

PROS Holdings, Inc.
Form 10-K
February 15, 2018
Table of Contents

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

Form 10-K
(MARK ONE)

ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the fiscal year ended December 31, 2017

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

For the transition period from _____ to _____
Commission File Number 001-33554

PROS HOLDINGS, INC.
(Exact Name of Registrant as Specified in Its Charter)

Delaware 76-0168604
(State or Other Jurisdiction of (I.R.S. Employer
Incorporation or Organization) Identification No.)

3100 Main Street, Suite 900, Houston, Texas 77002
(Address of Principal Executive Offices) (Zip code)
Registrant's telephone number, including area code: (713) 335-5151
Securities Registered Pursuant to Section 12(b) of the Act:

| Title of Each Class | Name of Each Exchange on Which Registered |
|---|---|
| Common Stock, par value \$0.001 per share | New York Stock Exchange |

Securities Registered Pursuant to Section 12(g) of the Act:
None

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

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Exchange 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 and posted on its corporate website, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§232.405 of

this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files).

Yes No

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

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer or a smaller reporting company. See definition 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 (do not check if a smaller reporting company) Smaller Reporting Company

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 voting and non-voting common equity held by non-affiliates of the registrant was approximately \$597.8 million as of June 30, 2017 based upon the closing price for the registrant's of the common stock on the New York Stock Exchange. This determination of affiliate status was based on publicly filed documents and is not necessarily a conclusive determination for other purposes.

As of February 12, 2018, there were outstanding 32,255,997 shares of common stock, par value \$0.001, of the registrant.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's Proxy Statement relating to its 2018 Annual Stockholders Meeting, to be filed within 120 days of the end of the fiscal year ended December 31, 2017, are incorporated by reference into Part III of this Annual Report on Form 10-K.

Table of Contents

PROS Holdings, Inc.
Annual Report on Form 10-K
Table of Contents
For the Year Ended December 31, 2017

| Item Description | Page |
|---|-------------|
| <u>Part I</u> | |
| 1 <u>Business</u> | <u>2</u> |
| 1A. <u>Risk Factors</u> | <u>10</u> |
| 1B. <u>Unresolved Staff Comments</u> | <u>23</u> |
| 2 <u>Properties</u> | <u>23</u> |
| 3 <u>Legal Proceedings</u> | <u>23</u> |
| 4 <u>Mine Safety Disclosure</u> | <u>23</u> |
| <u>Part II</u> | |
| 5 <u>Market for Registrant’s Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities</u> | <u>24</u> |
| 6 <u>Selected Financial Data</u> | <u>26</u> |
| 7 <u>Management’s Discussion and Analysis of Financial Condition and Results of Operations</u> | <u>27</u> |
| 7A. <u>Quantitative and Qualitative Disclosures About Market Risk</u> | <u>44</u> |
| 8 <u>Financial Statements and Supplementary Data</u> | <u>44</u> |
| 9 <u>Changes in and Disagreements with Accountants on Accounting and Financial Disclosure</u> | <u>44</u> |
| 9A. <u>Controls and Procedures</u> | <u>44</u> |
| 9B. <u>Other Information</u> | <u>45</u> |
| <u>Part III</u> | |
| 10 <u>Directors, Executive Officers and Corporate Governance</u> | <u>46</u> |
| 11 <u>Executive Compensation</u> | <u>46</u> |
| 12 <u>Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters</u> | <u>46</u> |
| 13 <u>Certain Relationships, Related Transactions and Director Independence</u> | <u>46</u> |
| 14 <u>Principal Accountant Fees and Services</u> | <u>46</u> |
| <u>Part IV</u> | |
| 15 <u>Exhibits and Financial Statement Schedules</u> | <u>47</u> |
| 16 <u>Form 10-K Summary</u> | <u>F-38</u> |

Table of Contents

SIGNIFICANT RELATIONSHIPS REFERENCED IN THIS ANNUAL REPORT

The terms "PROS," "we," "us," and "our" refer to PROS Holdings, Inc., a Delaware corporation, and all of its subsidiaries that are consolidated in conformity with the generally accepted accounting principles in the United States of America ("GAAP").

