the Executive shall be entitled to the following:

(A)

a lump sum payment in an amount equal to one times 100% of the Executive's annual base salary plus the Executive's Target Annual Incentive Bonus, such base salary to be the highest annual base salary in effect with respect to the Executive during the six-month period immediately preceding the Executive's termination and such Target Annual Incentive Bonus to be the highest Target Annual Incentive Bonus in effect with respect to the Executive for (1) the fiscal year in which the Change in Control occurs, (2) the fiscal year following the year in which

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the Change in Control occurs, or (3) the fiscal year in which the Change in Control Termination occurs, whichever is highest, payable within forty-five (45) days after the termination date; Termination Date; and

(B)

continued participation in the Benefit Plans, subject to the terms and conditions of the respective plans and applicable law and the Executive's election of continued coverage under COBRA, for a period of one year following the termination date; Termination Date; provided that, to the extent that any of the Benefit Plans does not permit such continuation of the Executive's participation following the Executive's termination or any such plan Benefit Plan is terminated, the Company shall pay the Executive an amount which is

sufficient for the Executive to purchase substantially equivalent benefits, such amount to be paid quarterly in advance; provided, further, however, that to the extent the Executive becomes eligible to receive medical, dental, vision and/or basic life insurance vision benefits under a plan provided by another employer, the Executive's entitlement to participate in the corresponding Benefit Plan or Plans or to receive such corresponding alternate payments shall cease as of the date the Executive is eligible to participate in such other plan, and the Executive shall promptly notify the Company of the Executive's eligibility under such plan.

(iv) No Duplication. Duplication. Payments and benefits under this Section 3(c) shall be in lieu and

without duplication of any amounts or benefits under Section 2, and the Executive shall be entitled to any such payments and benefits for no more than one year even if both such sections apply. If, in the event of a Change in Control Termination under Section 1(e)(iii), the Executive becomes entitled to payments under this Section 3(c) after the Executive has begun to receive payments under Section 2, the Executive shall be entitled to a make-up payment to ensure that the Executive receives the higher amount payable hereunder, with such make-up payment being made within forty-five (45) days following the Change in Control Termination.

(d) Deemed Amendment of Equity Awards. The Company and the Executive hereby agree that the

agreements evidencing any (i) Equity Awards to the Executive are hereby and will be deemed amended to give effect to the provisions of Sections 3 and 4 of this Agreement, and (ii) Bonus Equity are hereby and will be deemed amended to give effect to the provisions of Section 3(b)(ii) of this Agreement.

4.

Death or Disability.

Effective upon a termination of the Executive's employment due to Executive's death or by the Company due to the Executive's Disability, except as provided in any Equity Award documentation that explicitly or implicitly excludes such Equity Award from the effects of this section, all performance measures applicable to any Equity Awards held by the Executive shall be deemed to have been met at the Target Level and all Equity Awards held by the Executive shall immediately become vested, unrestricted and exercisable or distributable at the Target Level; provided that this Section 4 shall not apply to any Bonus Equity. Level.

5.

Certain Payments to Specified Employees.

(a) Notwithstanding anything to the contrary in this Agreement, if the Executive is a "specified employee" within the meaning of Code Section 409A(a)(2)(B)(i) at the time of the Executive's separation from service with the Company (in connection with a Change in Control Termination or otherwise), no payment or benefit payable or provided to the Executive pursuant to this Agreement that constitutes an item of deferred compensation under Code Section 409A and becomes payable by reason of the Executive's termination of employment with the Company will be paid or provided to the Executive prior to the earlier of (i) the expiration of the six (6) month period following the date of the Executive's "separation from service" (as such term is defined by Code Section 409A and the regulations promulgated thereunder), or (ii) the date of the Executive's death, but only to the extent such delayed commencement is otherwise required in order to avoid a prohibited distribution under Code Section 409A(a)(2). The payments and benefits to which the Executive would otherwise be entitled during the first six (6) months following the Executive's separation from service shall be accumulated and paid or provided, as applicable, in a lump sum, on the date that is six (6) months and one day following the Executive's separation from service (or if such date does not fall on a business day of the Company, the next following business day) and any remaining payments or benefits will be paid in accordance with the normal payment dates specified for them herein.

(b) All in-kind benefits provided and expenses eligible for reimbursement under this Agreement shall be provided by the Company or incurred by the Executive during the time periods set forth in this Agreement. All reimbursements shall be paid as soon as administratively practicable, but in no event shall any reimbursement be paid after the last day of the taxable year following the taxable year in which the expense was incurred. The amount of in-kind benefits provided or reimbursable expenses incurred in one taxable year shall not affect the in-kind benefits to be provided or the expenses eligible for reimbursement in any other taxable year (except for any lifetime or other aggregate limitation applicable to medical expenses). Such right to reimbursement or in-kind benefits is not subject to liquidation or exchange for another benefit.

(c) To the extent that any payment or benefit described in this Agreement constitutes "non-qualified deferred compensation" under Code Section 409A, and to the extent that such payment or benefit is payable upon the Executive's termination of employment, then such payments or benefits shall be payable only upon the Executive's "separation from service." The determination of whether and when a separation from service has occurred shall be made in accordance with the presumptions set forth in Treasury Regulation Section 1.409A 1(h).

(d) The parties intend that this Agreement will be administered in accordance with Code Section 409A. To the extent that any provision of this Agreement is ambiguous as to its compliance with Code Section 409A, the provision shall be read in such a manner so that all payments hereunder comply with Code Section 409A. Each payment pursuant to this Agreement is intended to constitute a separate payment for purposes of Treasury Regulation Section 1.409A 2(b)(2). The parties agree that this Agreement may be amended, as reasonably requested by either party, and as may be necessary to fully comply with Code Section 409A and all related rules and regulations in order to preserve the payments and benefits provided hereunder without additional cost to either party.

(e) The Company makes no representation or warranty and shall have no liability to the Executive or any other person if any provisions of this Agreement are determined to constitute deferred compensation subject to Code Section 409A but do not satisfy an exemption from, or the conditions of, such Section.

6.

Taxes.

(a) Withholding. Withholding. All payments to be made to the Executive under this Agreement will be subject to

any required withholding of federal, state and local income and employment taxes. In addition, the Company may withhold from any payments hereunder any amounts attributable to withholding taxes applicable to the vesting of or lapse of restrictions on restricted stock or restricted stock units held by the Executive or the exercise of any nonqualified stock options held by the Executive, including, in its discretion withholding from any shares deliverable to the Executive such number of shares as the Company determines is necessary to satisfy such tax obligations, valued at their fair market value (determined pursuant to the respective Company equity compensation plan) as of the date of such vesting or lapse of restrictions.

(b) Limitations on Payments. Payments.