CAUTIONARY STATEMENT REGARDING FORWARD LOOKING STATEMENTS

This Annual Report on Form 10-K contains certain statements that may be deemed to be "forward-looking statements" that anticipate results based on our estimates, assumptions and plans that are subject to uncertainty. These statements are made subject to the safe-harbor provisions of the Private Securities Litigation Reform Act of 1995, Section 27A of the Securities Act of 1933, as amended (the "Securities Act"), and Section 21E of the Securities Exchange Act of 1934, as amended (the "Exchange Act"). All statements in this report not dealing with historical results or current facts are forward-looking and are based on estimates, assumptions and projections. Statements which include the words "believes," "seeks," "expects," "may," "should," "intends," "likely," "targets," "plans," "anticipates," "estimates," or the negative version of those words and similar statements of future or forward-looking nature identify forward-looking statements. The forward-looking statements made herein are only made as of the date hereof, and we undertake no obligation to publicly update such forward-looking statements whether as a result of new information, future events or otherwise.

Numerous important factors, risks and uncertainties affect our operating results, including, without limitation, those contained in this report, and could cause our actual results to differ materially, from the results implied by these or any other forward-looking statements made by us or on our behalf. There can be no assurance that future results will meet expectations. You should pay particular attention to the important risk factors and cautionary statements described in the section of this report entitled "Risk Factors". You should also carefully review the cautionary statements described in the other documents we file from time to time with the Securities and Exchange Commission ("SEC"), specifically all Quarterly Reports on Form 10-Q and Current Reports on Form 8-K. Information contained on our website is not part of this report.

Part I

Item 1. Business

Overview

PROS is a cloud software company powering the shift to modern commerce by helping companies create personalized and frictionless buying experiences for their customers. Fueled by artificial intelligence, machine learning and proven science, our solutions make it possible for companies to price, configure and sell their products and services in an omnichannel environment with speed, precision and consistency. Our customers benefit from decades of data science expertise infused into our purpose-built industry solutions. We also provide professional services to implement our software solutions.

We were incorporated in Texas in 1985. We reincorporated as a Delaware corporation in 1998. In 2002, we reorganized as a holding company in Delaware. Our principal executive offices are located at 3100 Main Street, Suite 900, Houston, Texas 77002. We report as one operating segment with our Chief Executive Officer acting as our chief operating decision maker. Our telephone number is (713) 335-5151. Our website is www.pros.com. Our website and the information contained therein or connected thereto are not intended to be incorporated into this Annual Report on Form 10-K.

Our Industry

Data-driven decision making is an important driver of business performance. Intense global competition, market volatility and rising costs put pressure on companies to simultaneously drive top-line and bottom-line results. In response to these pressures, we believe companies are increasingly focused on modern commerce software solutions that leverage prescriptive analytics to accelerate the process of converting prospects to customers using data science-based decision-making technology. We also believe that market forces, including increasingly complex

business models, uncertain demand for products and services, volatile costs, and exponentially increasing enterprise and market data, will accelerate the demand for software solutions that align critical sales, pricing and revenue management processes to help increase visibility, business agility and customer engagement. We believe the market for solutions that address the needs for companies to improve top-line and bottom-line financial results simultaneously is a large and growing opportunity that spans most major industries.

Our Solutions

PROS modern commerce solutions offer what we believe is a holistic approach to improving revenue and profit

2

Table of Contents

performance by helping companies create personalized and frictionless buying experiences for their customers. Our selling and pricing solutions leverage artificial intelligence designed to accelerate the process of converting prospects to customers, using data science-based decision-making technology. Our solutions are designed to enable companies to move pricing and revenue management strategies to leveraging scaled data-driven pricing strategies that are formulated to help increase profit margins by driving profit expansion and protecting against profit erosion. These data-driven insights help identify which customers and prospects of a company are most likely to buy, and what offers and price points are most likely to result in a closed deal. These insights leverage data science based on a company's historic customer transactions, market and other data to uncover customer buying patterns and preferences. This data science embedded in our solutions provides our customers with predictive and prescriptive guidance on key business decisions that drive growth and profitability, including product mix optimization, price forecasting, price optimization, product configuration recommendations, cross-sell and upsell recommendations, attrition detection, and willingness-to-pay. Our solutions also help to increase visibility, business agility and customer engagement by aligning critical sales, pricing and revenue management processes. As a result, our solutions make it easier for companies to configure the correct product(s), set the right price and get a quote into the hands of a customer faster.