(i) If it is determined that any payment, benefit or distribution provided for in this

Agreement or otherwise (for the purposes of this Section 6(b), each, a “Payment” and collectively, the “Payments”) from the Company to or for the benefit of the Executive (x) constitutes a “parachute payment” within the meaning of Section 280G of the Code and (y) but for this subsection (b), would be subject to the excise tax imposed by Section 4999 of the Code (the “Excise Tax”), such Payments shall be either:

(A)

delivered in full, or

(B)

delivered to such lesser extent that would result in no portion of the Payments being subject to the Excise Tax,

whichever of the foregoing amounts, taking into account the applicable federal, state and local income taxes and the Excise Tax, results in the receipt by the Executive on an after-tax basis, of the greatest amount of Payments, notwithstanding that all or some portion of the Payments may be taxable under Section 4999 of the Code. Unless the Company and Executive otherwise agree in writing, any determination required under this Section 6(b)(i) shall be made in writing in good faith by an independent accounting firm selected by the Company, whose determinations shall be binding upon the Company and the Executive (the “Accountants”), in good faith consultation with the Executive.

(ii) In the event a reduction in the Payments is required hereunder, the Company shall

promptly give the Executive notice to that effect and the Executive may then determine, in the Executive’s sole discretion, which and how much of the Payments shall be eliminated or reduced (as long as, after such election, none in the following order, in each case, in reverse chronological order beginning with the Payments that are to be paid the furthest in time from consummation of the transaction that is subject to Section 280G of the Code: (1) cash payments not subject to Section 409A of the Code; (2) cash payments subject to Section 409A of the Code; (3) equity-based payments and acceleration; and (4) non-cash forms of benefits; *provided* that in the case of all the foregoing Payments all amounts or payments that are not subject to calculation under Treas. Reg. §1.280G-1, Q&A-24(b) or (c) shall be reduced before any amounts that are subject to the Excise Tax) calculation under Treas. Reg. §1.280G-1, Q&A-24(b) or (c), and shall advise the Company in writing of the Executive’s election within ten (10) days of the Executive’s receipt of the Company’s notice. If no such election is made by the Executive within such period, the Company may determine which and how much of the Payments shall be eliminated or reduced (as long as, after such determination, none of the Payments that are subject to the Excise Tax) and calculation under Treas. Reg. §1.280G-1, Q&A-24(b) but not §1.280G-1, Q&A-24(c) shall notify the Executive promptly of such determination. be reduced before any amounts that are subject to calculation under §1.280G-1, Q&A-24(c).

(iii) For purposes of making the determinations and calculations required by this Section 6(b),

the Accountants:

(A)

shall take into account the value of any reasonable compensation for services to be rendered by the Executive before or after the Change in Control within the meaning of Section 280G(b)(2) of the Code and the regulations thereunder, including without limitation, the Executive's agreeing to refrain from performing services pursuant to a covenant not to compete or similar covenant, whether set forth in this Agreement or otherwise (a "Noncompete Covenant"), and the Company shall cooperate in good faith in connection with any such valuations and reasonable compensation positions. Without limiting the generality of the foregoing, for purposes of this provision, the Company agrees to allocate as consideration for any Noncompete Covenant the maximum amount of compensation positions; and benefits payable under this Agreement reasonably allocable thereto so as to avoid, to the extent possible, subjecting any Payments to tax under Section 4999 of the Code; and

(B)

may make reasonable assumptions and approximations concerning the application of taxes and may rely on reasonable good faith interpretations concerning the application of Sections 280G and 4999 of the Code.

The Company and the Executive shall furnish to the Accountants such information and documents as the Accountants may reasonably request in order to make a determination under this Section 6(b). The Company shall bear all costs the Accountants may reasonably incur in connection with any calculations contemplated by this Section 6(b).

(iv) If the Payments are reduced to avoid the Excise Tax pursuant to Section 6(b)(i) hereof and

notwithstanding such reduction, the IRS United States Internal Revenue Service ("IRS") determines that the Executive is liable for the Excise Tax as a result of the receipt of Payments from the Company, then the Executive shall be obligated to pay to the Company (the "Repayment Obligation") an amount of money equal to the "Repayment Amount." The Repayment Amount shall be the smallest such amount, if any, as shall be required to be paid to the Company so that the Executive's net proceeds with respect to the Payments (after taking into account the payment of the Excise Tax imposed on such benefits) shall be maximized. Notwithstanding the foregoing, the Repayment Amount shall be zero if a Repayment Amount of more than zero would not eliminate the Excise Tax in accordance with the principles of Section 6(b)(i). If the Excise Tax is not eliminated through the performance of the Repayment Obligation, the Executive shall pay the Excise Tax. The Repayment Obligation shall be discharged within 30 thirty (30) days of either (A) the Executive's entering into a binding agreement with the

IRS as to the amount of Excise Tax liability, or (B) a final determination by the IRS or a court decision requiring the Executive to pay the Excise Tax from which no appeal is available or is timely taken.

7. Recovery of Incentive Compensation Received upon Subsequent Restatement

Term. Executive understands that Executive is or may become subject to the Company's Executive Compensation Recoupment Policy adopted pursuant to Rule 10D-1 promulgated under the Exchange Act and Nasdaq

Rule 5608, or any successor rule (the “Clawback Policy”). Executive understands that if Executive is or becomes subject to the Clawback Policy, the Company and/or the Board shall be entitled to recover all Recoverable Compensation (as defined in the Clawback Policy) from Executive pursuant to such means as the Company and/or the Board may elect. Executive understands that such recovery may be sought and occur after Executive’s employment with the Company terminates. Executive further agrees that the Executive is not entitled to indemnification for any Recoverable Compensation or for any claim or losses arising out of or in any way related to Recoverable Compensation recovered pursuant to the Clawback Policy and, to the extent any agreement or organizational document purports to provide

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otherwise, the Executive hereby irrevocably agrees to forego such indemnification. The Executive acknowledges and agrees that the Executive has received and has had an opportunity to review the Clawback Policy. This Section 7 is a material term of this Agreement.

8. Term

Unless the Executive’s employment is earlier terminated for any reason, this Agreement shall continue in effect until 11:59 p.m. on September 30, 2022 September 30, 2024 and shall automatically renew thereafter on an annual basis for additional twelve month twelve-month terms unless either party provides written notice to the other party of non-renewal at least ninety (90) days prior to the expiration of the then current term. If a Change in Control occurs while this Agreement is in effect, the term of this Agreement shall automatically be extended to the second anniversary of the Change in Control. Upon the termination of this Agreement, the respective rights and obligations of the parties shall survive to the extent necessary to carry out the intentions of the parties as embodied herein.

8. 9. Successors and Assigns.Assigns

(a)

This Agreement is personal to the Executive and is not assignable by the Executive, other than by will or the laws of descent and distribution, without the prior written consent of the Company.

(b)

This Agreement shall inure to the benefit of and be binding upon the Company and its successors and assigns.

(c)

(b) The Company will require any successor or acquirer (whether direct or indirect, by purchase, merger, consolidation or otherwise) to all or substantially all of the business and/or assets of the Company to assume expressly and agree to perform this Agreement in the same manner and to the same extent that the Company would be required to perform it if no such succession had taken place. As used in this Agreement, "Company" shall mean the Company as defined above and any successor to or acquirer of its business and/or assets that assumes and agrees to perform this Agreement.

9. 10. No Duty to Mitigate. Mitigate

In no event shall the Executive be obligated to seek other employment or take any other action by way of mitigation of the amounts payable to the Executive under any of the provisions of this Agreement and, except as contemplated by Sections 2(b) and 3(c)(iii)(B)hereof, any benefits payable to the Executive hereunder shall not be subject to reduction for any compensation received from other employment.

10. 11. Conditions to Payment of Severance. Severance

Notwithstanding any other provision of this Agreement, the Executive's entitlement to receive any of the payments and other benefits contemplated by Sections 2, 3 or 4 (with respect to Disability) hereof shall be contingent upon:

(a) execution by the Executive within forty-five (45) days of the termination Termination Date (or a shorter period as may be determined by the Company) of a general release in

substantially the form of Appendix A hereto (such applicable form depending on my age Executive's location and other legitimate factors as determined by the Company at the time of termination, the "Release"), which, if applicable, has not subsequently been revoked, and the Executive hereby acknowledges and agrees that the Company's entering into this Agreement and agreement to make such payments are and shall be good and sufficient consideration for such Release; and

(b) the Executive's continued written reaffirmation of and compliance with the material terms of this Agreement, as applicable,

and those of the Executive's Non-Disclosure, Non-Competition and Invention Agreement with the Company. Restrictive Covenant Agreement.

12. Miscellaneous

11. (a) Miscellaneous.

(a)Governing Law. Law. This Agreement shall be governed by and construed in accordance with the laws of the Commonwealth of Massachusetts, except any such laws that would render such choice of law ineffective.

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(b)

Compliance with Section 409A. This Agreement is intended, to the extent applicable, to constitute good faith compliance with the requirements of Section 409A of the Code. The Company and the Executive agree that they shall cooperate in good faith to amend any provision hereof to the extent required to maintain compliance with the provisions of Section 409A of the Code as they may be modified hereafter (including by subsequent regulations or other guidance of the Internal Revenue Service).

(c)Amendment. Amendment. This Agreement may not be amended or modified otherwise than by a written agreement executed by the parties hereto or their respective successors and legal representatives.

(d) (c)

Partial Invalidity. Invalidity. If any provision in this Agreement is held by a court of competent jurisdiction to be invalid, void, or unenforceable, the remaining provisions will nevertheless continue in full force without being impaired or invalidated in any way.

(e) (d)

Entire Agreement; Effect of Current Agreement. Agreement. This Agreement constitutes the entire understanding and agreement between the parties hereto regarding the compensation and benefits payable to the Executive in the respective circumstances described herein, superseding all prior understandings and agreements, whether oral or written.

(f)

Expenses. (e) Expenses. The Company agrees to pay, as incurred solely with respect to any contest with respect to which the Executive is successful on the merits and within twenty (20) days after submission of reasonable supporting documentation, to the full extent permitted by law, all legal fees and expenses the Executive may reasonably incur have incurred as a result of any contest by the Company, the Executive or others of the validity or enforceability of, or liability under, any provision of this Agreement (including as a result of any contest by the Executive about the amount of any payment pursuant to this Agreement) with respect to which the Executive is successful on the merits, , plus, in each case, interest on any delayed payment at the applicable Federal rate provided for in Section 7872(f)(2)(A) of the Code. The Company's payment of any eligible expenses must shall be made no later than December 31 of the year within sixty (60) days after the year in which the expense was incurred. Executive's submission of reasonable supporting documentation for such expenses.

(g)

Notices. Notices. All notices and other communications hereunder shall be in writing and shall be delivered by hand delivery, by a reputable overnight courier service, or by registered or certified mail, return receipt requested, postage prepaid. Notice to the Executive shall be addressed to the Executive at the Executive's last address contained in the records of the Company, and notice to the Company shall be addressed to:

PTC Inc.

121 Seaport Boulevard

Boston, MA 02210

Attention: General Counsel

Notice shall be addressed to such other address as either party shall have furnished to the other in writing in accordance herewith. Any notice or communication shall be deemed to be delivered upon the date of hand delivery, one day following delivery to an overnight courier service, or three days following mailing by registered or certified mail.

EXECUTED as of the date set forth below.

PTC INC. **EXECUTIVE**

By:

Print Name:

Title:

Date:

Signed:

Print Name:

Date:

Exhibit 10.6

EXECUTIVE AGREEMENT

This Executive Agreement ("Agreement") is by and between PTC Inc., a Massachusetts corporation (the "Company"), and Michael DiTullio (the "Executive").

WHEREAS, the Executive is the President and Chief Operating Officer of the Company;

WHEREAS, the Executive has executed a Restrictive Covenant Agreement with the Company;

WHEREAS, the Company wishes to make the following arrangements with the Executive concerning certain payments and benefits to be provided to the Executive in the event of a Change in Control of the Company or if the Executive's employment with the Company is terminated in certain circumstances specified herein;

NOW, THEREFORE, the Company and the Executive hereby agree as follows:

1. Definitions

For the purposes of this Agreement:

(a) "Board" means the Company's board of directors.

(b) "Code" means the U.S. Internal Revenue Code of 1986, as amended.

(c) "Cause" means:

(i) the Executive's willful and continued failure to substantially perform the Executive's duties to the Company (other than any such failure resulting from the Employee's incapacity due to physical or mental illness), provided that the Company has delivered a written demand for performance to the Executive specifically identifying the manner in which the Company believes that the Executive has not substantially performed the Executive's duties and the Executive does not cure such failure within thirty (30) days after such demand;

(ii) willful conduct by the Executive which is demonstrably and materially injurious to the Company;

(iii) the Executive's conviction of, or pleading of guilty or nolo contendere to, a felony;

(iv) the Executive's entry in the Executive's personal capacity into a consent decree relating to the business of the Company with any government body; or

(v) the Executive's willful violation of any material provision of the Executive's Restrictive Covenant Agreement; provided that, if such violation can be cured, the Executive has not, within thirty (30) days after written demand by the Company, cured such violation.

For purposes of this definition, no act or failure to act on the Executive's part shall be deemed "willful" unless done or omitted to be done by the Executive not in good faith and without reasonable belief that the Executive's action or omission was in the best interests of the Company.