We offer our solutions as Software-as-a-Service ("SaaS"). Our subscription services enable our customers to implement, access and use our software on the PROS cloud via an internet connection. We believe our cloud solutions allow our customers to reduce their initial investment in third-party software, hardware, and administration requirements over traditional enterprise software, and also allow smaller customers to cost-effectively leverage our enterprise class infrastructure, infrastructure management, security and other best practices. In addition, as we manage all updates and upgrades of software deployed on the PROS cloud on behalf of our customers, we are able to provide our customers with our latest product innovations in a more uniform way. Over time, we expect that this model will require us to support fewer old versions of our software solutions, which would allow our product development team to focus more effort on creating innovative enhancements to our existing products and developing new products. We offer both single-tenant and multi-tenant solutions under our SaaS model generally via three-year subscriptions with pricing generally based on the number of users, data volume and revenue managed by our software.

Before 2015, we primarily offered perpetual license solutions to our customers. For perpetual licenses, our customers received the perpetual right to use our software. Our license agreements provided customers with the right to use licensed solutions within a specific license scope, including but not limited to revenue, geography, users, and business unit. The vast majority of our software license customers also purchased software maintenance and support, generally for an initial period of two years, then annual renewals thereafter. Software maintenance and support include unspecified software updates and enhancements on a when-and-if-available basis, maintenance releases, and patches released during the term of the support period.

Our high-performance software architecture supports real-time, high-volume transaction processing and enables us to handle the processing and database requirements of sophisticated enterprise customers, including those who need to respond to their customers with sub-second electronic response requirements. We provide standardized configurations of our software based on the industries we serve and offer professional services to configure these solutions to meet the specific needs of each customer. Our software solutions operate in large, complex and demanding information technology environments.

PROS modern commerce software solutions enable companies across the many industries that we service to improve top-line and bottom-line financial results simultaneously by aligning sales, pricing, product, demand and availability. Our cloud solutions, which enable our customers to provide a consistent buyer experience across channels, include SellingPRO, PricingPRO and RevenuePRO.

Table of Contents

Solutions for Selling

Our SellingPRO solutions are comprised of a broad set of configuration, quoting and eCommerce capabilities with data science-driven, actionable insights to deliver sales proposals through prescriptive selling actions, pricing and offer guidance designed to convert more of the right deals at the right price, and with greater speed, accuracy, scale and consistency across all of the customer's sales channels. SellingPRO includes the following editions:

SellingPRO Deal Desk edition provides deal analytics to a customer's sales team to quickly analyze a large volume of complex opportunities and instantly create proposals with prescriptive products, services, terms and pricing.

SellingPRO Deal Desk edition also simplifies deal approval processes and accelerates responsiveness by automating quote generation and approval workflows.

SellingPRO Smart CPQ edition integrates PROS data science-driven price guidance with a customer's existing CRM solution to enable sales teams to quickly create accurate and highly-customized offers for each customer.

SellingPRO eCommerce edition provides offer and pricing guidance through a personalized and consistent customer experience across sales channels including but not limited to customer partner internet portals and eCommerce websites. SellingPRO eCommerce edition also enables companies to efficiently reach new sales markets and add new sales channels from a single product and configuration repository.

SellingPRO Opportunity Detection edition applies artificial intelligence and machine learning to analyze transaction activity, uncover buying behavior trends and identify new opportunities. Using techniques such as outlier detection, churn forecasting and clustering algorithms, it finds inconsistent, declining and gap purchasing behaviors at the product level for each customer. These sales opportunity recommendations are then presented to each sales rep in an easy-to-use interface in their familiar CRM environment for instant evaluation and action.

Solutions for Pricing

Our PricingPRO solutions deliver insight into pricing practices, enhances control over pricing execution and provides prescriptive pricing recommendations to the sales team. PricingPRO includes the following editions:

PricingPRO Control edition helps companies centralize all pricing strategies and execution to create a single source of pricing information, manage and enforce pricing policies, quickly change pricing strategies and eliminate pricing errors.

- PricingPRO Guidance edition provides data science-driven, market-based pricing and offer guidance to help sales teams confidently negotiate pricing on each deal.

Table of Contents

Solutions for Revenue Management

Our RevenuePRO solutions are a set of integrated software solutions that enable enterprises in the travel industry, including the airline, hotel and cruise industries, to drive revenue and profit-maximizing business strategies through the application of advanced forecasting, optimization technologies and decision-support capabilities. These big data solutions provide businesses the tools and processes to help maximize revenue and profitability; quickly adapt to changing market conditions and business objectives; differentiate customers by market and sales channel; effectively conduct real-time negotiations; monitor pricing and revenue management performance; and increase customer loyalty by providing the right products and services to the right customer at the right time. Our RevenuePRO suite of products include the following editions:

• RevenuePRO Passenger Revenue Management edition manages passenger demand with either leg- or segment-based revenue management.