(d) "Change in Control" means the occurrence of any of the following events:

(i) any "person," as such term is used in Sections 13(d) and 14(d) of the Securities Exchange Act of 1934, as amended (the "Exchange Act") (other than the Company, any trustee or other fiduciary holding securities under an employee benefit plan of the Company, or any corporation owned directly or indirectly by the stockholders of the Company in substantially the same proportion as their ownership of stock in the Company) is or becomes the "beneficial owner" (as defined in Rule 13d-3 under the Exchange Act), directly or indirectly, of securities of the Company representing fifty percent (50%) or more of the combined voting power of the Company's then outstanding securities (other than as a result of acquisitions of such securities from the Company);

(ii) individuals who constitute the Board as of the date hereof (the "Incumbent Board") cease for any reason to constitute at least a majority of the Board, provided that any person becoming a director subsequent to the date hereof whose election, or nomination for election by the Company's stockholders, was approved by a vote of at least a majority of the directors then comprising the Incumbent Board (other than an election or nomination of an individual whose initial assumption of office is in connection with an actual or threatened election contest relating to the election of the directors of the Company) shall be, for purposes of this Agreement, considered to be a member of the Incumbent Board;

(iii) the consummation of a merger, share exchange or consolidation of the Company or any subsidiary of the Company with any other entity (each a "Business Combination"), other than (A) a Business Combination that would result in the voting securities of the Company outstanding immediately prior thereto continuing to represent (either by remaining outstanding or by being converted into voting securities of another entity) beneficial ownership, directly or indirectly, of a majority of the combined voting power of the Company or the surviving entity (including any person that, as a result of such transaction, owns all or substantially all of the Company's assets either directly or through one or more subsidiaries) outstanding immediately after such Business Combination or (B) a merger, share exchange or consolidation effected to implement a recapitalization of the Company (or similar transaction) in which no "person" (as defined above) is or becomes the beneficial owner of fifty percent (50%) or more of the combined voting power of the Company's then outstanding securities;

(iv) the sale or disposition by the Company of all or substantially all of the Company's assets;

(v) the liquidation or dissolution of the Company.

(e) "Change in Control Termination" means any of the following terminations of the Executive's employment:

(i) termination of the Executive's employment by the Company during the period from the date of a Change in Control through the second anniversary thereof, other than for Cause or as a result of the Executive's death or Disability;

(ii) resignation by the Executive for Good Reason during the period from the date of a Change in Control through the second anniversary thereof; or

(iii) termination of the Executive's employment by the Company within one hundred eighty (180) days prior to a Change in Control, other than for Cause or as a result of the Executive's death or Disability, if it is reasonably demonstrated by the Executive that such termination of employment (A) was at the request of a third party that has taken steps reasonably calculated to effect the Change in Control or (B) was otherwise related to or in anticipation of the Change in Control. A Change in Control Termination under this Section 1(e)(iii) shall be deemed to have occurred when the Change in Control occurs.

(f) "Disability" means such physical or mental incapacity as to make the Executive unable to perform the essential functions of the Executive's employment duties for a period of at least sixty (60) consecutive days with or without reasonable accommodation. If any question shall arise as to whether during any period the Executive is so disabled as to be unable to perform the essential functions of the Executive's employment duties with or without reasonable accommodation, the Executive may, and at the request of the Company shall, submit to the Company a certification in reasonable detail by a physician selected by the Company to whom the Executive or the Executive's guardian has no reasonable objection as to whether the Executive is so disabled or how long such disability is expected to continue, and such certification shall for the purposes of this Agreement be conclusive of the issue. The Executive shall cooperate with any reasonable request of the physician in connection with such certification. If such question shall arise and the Executive shall fail to submit such certification, the Company's determination of such issue shall be binding on the Executive.

(g) "Equity Award" means any stock option, stock appreciation right, restricted stock unit, restricted stock or other equity award issued under any Stock Plan, but excludes any Target Annual Incentive Bonus that may be payable in the form of equity.

(h) "Good Reason" means the occurrence, without the Executive's consent and without Cause, of any of the following events after or in connection with a Change in Control (provided that the Executive shall have given the Company written notice describing such event within ninety (90) days of its initial existence and the matter shall not have been fully remedied by the Company within thirty (30) days after receipt of such notice (the "Cure Period") and the Executive terminates employment within sixty (60) days after the end of the Cure Period):

(i) any reduction of the Executive's annual base salary or target bonus as in effect at the date of the Change in Control; provided that any such reduction (not exceeding fifteen percent (15%) of either (A) such base salary or (B) the sum of such base salary and such target bonus) that is consistent with similar actions taken with respect to the base salaries and/or target bonuses of the other senior executives of the Company shall not constitute Good Reason;

(ii) any material reduction in the aggregate benefits for which the Executive is eligible under the Company's benefit plans, including medical, dental, vision, basic life insurance, retirement, paid time off, long-term disability and short-term disability plans; provided that any such reduction or other action that is consistent with similar actions taken with respect to comparable benefits of the Company employees generally shall not constitute Good Reason;

(iii) a material diminution in the substantive responsibilities or the scope of the Executive's position, taking into consideration, without limitation, the dollar amount of the budget and the number of employees for which the Executive has responsibility (and a reduction of more than ten percent (10%) in such dollar amount or such number from that which was applicable at the date of the Change in Control shall be deemed a "material diminution" unless it is comparable to similar reductions then applicable to the Company's executive officers generally);

(iv) any breach by the Company of its material obligations under this Agreement;

(v) any failure by the Company to obtain the assumption of this Agreement by any successor or assign of the Company; or

(vi) any requirement that the Executive relocate to a primary work site that would increase the Executive's one-way commute distance by more than fifty (50) miles from the Executive's then principal residence.

(i) "Restrictive Covenant Agreement" means the most recent agreement executed by the Executive in favor of the Company that contains restrictions on competition with the Company and its subsidiaries and/or solicitation of employees and customers of the Company and its subsidiaries and/or disparagement of the Company and its subsidiaries and/or use or disclosure of confidential information of the Company and its subsidiaries.

(j) "Stock Plan" means any stock option or equity compensation plan of the Company in effect at any time, including without limitation the 2000 Equity Incentive Plan.

(k) "Target Annual Incentive Bonus" means an Annual Incentive Bonus (stated as a cash amount even if it may be payable in the form of equity) payable under a Corporate Incentive Plan of the Company for achievement of performance measure(s) at the Target Level. "Corporate Incentive Plan" means any incentive program of the Company in effect at the respective time to the extent it provides for compensation upon achievement of one or more performance measures with a performance period of one year ("Annual Incentive Bonus").

(l) "Target Level" means the level at which 100% of the Target Annual Incentive Bonus becomes payable or at which 100% of the target value of performance-based Equity Award for the applicable performance period vests. Any upside bonus, upside equity, or other amounts that may be earned for achievement of performance measures above the Target Level and any discretionary or other bonus are not considered part of the Target Annual Incentive Bonus or any performance-based Equity Awards.

(m) "Termination Date" means the last date of the Executive's employment with the Company, a subsidiary, an affiliate or a successor. A transfer of the Executive's employment within the Company and its subsidiaries and affiliates or to a successor shall not be deemed a termination of employment.

2. Termination of Employment by the Company without Cause

If the Company terminates the Executive's employment without Cause (other than a termination constituting a Change in Control Termination or a termination due to the Executive's death or Disability), effective upon the later of the Termination Date or the effectiveness of the Release executed in connection with such termination and subject to the Executive satisfying all the conditions to Payment of Severance (as set forth in Section 11 below), the Executive shall be entitled to the following:

(a) a lump sum payment in an amount equal to 100% of the highest annual base salary in effect with respect to the Executive during the six-month period immediately preceding the Termination Date, payable within forty-five (45) days after the Termination Date;

(b) a lump sum payment in an amount equal to 100% of the Target Annual Incentive Bonus, if any, for which the Executive is eligible for the fiscal year in which the Termination Date occurs, payable within forty-five (45) days after the Termination Date;

(c) all unvested Equity Awards held by the Executive on the Termination Date will remain outstanding and continue to vest in accordance with their respective terms and be settled on each remaining vest date without regard to the requirement that the Executive be employed by the Company, and, in the event of the Executive's death after such termination of employment, all then unvested Equity Awards shall automatically vest as of the date of the Executive's death; and

(d) continued participation in the Company's medical, dental, and vision benefit plans (the "Benefit Plans"), subject to the terms and conditions of the respective plans and applicable law and the Executive's election of continued coverage under COBRA, for a period of one year following the Termination Date; provided that, to the extent that any of the Benefit Plans does not permit such continuation of the Executive's participation following the Executive's termination or any such Benefit Plan is terminated, the Company shall pay the Executive an amount which is sufficient for the Executive to purchase substantially equivalent benefits, such amount to be paid quarterly in advance; provided further, however, that to the extent the Executive becomes eligible to receive medical, dental, and/or vision benefits under a plan provided by another employer, the Executive's entitlement to participate in the corresponding Benefit Plan or Benefit Plans or to receive such corresponding alternate payments shall cease as of the date the Executive is eligible to participate in such other plan, and the Executive shall promptly notify the Company of the Executive's eligibility under such plan.

3. Change in Control

(a) Equity Awards. Effective upon a Change in Control that occurs during the Executive's employment, and except as provided in any Equity Award documentation that explicitly or implicitly excludes such Equity Award from the effects of this Section 3, the following shall occur:

(i) any performance measure(s) applicable to any outstanding Equity Award held by the Executive shall be deemed to have been met at the Target Level (which deemed performance will not affect any service-based vesting schedule for such Equity Award); and

(ii) each outstanding Equity Award held by the Executive shall be deemed amended automatically to provide that, notwithstanding any provision of any Stock Plan, such Equity Award may not be terminated or forfeited without the Executive's written consent (provided that this shall not prevent termination of (A) any unvested portion thereof that is terminated or forfeited upon termination of the Executive's employment as provided in the respective Stock Plan or in any agreement or certificate executed in connection with such Equity Award, (B) a stock option the termination of which is covered by Section 8(i) of the Company's 2000 Equity Incentive Plan, or (C) an Equity Award upon payment of a cash payment with a Fair Market Value (as defined in the applicable Stock Plan) equal to the amount that would have been received upon the exercise or payment of the Equity Award had the Equity Award been exercised or paid upon the Change in Control).

(b) Annual Incentive Bonus. Effective upon (x) a Change in Control that occurs during the Executive's employment or (y) a Change in Control Termination under Section 1(e)(iii), the Executive shall be entitled to payment of an amount equal to a pro-rata portion of the Target Annual Incentive Bonus, if any, for which the Executive is eligible for the fiscal year in which the Change in Control occurs, based on the percentage of the performance period completed through the date of the Change in Control, for the purposes of which any performance measure(s) applicable to such Target Annual Incentive Bonus shall be deemed to have been met at the Target Level, which payment shall be made in one lump sum within forty-five (45) days of the date of the Change in Control.

(c) Change in Control Termination Benefits.

(i) Equity Awards. Effective upon the later of a Change in Control Termination or the effectiveness of the Release executed in connection with such Change in Control Termination and subject to the Executive satisfying all the conditions to Payment of Severance (as set forth in Section 11 below), the following shall occur:

(A) all outstanding Equity Awards held by the Executive shall immediately become vested and exercisable or distributable in full; and

(B) all restrictions applicable to restricted stock issued under any Stock Plan and held by the Executive shall immediately lapse.

(ii) Make-Up Payment. Upon determination that a Change in Control Termination under Section 1(e)(iii) has occurred (the "Determination Date"), the Company shall pay the Executive a lump sum in the amount equal to the sum of:

(A) the excess, if any, of (A) the product of (1) the number of additional shares of the Company's Common Stock that were subject to Equity Awards that would have become vested and exercisable and/or as to which the restrictions would have lapsed, in each case solely as a result of Section 3(c)(i), and for which the Executive would have been entitled to receive consideration in the Change in Control (on the same basis as other holders of the Company's Common Stock), had the Executive remained employed through the date of the Change in Control and was deemed to have exercised all the stock options that would then have become exercisable under Section 3(c)(i)(A) times (2) the amount per share of the Company's Common Stock (if any) received by the Company's stockholders generally pursuant to the Change in Control (the "Shareholder Price") over (B) the aggregate exercise price of all such additional stock options that the Executive would then have become able to exercise upon the Change in Control as a result of Section 3(c)(i)(A) (whereupon all such Equity Awards shall terminate and shall no longer be exercisable); and

(B) the excess, if any, of (A) the product of (1) the number of shares of the Company's Common Stock that the Executive (a) held on the Termination Date or could have acquired upon exercise of stock options held on such date and (b) sold before the consummation of the Change in Control (the "Pre-Sold Shares") times (2) the Shareholder Price over (B) the aggregate amount received by the Executive in the sale(s) of the Pre-Sold Shares.

The Company shall pay this lump sum payment within forty-five (45) days following the Determination Date.

(iii) Salary, Annual Incentive Bonus and Benefits. Effective upon the later of a Change in Control Termination or the effectiveness of the Release executed in connection with such Change in Control Termination and subject to the Executive satisfying all the conditions to Payment of Severance (as set forth in Section 11 below), the Executive shall be entitled to the following:

(A) a lump sum payment in an amount equal to 100% of the Executive's annual base salary plus the Executive's Target Annual Incentive Bonus, such base salary to be the highest annual base salary in effect with respect to the Executive during the six-month period immediately preceding the Executive's termination and such Target Annual Incentive Bonus to be the highest Target Annual Incentive Bonus in effect with respect to the Executive for (1) the fiscal year in which the Change in Control occurs, (2) the fiscal year following the year in which

the Change in Control occurs, or (3) the fiscal year in which the Change in Control Termination occurs, whichever is highest, payable within forty-five (45) days after the Termination Date; and

(B) continued participation in the Benefit Plans, subject to the terms and conditions of the respective plans and applicable law and the Executive's election of continued coverage under COBRA, for a period of one year following the Termination Date; provided that, to the extent that any of the Benefit Plans does not permit such continuation of the Executive's participation following the Executive's termination or any such Benefit Plan is terminated, the Company shall pay the Executive an amount which is sufficient for the Executive to purchase substantially equivalent benefits, such amount to be paid quarterly in advance; provided, further, however, that to the extent the Executive becomes eligible to receive medical, dental, and/or vision benefits under a plan provided by another employer, the Executive's entitlement to participate in the corresponding Benefit Plan or Plans or to receive such corresponding alternate payments shall cease as of the date the Executive is eligible to participate in such other plan, and the Executive shall promptly notify the Company of the Executive's eligibility under such plan.