• RevenuePRO Group Sales Optimizer edition manages the airline group booking process by determining optimal group availability and pricing.

• RevenuePRO Real-Time Dynamic Pricing™ edition determines optimal availability based on real-time evaluations and provides real-time availability and pricing to distribution channels, and keeps rules, fares and other data synchronized and deployable across multiple data centers.

• RevenuePRO Shopping edition is an airfare pricing and shopping engine that delivers fast, accurate and comprehensive flight search results.

• RevenuePRO Merchandising edition helps airlines to increase conversion and revenues per passenger by selling extra baggage, legroom and other services dynamically. Airlines can upsell at any time in the customer journey using rich content for a superior shopping experience across direct distribution channels.

Technology

Software Architecture. Our software architecture is based on open standards such as Java, C/C++, HTML5, JavaScript, XML, and HTTP. We have created a component-based design in a service-oriented architecture to develop a flexible, layered framework. This framework supports parallel and independent evolution and innovation in technologies and product features.

Micro-services Architecture. A comprehensive web services interface is at the heart of our architecture. This interface enables extension onto other platforms and the creation of rich integrated solutions. It is also the foundation of our initiative to bring our solutions to the enterprise software and devices that many businesses are already using.

Embedded Science. Our robust science-based capabilities such as forecasting, optimization, segmentation, and price guidance allow us to leverage the deep expertise and research of our science and research group in our solutions. These capabilities are industry-independent and are validated using our proprietary verification and testing processes.

Configuration vs. Custom Coding. Our solutions can be configured to meet each customer's business needs through configuration rather than custom code. The configuration capabilities define both a business layer (including definition of user workflows, executive dashboards, analytics views, calculations, approval processes and alerts), as well as a data layer that permits configuration of data structures, including hierarchical dimensions, pricing levels and measures. Much of the configuration can be performed by a business user without information technology personnel involvement. We maintain configurations allowing our customers to use the latest version of our solutions.

Scalability. We leverage modern big data technologies such as MapReduce and Hadoop®, NoSQL databases such as Cassandra and MongoDB®, and in-memory and column-oriented data stores to scale to large data volumes and high user request rates. The scalability of our software solutions has been tested and validated in conjunction with third-party vendors.

Data Integration. The data needed to execute and optimize sales, quoting, pricing, rebate and revenue management functionality typically resides in multiple sources, such as a company's enterprise resource planning ("ERP"), supply chain management ("SCM"), customer relationship management ("CRM"), reservations and inventory systems, and/or industry-specific transaction systems. In addition, productivity tools such as spreadsheets and external market data sources are common. Our data integration capabilities utilize web services and file-based data interfacing to bring data from disparate sources together into a single cohesive database, both in real time and through scheduled batch tasks. We also provide certified content for integration with SAP as well as integration development services using industry standard tools.

Table of Contents

User Interface. Our technology provides a rich, browser-based interface that supports both local and remote users. This interface supports a wide variety of interactive charts and other data views, and provides a comprehensive data security model based on user role and scope of responsibility. We also offer capabilities for multiple mobile devices, tablets, CRM systems, and client applications.

Cloud Infrastructure. Our SaaS solutions are fully architected, scaled and managed by PROS to meet enterprise-class data demands. We currently deliver our solutions from enterprise cloud computing platform providers, including Microsoft Azure and IBM Softlayer, as well as from secure co-location data centers operated by third parties. Our infrastructure is designed to achieve high levels of security, scalability, performance and availability. We provide a highly secure computing environment as well as high application availability.

Subscription Services

Our subscription services generally provide customers access to our software within a cloud-based IT environment that we manage and offer to customers on a subscription basis and allow our customers to benefit from our latest cloud solutions, reduce infrastructure, installation, and ongoing administration requirements. We historically also offered cloud-based services to allow existing customers who previously purchased licenses to our software to have access to that software within a cloud-based IT environment that we manage. This allows those customers to reduce infrastructure and ongoing administration requirements as an alternative to their on-premise deployment of our software. We generally offer these services via 24 to 60 month contracts with pricing based on the data volumes, number of users and service levels requested.