(iv) No Duplication. Payments and benefits under this Section 3(c) shall be in lieu and without duplication of any amounts or benefits under Section 2, and the Executive shall be entitled to any such payments and benefits for no more than one year even if both such sections apply. If, in the event of a Change in Control Termination under Section 1(e)(iii), the Executive becomes entitled to payments under this Section 3(c) after the Executive has begun to receive payments under Section 2, the Executive shall be entitled to a make-up payment to ensure that the Executive receives the higher amount payable hereunder, with such make-up payment being made within forty-five (45) days following the Change in Control Termination.

(d) Deemed Amendment of Equity Awards. The Company and the Executive hereby agree that the agreements evidencing any Equity Awards to the Executive are hereby and will be deemed amended to give effect to the provisions of Sections 3 and 4 of this Agreement.

4. Death or Disability; Qualified Retirement

(a) Death or Disability. Effective upon a termination of the Executive's employment due to Executive's death or by the Company due to the Executive's Disability, except as provided in any Equity Award documentation that explicitly or implicitly excludes such Equity Award from the effects of this section, all performance measures applicable to any Equity Awards held by the Executive shall be deemed to have been met at the Target Level and all Equity Awards held by the Executive shall immediately become vested, unrestricted and exercisable or distributable at the Target Level.

(b) Qualified Retirement. If Executive's employment terminates due to voluntary resignation after September 30, 2025, all unvested Equity Awards will remain outstanding and continue to vest and be settled on each remaining vest date without regard to the requirement that the Executive be employed by the Company. In the event of the Executive's death after such retirement, all then unvested Equity Awards shall automatically vest as of the date of the Executive's death.

5. Certain Payments to Specified Employees

(a) Notwithstanding anything to the contrary in this Agreement, if the Executive is a "specified employee" within the meaning of Code Section 409A(a)(2)(B)(i) at the time of the Executive's separation from service with the Company (in connection with a Change in Control Termination or otherwise), no payment or benefit payable or provided to the Executive pursuant to this Agreement that constitutes an item of deferred compensation under Code Section 409A and becomes payable by reason of the Executive's termination of employment with the Company will be paid or provided to the Executive prior to the earlier of (i) the expiration of the six (6) month period following the date of the Executive's "separation from service" (as such term is defined by Code Section 409A and the regulations promulgated thereunder), or (ii) the date of the Executive's death, but only to the extent such delayed commencement is otherwise required in order to avoid a prohibited distribution under Code Section 409A(a)(2). The payments and benefits to which the Executive would otherwise be entitled during the first six (6) months following the Executive's separation from service shall be accumulated and paid or provided, as applicable, in a lump sum, on the date that is six (6) months and one day following the Executive's separation from service (or if such date does not fall on a business day of the Company, the next following business day) and any remaining payments or benefits will be paid in accordance with the normal payment dates specified for them herein.

(b) All in-kind benefits provided and expenses eligible for reimbursement under this Agreement shall be provided by the Company or incurred by the Executive during the time periods set forth in this Agreement. All reimbursements shall be paid as soon as administratively practicable, but in no event shall any reimbursement be paid after the last day of the taxable year following the taxable year in which the expense was incurred. The amount of in-kind benefits provided or reimbursable expenses incurred in one taxable year shall not affect the in-kind benefits to be provided or the expenses eligible for reimbursement in any other taxable year (except for any lifetime or other aggregate limitation applicable to medical expenses). Such right to reimbursement or in-kind benefits is not subject to liquidation or exchange for another benefit.

(c) To the extent that any payment or benefit described in this Agreement constitutes "non-qualified deferred compensation" under Code Section 409A, and to the extent that such payment or benefit is payable upon the Executive's termination of employment, then such payments or benefits shall be payable only upon the Executive's "separation from service." The determination of whether and when a separation from service has occurred shall be made in accordance with the presumptions set forth in Treasury Regulation Section 1.409A 1(h).

(d) The parties intend that this Agreement will be administered in accordance with Code Section 409A. To the extent that any provision of this Agreement is ambiguous as to its compliance with Code Section 409A, the provision shall be read in such a manner so that all payments hereunder comply with Code Section 409A. Each payment pursuant to this Agreement is intended to constitute a separate payment for purposes of Treasury Regulation Section 1.409A 2(b)(2). The parties agree that this Agreement may be amended, as reasonably requested by either party, and as may be necessary to fully comply with Code Section 409A and all related rules and regulations in order to preserve the payments and benefits provided hereunder without additional cost to either party.

(e) The Company makes no representation or warranty and shall have no liability to the Executive or any other person if any provisions of this Agreement are determined to constitute deferred compensation subject to Code Section 409A but do not satisfy an exemption from, or the conditions of, such Section.

6. Taxes

(a) Withholding. All payments to be made to the Executive under this Agreement will be subject to any required withholding of federal, state and local income and employment taxes. In addition, the Company may withhold from any payments hereunder any amounts attributable to withholding taxes applicable to the vesting of or lapse of restrictions on restricted stock or restricted stock units held by the Executive or the exercise of any nonqualified stock options held by the Executive, including, in its discretion withholding from any shares deliverable to the Executive such number of shares as the Company determines is necessary to satisfy such tax obligations, valued at their fair market value (determined pursuant to the respective Company equity compensation plan) as of the date of such vesting or lapse of restrictions.

(b) Limitations on Payments.

(i) If it is determined that any payment, benefit or distribution provided for in this Agreement or otherwise (for the purposes of this Section 6(b), each, a "Payment" and collectively, the "Payments") from the Company to or for the benefit of the Executive (x) constitutes a "parachute payment" within the meaning of Section 280G of the Code and (y) but for this subsection (b), would be subject to the excise tax imposed by Section 4999 of the Code (the "Excise Tax"), such Payments shall be either:

(A) delivered in full, or

(B) delivered to such lesser extent that would result in no portion of the Payments being subject to the Excise Tax,

whichever of the foregoing amounts, taking into account the applicable federal, state and local income taxes and the Excise Tax, results in the receipt by the Executive on an after-tax basis, of the greatest amount of Payments,

notwithstanding that all or some portion of the Payments may be taxable under Section 4999 of the Code. Unless the Company and Executive otherwise agree in writing, any determination required under this Section 6(b)(i) shall be made in writing in good faith by an independent accounting firm selected by the Company, whose determinations shall be binding upon the Company and the Executive (the "Accountants"), in good faith consultation with the Executive.