Sales and Marketing

We sell and market our software solutions primarily through our direct global sales force and indirectly through resellers and systems integrators. Our sales force is organized by our target markets of the manufacturing, distribution, and services industries, including automotive and industrial, business-to-business ("B2B") services, cargo, chemicals and energy, consumer goods, insurance, food and beverage, healthcare, high tech, and travel. Our sales force is responsible for the worldwide sale of our solutions to new and existing customers, and works in concert with our solutions personnel for selling and providing solution demonstrations to new customers.

Our marketing activities consist of a variety of programs designed to generate sales leads and build awareness of our solutions. We host conferences for sales, pricing, and revenue management professionals, host informational web seminars and participate in and sponsor other industry and trade conferences and organizations.

Professional Services

We provide software-related professional services, including implementation and configuration services, consulting and training.

Implementation and Configuration

Our software solution implementations have a standardized and tested implementation process developed through years of experience implementing our software solutions in global enterprises across multiple industries. Our professional services team works closely with our customers to develop an integrated project plan to help them accelerate time to value. Pursuant to these plans, we provide configuration services related to our solutions. We also assist customers in loading and validating data and supporting organizational activities to assist our customers' transition from awareness of their pricing challenges to adoption of pricing excellence best practices. In addition to our own internal professional services team, we also work with a team of globally diverse partners who have been certified to implement our software.

Strategic Services

Our strategic services include discovery and insight consulting to analyze a customer's current pricing processes and data, identifying and prioritizing specific high-value pricing opportunities, and recommending pricing best practices and strategic pricing services. We also offer change management, pricing process redesign, pricing organizational design, opportunity assessment and performance management consulting. These strategic services enhance our partnerships with our customers and help them achieve their specific pricing goals.

6

Table of Contents

Training

We offer training to both our customers and partners to increase the knowledge and skills to deploy and use the full functionality of our software solutions. We offer an array of live and virtual classroom training, as well as tailored, private on-site classroom training. Our courses include training on all aspects of our software solutions, from introductory on-demand mini-courses to multi-day hands-on deep technical classroom sessions.

Maintenance and Support

We offer ongoing maintenance and support services for our software solutions using a global model to support our customers across major geographies. Maintenance enrollment entitles a customer to solicit support through a web-based interface which allows the customer to submit and track issues, access our online knowledge base and receive unspecified upgrades, maintenance releases and bug fixes during the term of the support period on a when-and-if-available basis. In addition, our customer support personnel responds to customer issues using an escalation process that prioritizes reported issues based on a defined set of severity levels, as well as assists customers in deploying our standard releases for each software solution by providing release web seminars and documentation. Maintenance fees are an important source of recurring revenue, and we invest significant resources in providing these services. Revenue from maintenance and support services comprised 41%, 45%, and 38% of our total revenue in 2017, 2016 and 2015, respectively. We expect our maintenance revenue will decrease over time as a result of existing customers migrating from our on-premise solutions to our cloud solutions and customers purchasing fewer licenses to our software as a result of our cloud strategy.

Customers

We sell our software solutions to customers across many industries, including manufacturing, distribution, and services industries, including automotive and industrial, B2B services, cargo, chemicals and energy, consumer goods, insurance, food and beverage, healthcare, high tech, and travel. Our customers are generally large global enterprises, although we also have customers that are much smaller in scope of operations. In each of 2017, 2016 and 2015, we had no single customer that accounted for 10% or more of revenue.

International Operations

We are a global company that conducts sales, sales support, professional services, product development and support, and marketing around the world. Our headquarters is located in Houston, Texas, and we also have additional field operations through our operating subsidiaries in Australia, Bulgaria, Canada, France, Germany, Ireland, United Arab Emirates, United Kingdom and the United States. We conduct development activities predominantly in Bulgaria, France and the U.S., and also utilize third-party contractors in Bolivia, Colombia and India. We plan to continue to expand our operations in international locations to meet the strategic objectives of our business.

Approximately 63%, 63%, and 62% of our total revenue came from customers outside the U.S. for the years ended December 31, 2017, 2016 and 2015, respectively. Our business, financial condition and results of operations could be adversely impacted by factors, including currency fluctuations or regulatory, political, social and economic developments or instability in the foreign jurisdictions in which we operate. For additional financial information about geographic areas, see Note 15 of the Notes to the Consolidated Financial Statements.