(ii) In the event a reduction in the Payments is required hereunder, the Payments shall be reduced in the following order, in each case, in reverse chronological order beginning with the Payments that are to be paid the furthest in time from consummation of the transaction that is subject to Section 280G of the Code: (1) cash payments not subject to Section 409A of the Code; (2) cash payments subject to Section 409A of the Code; (3) equity-based payments and acceleration; and (4) non-cash forms of benefits; *provided* that in the case of all the foregoing Payments all amounts or payments that are not subject to calculation under Treas. Reg. §1.280G-1, Q&A-24(b) or (c) shall be reduced before any amounts that are subject to calculation under Treas. Reg. §1.280G-1, Q&A-24(b) or (c), and Payments that are subject to calculation under Treas. Reg. §1.280G-1, Q&A-24(b) but not §1.280G-1, Q&A-24(c) shall be reduced before any amounts that are subject to calculation under §1.280G-1, Q&A-24(c).

(iii) For purposes of making the determinations and calculations required by this Section 6(b), the Accountants:

(A) shall take into account the value of any reasonable compensation for services to be rendered by the Executive before or after the Change in Control within the meaning of Section 280G(b)(2) of the Code and the regulations thereunder, including without limitation, the Executive's agreeing to refrain from performing services pursuant to a covenant not to compete or similar covenant, whether set forth in this Agreement or otherwise (a "Noncompete Covenant"), and the Company shall cooperate in good faith in connection with any such valuations and reasonable compensation positions; and

(B) may make reasonable assumptions and approximations concerning the application of taxes and may rely on reasonable good faith interpretations concerning the application of Sections 280G and 4999 of the

Code.

The Company and the Executive shall furnish to the Accountants such information and documents as the Accountants may reasonably request in order to make a determination under this Section 6(b). The Company shall bear all costs the Accountants may reasonably incur in connection with any calculations contemplated by this Section 6(b).

(iv) If the Payments are reduced to avoid the Excise Tax pursuant to Section 6(b)(i) hereof and notwithstanding such reduction, the United States Internal Revenue Service ("IRS") determines that the Executive is liable for the Excise Tax as a result of the receipt of Payments from the Company, then the Executive shall be obligated to pay to the Company (the "Repayment Obligation") an amount of money equal to the "Repayment Amount." The Repayment Amount shall be the smallest such amount, if any, as shall be required to be paid to the Company so that the Executive's net proceeds with respect to the Payments (after taking into account the payment of the Excise Tax imposed on such benefits) shall be maximized. Notwithstanding the foregoing, the Repayment Amount shall be zero if a Repayment Amount of more than zero would not eliminate the Excise Tax in accordance with the principles of Section 6(b)(i). If the Excise Tax is not eliminated through the performance of the Repayment Obligation, the Executive shall pay the Excise Tax. The Repayment Obligation shall be discharged within thirty (30) days of either (A) the Executive's entering into a binding agreement with the IRS as to the amount of Excise Tax liability, or (B) a final determination by the IRS or a court decision requiring the Executive to pay the Excise Tax from which no appeal is available or is timely taken.

7. Recovery of Incentive Compensation Received upon Subsequent Restatement

Executive understands that Executive is or may become subject to the Company's Executive Compensation Recoupment Policy adopted pursuant to Rule 10D-1 promulgated under the Exchange Act and Nasdaq Rule 5608, or any successor rule (the "Clawback Policy"). Executive understands that if Executive is or becomes subject to the Clawback Policy, the Company and/or the Board shall be entitled to recover all Recoverable Compensation (as defined

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in the Clawback Policy) from Executive pursuant to such means as the Company and/or the Board may elect. Executive understands that such recovery may be sought and occur after Executive's employment with the Company terminates. Executive further agrees that the Executive is not entitled to indemnification for any Recoverable Compensation or for any claim or losses arising out of or in any way related to Recoverable Compensation recovered pursuant to the Clawback Policy and, to the extent any agreement or organizational document purports to provide otherwise, the Executive hereby irrevocably agrees to forego such indemnification. The Executive acknowledges and agrees that the Executive has received and has had an opportunity to review the Clawback Policy. This Section 7 is a material term of this Agreement.

8. Term

Unless the Executive's employment is earlier terminated for any reason, this Agreement shall continue in effect until 11:59 p.m. on September 30, 2025 and shall automatically renew thereafter on an annual basis for additional twelve-month terms unless either party provides written notice to the other party of non-renewal at least ninety (90) days prior to the expiration of the then current term. If a Change in Control occurs while this Agreement is in effect, the term of this Agreement shall automatically be extended to the second anniversary of the Change in Control. Upon the termination of this Agreement, the respective rights and obligations of the parties shall survive to the extent necessary to carry out the intentions of the parties as embodied herein, it being expressly agreed that Section 4(b) governing a Qualified Retirement shall survive any termination of this Agreement.

9. Successors and Assigns

(a) This Agreement is personal to the Executive and is not assignable by the Executive, other than by will or the laws of descent and distribution, without the prior written consent of the Company.

(b) This Agreement shall inure to the benefit of and be binding upon the Company and its successors and assigns.

(b) The Company will require any successor or acquirer (whether direct or indirect, by purchase, merger, consolidation or otherwise) to all or substantially all of the business and/or assets of the Company to assume expressly and agree to perform this Agreement in the same manner and to the same extent that the Company would be required to perform it if no such succession had taken place. As used in this Agreement, “Company” shall mean the Company as defined above and any successor to or acquirer of its business and/or assets that assumes and agrees to perform this Agreement.

10. No Duty to Mitigate

In no event shall the Executive be obligated to seek other employment or take any other action by way of mitigation of the amounts payable to the Executive under any of the provisions of this Agreement and, except as contemplated by Sections 2(b) and 3(c)(iii)(B) hereof, any benefits payable to the Executive hereunder shall not be subject to reduction for any compensation received from other employment.

11. Conditions to Payment of Severance

Notwithstanding any other provision of this Agreement, the Executive’s entitlement to receive any of the payments and other benefits contemplated by Sections 2, 3 or 4 (with respect to Disability) hereof shall be contingent upon:

(a) execution by the Executive within forty-five (45) days of the Termination Date (or a shorter period as may be determined by the Company) of a general release in substantially the form of Appendix A hereto (such applicable form depending on Executive’s location and other legitimate factors as determined by the Company at the time of termination, the “Release”), which, if applicable, has not subsequently been revoked, and the Executive hereby acknowledges and agrees that the Company’s entering into this Agreement and agreement to make such payments are and shall be good and sufficient consideration for such Release; and

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(b) the Executive’s continued written reaffirmation of and compliance with the material terms of this Agreement, as applicable, and those of the Executive’s Restrictive Covenant Agreement.

12. Miscellaneous

(a) Governing Law. This Agreement shall be governed by and construed in accordance with the laws of the Commonwealth of Massachusetts, except any such laws that would render such choice of law ineffective.

(b) Amendment. This Agreement may not be amended or modified otherwise than by a written agreement executed by the parties hereto or their respective successors and legal representatives.

(c) Partial Invalidity. If any provision in this Agreement is held by a court of competent jurisdiction to be invalid, void, or unenforceable, the remaining provisions will nevertheless continue in full force without being impaired or invalidated in any way.

(d) Entire Agreement; Effect of Current Agreement. This Agreement constitutes the entire understanding and agreement between the parties hereto regarding the compensation and benefits payable to the Executive in the respective circumstances described herein, superseding all prior understandings and agreements, whether oral or written.