Seasonality

Historically, we have experienced a higher volume of transactions in the quarter ended December 31, which is our fourth fiscal quarter, and to a lesser extent, during other fiscal quarters. However, our transition to cloud strategy has moderated, and may continue to moderate, our historical seasonality trends.

Competition

The markets for our products and services are competitive, fragmented and rapidly evolving. For example, we have seen consolidation in the quoting software market with large vendors acquiring smaller quoting companies as they attempt to provide end-to-end solutions to drive sales and profit. Today, we are increasingly competing in a sales ecosystem with competitors that all aim to drive effectiveness and efficiency in selling, although we believe no single company has an offering that matches the integrated capabilities of our solutions. We face collective competition from a number of larger and smaller companies. For example, Vendavo and Zilliant compete against the pricing management features of our revenue and profit realization solutions. Others, such as Apptus, Oracle, and Salesforce.com compete against the quoting features of our revenue and profit realization

7

Table of Contents

solutions. Yet others, such as Sabre Airline Solutions, Amadeus and AirRM, compete against a portion of our revenue management solutions in the airline industry. Several large enterprise application providers, such as JDA Software and SAP, have developed offerings that include limited pricing and revenue management functionality. Our solutions also compete with custom solutions developed internally by businesses, which require some combination of manual processes, external consultants, spreadsheets and internally-developed software tools.

The number of companies that we compete with has increased in recent years as we expanded into adjacent technologies. We believe our customers consider the following factors when evaluating our solutions versus competitive solutions:

- customer base;
- industry domain expertise;
- breadth and depth of product and service offerings;
- ability to offer integrated high-value solutions;
- domain management best practices expertise and delivery;
- ability for users to configure the solution to their needs;
- depth of expertise in data and pricing science;
- real-time solutions;
- return on investment, total cost of ownership, and time-to-value;
- product architecture, functionality, performance, reliability and scalability;
- services and customer support quality;
- size and quality of partner ecosystem;
- existing customer relationships; and
- vendor viability.

We believe that none of our competitors can provide all of the functionality needed to support an organization interested in optimizing sales growth through data science-driven pricing, quoting and revenue management. Our competitors generally compete on price and by bundling their applications with other enterprise applications, and we expect that this will continue in the future. We distinguish ourselves from these vendors through our long history of providing software solutions incorporating data science, machine learning, and/or artificial intelligence, the breadth and depth of the functionality we offer, the robust integration and configuration capabilities of our solutions, and our proven ability to provide high-value dynamic science-based optimization software to our global customer base across multiple industries. In the future, we believe our competition will continue to increase as more companies move into our market segment and as we expand into adjacent market segments.

Intellectual Property and Other Proprietary Rights

Our success and ability to compete is dependent in part on our ability to develop and maintain the proprietary aspects of our technology and operate without infringing upon the proprietary rights of others. Due to the rapidly changing nature of applicable technologies and current limitations in U.S. patent law, we believe that for the improvement of existing solutions and development of new solutions, reliance upon trade secrets and unpatented proprietary know-how are generally more advantageous for us than patent and trademark protection. We also rely on a combination of trade secrets, confidentiality procedures, contractual provisions, patents, trademarks, copyrights and other similar measures to protect our proprietary information.

Research and Development

We believe our software innovation is the foundation of our business and accordingly have made, and continue to make significant investments in research and development for the enhancement of existing products and services and the development of new products and services. We also believe that our long-term investment in artificial intelligence and machine learning of pricing and revenue management differentiates us from our competitors. We are committed to continuing to further development of these high-value solutions as evidenced by our continued investment in

research and development. In fiscal 2017, 2016 and 2015, we incurred expenses of \$56.0 million, \$52.8 million and \$46.8 million, respectively, in research and development to enhance our existing portfolio of solutions and to develop new solutions. Our research and development expenses include costs associated with our product management, product development and science and research groups. We conduct research and development activities predominantly in the U.S. and to a lesser extent in Bulgaria and France.

Table of Contents

We employ scientists, most of whom are Ph.D.s, to advance sales, pricing, and revenue management technology and its implementation in our software solutions. These scientists have specialties including, but not limited to, operations research, management science, statistics, econometrics, and computational methods. Our scientists regularly interact with our customers, product development, sales, marketing, and professional services staff to help keep our science efforts relevant to real-world demands.