(e) Expenses. The Company agrees to pay, solely with respect to any contest with respect to which the Executive is successful on the merits and after submission of reasonable supporting documentation, to the full extent permitted by law, all legal fees and expenses the Executive may reasonably have incurred as a result of any contest by the Company, the Executive or others of the validity or enforceability of, or liability under, any provision of this Agreement (including as a result of any contest by the Executive about the amount of any payment pursuant to this Agreement), plus, in each case, interest on any delayed payment at the applicable Federal rate provided for in Section 7872(f)(2)(A) of the Code. The Company's payment of any eligible expenses shall be made within sixty (60) days after the Executive's submission of reasonable supporting documentation for such expenses.

(g) Notices. All notices and other communications hereunder shall be in writing and shall be delivered by hand delivery, by a reputable overnight courier service, or by registered or certified mail, return receipt requested, postage prepaid. Notice to the Executive shall be addressed to the Executive at the Executive's last address contained in the records of the Company, and notice to the Company shall be addressed to:

PTC Inc.
121 Seaport Boulevard
Boston, MA 02210
Attention: General Counsel
Notice shall be addressed to such other address as either party shall have furnished to the other in writing in accordance herewith. Any notice or communication shall be deemed to be delivered upon the date of hand delivery, one day following delivery to an overnight courier service, or three days following mailing by registered or certified mail.

EXECUTED as of the date first written above. set forth below.

P **[**

T **E**

CINC.

XECUTIVE NAME]

By: /s/Lisa Reilly

Print Name: Lisa Reilly

Title: Chief People Officer

Date: November

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By: S/s/Michael DiTullio /s/ Catherine Kniker Date: November 16, 2023

Print Name: Jim Heppelmann Michael DiTullio

[Name] Catherine Kniker

[Title] President & CEO, PTC

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Exhibit 21.1

PTC Inc.	
Subsidiaries	
Jurisdiction	**Name**
Delaware	Parametric Technology International, Inc.
Delaware	ServiceMax, Inc.
Massachusetts	PTC Foundation Inc.
Massachusetts	PTC International, Inc.
Massachusetts	PTC Seaport Holdings Inc.
Australia	Parametric Technology Australia Pty. Limited
Australia	Migenius PtyServiceMax Australia Pty. Ltd.
Austria	Parametric Technology Gesellschaft, m.b.H.
Belgium	Parametric Technology (Belgium) b.v.b.a.
Brazil	Parametric Technology Brasil Ltda.
Canada	PTC (Canada) Inc.
Cayman Islands	PTC Seaport (Cayman) Ltd.
Cayman Islands	Parametric Technology (Cayman) Ltd.
Cayman Islands	Seaport Holdings (Cayman) Ltd.
China	Parametric Technology (Shanghai) Software Co. Ltd.

Denmark	Parametric Technology (Denmark) A/S
France	Parametric Technology S.A.
Germany	Intland Software GmbH
Germany	Eger Invest GmbH
Germany	Parametric Technology GmbH
Germany	Parametric Technology Holding Germany GmbH
Germany	pure-systems GmbH
Hong Kong	Parametric Technology (Hong Kong) Ltd.
Hungary	Intland Software PTC Hungary KFT
Hungary	Intland Cloud Services BT
Hungary	Intland Professional Services BT
Hungary	Intland Retina BT
Hungary	Intland Softwate Development BT
Hungary	Intland Solutions BT
India	OnShape India Private Limited
India	Parametric Technology (India) Private Limited
India	Parametric Technology (India) Private Ltd.
India	PTC Software (India) Private Limited
India	ServiceMax Technologies (India) Private Limited
Ireland	PTC (IFSC) Limited
Ireland	PTC (SSI) dac Unlimited Company
Israel	Parametric Technology Israel Ltd.
Italy	Parametric Technology Italia S.r.l.
Japan	PTC Japan KK
Korea	PTC Korea Co., Ltd.
Malaysia	Parametric Technology Corporation (Malaysia) Sdn. Bhd.
Malta	PTC (Malta) Ltd.
Mauritius	CV Holding (Mauritius) Ltd.
Mexico	Parametric Technology Mexico, S.A. de C.V.
Netherlands	Parametric Technology Europe B.V.
Netherlands	Parametric Technology Nederland B.V.
Netherlands	ServiceMax Netherlands B.V.
Romania	PTC Eastern Europe S.R.L.
Serbia	Plugin76 d.o.o. R&D za razvoj softvera Subotica

Singapore	Parametric Technology Singapore Pte. Ltd.
Singapore	ServiceMax Software Singapore Pte. Ltd.
Spain	Parametric Technology España, S.A.
Sweden	PTC Sweden AB
Switzerland	Parametric Technology (Schweiz) AG
Taiwan	Parametric Technology Taiwan Ltd.
United Kingdom	Parametric Holdings (UK) Limited
United Kingdom	Parametric Technology (UK) Limited
United Kingdom	CloudMilling Ltd Limited
United Kingdom	ServiceMax Europe Limited
United Kingdom	ServiceMax Global Ltd.

Exhibit 23.1

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the Registration Statements on Form S-8 (No. 333-211751 333-271506 and 333-231992) 333-271505) and on Form S-3 (No. 333-261270) of PTC Inc. of our report dated November 15, 2022 November 17, 2023 relating to the financial statements and the effectiveness of internal control over financial reporting, which appears in this Form 10-K.

/s/ PricewaterhouseCoopers LLP
Boston, Massachusetts
November 15, 2022 17, 2023

EXHIBIT 31.1

CERTIFICATION

I, James Heppelmann, certify that:

1. I have reviewed this annual report on Form 10-K of PTC Inc.;

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

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

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

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

b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

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

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

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

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

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

Date: November 15, 2022 17, 2023

/S/ JAMES HEPPELMANN

James Heppelmann

President Chairman of the Board and Chief Executive Officer

EXHIBIT 31.2

CERTIFICATION

I, Kristian Talvitie, certify that:

1. I have reviewed this annual report on Form 10-K of PTC Inc.;

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

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

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

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

b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

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

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

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

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

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

Date: November 15, 2022 17, 2023	/S/ KRISTIAN TALVITIE
	Kristian Talvitie
	Executive Vice President and Chief Financial Officer

EXHIBIT 32

Certification of Periodic Financial Report

Pursuant to 18 U.S.C. Section 1350

Pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, each of the undersigned officers of PTC Inc. (the "Company") certifies that, to his knowledge, the Annual Report on Form 10-K of the Company for the year ended September 30, 2022 September 30, 2023 fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934 and information contained in that Form 10-K fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: November 15, 2022 17, 2023	/S/ JAMES HEPPELMANN
	James Heppelmann
	President Chairman of the Board and Chief Executive Officer
Date: November 15, 2022 17, 2023	/S/ KRISTIAN TALVITIE
	Kristian Talvitie
	Executive Vice President and Chief Financial Officer