Employees

As of December 31, 2017, we had 1,066 full-time personnel, which included 934 employees and 132 outsourced personnel. We have not experienced any work stoppages and consider our employee relations to be good.

Website

We maintain a website at www.pros.com. No information on our website is incorporated by reference herein. We make available, free of charge through our website, our Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K, including exhibits thereto, and any amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Exchange Act, as soon as reasonably practicable after the reports are electronically filed with or furnished to the SEC. Our reports that are filed with, or furnished to, the SEC are also available at the SEC's website at www.sec.gov. You may also read and copy any materials we file with the SEC, free of charge, at the SEC's Public Reference Room at 100 F Street, N.E., Washington, DC 20549. You may obtain information on the operation of the Public Reference Room by calling the SEC at 1-800-SEC-0330.

Annual CEO Certification

Pursuant to Section 303A.12(a) of the New York Stock Exchange ("NYSE") Listed Company Manual, we submitted to the NYSE an annual certification signed by our Chief Executive Officer certifying that he was not aware of any violation by us of NYSE corporate governance listing standards on June 8, 2017.

Table of Contents

Item 1A. Risk Factors

We operate in a dynamic environment that involves numerous risks and uncertainties. The following section describes some of the risks that may adversely affect our business, financial condition or results of operations, and the trading price of our common stock; these risks are not necessarily listed in terms of their importance or level of risk.

Risks relating to our business and industry

If our security measures are breached and unauthorized access is obtained to a customer's data, our data or our IT systems, our solutions may be perceived as not being secure, customers may curtail or stop using our solutions and/or we may incur significant legal and financial exposure and liabilities.

Our solutions and services involve the storage, and to a more limited extent, the transmission of our customers' proprietary information. Despite the implementation of security measures and third-party security attestations, these systems may still be vulnerable to data theft, computer viruses, malicious software programs, programming errors, attacks by third parties or similar disruptive problems, and could result in someone obtaining unauthorized access to our customers' data or our data, including our intellectual property and other confidential business information, or our IT systems. Because the techniques used to compromise systems change frequently and may not be recognized until launched, we may be unable to anticipate these techniques or to implement adequate preventative measures. In addition, the costs to prevent, eliminate or alleviate security vulnerabilities, computer viruses, malicious software programs, and other attacks by third parties are significant. Our efforts to address these problems may not be successful and could result in interruptions, delays, cessation of service and loss of existing or potential customers. We cannot predict the extent, frequency or impact of these problems on us. Any security breach could result in a loss of confidence in the security of our solutions and services, damage our reputation, negatively impact our future sales, disrupt our business, increase our information security costs, and lead to indemnity obligations, legal liability and other costs.

We depend on third-party data centers and other unrelated service providers and any disruption in these operations could impair the delivery of our service and negatively affect the market for our cloud solutions.

Our cloud products are dependent upon third-party hardware, software and cloud hosting vendors, including Microsoft Azure and IBM Softlayer, all of which must inter-operate for end users to achieve their computing goals. We utilize third-party data center hosting facilities, cloud platform providers, and other service providers to host and deliver our subscription services as well as for our own business operations. While we control and generally have exclusive access to our servers and all of the components of our network that are located in our external data centers, we do not control the operation of these facilities and they are vulnerable to damage or interruption from earthquakes, floods, fires, power loss, telecommunications failures and similar events. They may also be subject to security incidents, break-ins, sabotage, intentional acts of vandalism and similar misconduct. Despite our failover capabilities, standard protocols and other precautions taken at these facilities, the occurrence of a natural disaster or an act of terrorism, a decision to close the facilities without adequate notice or other unanticipated problems at these facilities could result in lengthy interruptions in our service.

In addition, these providers have no obligation to renew their agreements with us on commercially reasonable terms, or at all. If we are unable to renew these agreements on commercially reasonable terms, or if one of our data center operators is acquired, we may be required to transfer our servers and other infrastructure to new data center facilities, and we may incur significant costs and possible service interruption in connection with doing so. Any interruptions or delays in these hosted services, or security or privacy breaches, could damage our reputation, negatively impact our future sales, disrupt our business, and lead to legal liability and other costs.

Furthermore, certain of our applications are essential to our customers' ability to price their products or services. Any interruption in our service may affect the availability, accuracy or timeliness of pricing information and as a result could damage our reputation, cause our customers to terminate their use of our solutions, require us to issue service credits to our customers, require us to indemnify our customers against certain losses, and prevent us from gaining additional business from current or future customers.

Expanding and evolving data privacy laws and regulations could impact our business and expose us to increased liability.

We provide our cloud software solutions globally, including in countries that have more stringent regulations than the U.S., including regulations relating to data privacy and the unauthorized use of, or access to, and retention of commercial and personal information. These data protection laws may be inconsistent across jurisdictions, and are subject to interpretation, particularly in the EU, where the regulatory framework for privacy is actively evolving and is likely to remain uncertain for the

Table of Contents

foreseeable future. For example, the EU General Data Protection Regulation ("GDPR") becomes effective in May 2018, and imposes new requirements regarding the handling of personal data. The GDPR and other changes in laws or regulations, which enhance protection of certain types of data, could increase our cost of providing our products and services, limit us from offering certain solutions in certain jurisdictions, and could impact our new technology innovation related to artificial intelligence and machine learning. In addition, our cloud software solutions store data on behalf of our customers, and if our customers fail to comply with contractual obligations or applicable laws, it could result in litigation or reputational harm to us. Any inability to adequately address privacy concerns, even if unfounded, or to comply with more complex and numerous privacy or data protection laws, regulations and privacy standards, could result in liability to us, damage our reputation, inhibit sales of our solutions and could harm our business, financial condition and results of operations.

Our cloud offerings bring other business and operational risks compared to our legacy on-premises software.

The enterprise cloud computing market is less mature than the market for on-premise enterprise software, and may not be as broadly accepted as on-premise software in the enterprise market, particularly given that customers use our software for important aspects of their business. Prospects and customers may be reluctant or unwilling to use a cloud-based solution due to cost, security, privacy or other concerns, which could delay our sales cycles if we need to educate customers about our cloud solutions. In addition, any errors, defects, disruptions in service or other performance problems could hurt our reputation, may damage our customers' businesses, our customers could elect to not renew, delay or withhold payment to us, we could lose future sales, or customers may make other claims against us, which could harm our subscription revenues, result in an increase in our provision for doubtful accounts, increase collection cycles for our accounts receivable or lead to the expense and risk of litigation.

While we plan to increase our focus on migrating our legacy on-premises software customers to our latest cloud solutions in 2018, our existing customers who purchased licenses to our software may have invested substantial personnel and financial resources in our legacy software, and although we intend to continue to support our perpetual license customers. If our migration efforts are not successful, our internal development and customer support teams could find it increasingly difficult and costly to support both traditional software installed by customers and software delivered as a service.

We are experiencing reduced revenues and corresponding cash flow without a corresponding decrease in expenses as a result of our cloud strategy, which may continue for longer than we expect.

We expect our expenses to exceed our revenues and cash flow in the near term as we continue to make investments as part of our cloud strategy, particularly in new product development, security, privacy and cloud operations. Our ability to return to profitability depends on our ability to: continue to drive subscription sales, develop enhancements to our existing products and develop new products, build our sales and marketing and product development organizations, successfully execute our marketing and sales strategies, enter into and maintain beneficial channel relationships, appropriately manage our expenses, and identify and acquire companies or assets at attractive valuations. If we are not able to execute on these actions and grow our revenue and corresponding cash flows to offset these expected costs, our business may not grow as we anticipate, our operating results could be adversely affected and we may continue to incur net losses, on a GAAP basis, in the future. Additionally, operating margins on our cloud-only products may be lower than those we have achieved on our more mature products, and our new initiatives may not generate sufficient revenue and cash flows to recoup our investments in them. If any of these events were to occur, it could adversely affect our business, results of operations and financial condition.

We are a multinational corporation, which subjects us to increased risks that may adversely affect our operating results.

The majority of our revenues are derived from our customers outside the U.S. For the years ended December 31, 2017, 2016 and 2015, approximately 63%, 63% and 62% of our total revenue, respectively, was derived from outside the U.S. To date, the majority of our sales have been denominated in U.S. dollars, although the majority of our expenses that we incur in our international operations are denominated in local currencies. To date, we have not used risk management techniques or "hedged" the risks associated with fluctuations in foreign currency exchange rates. Consequently, our results of operations and financial condition, including our revenue and operating margins, are subject to losses from fluctuations in foreign currency exchange rates.

Our operations outside the U.S. are subject to risks inherent in doing business internationally, requiring resources and management attention, and may subject us to new or larger levels of regulatory, economic, foreign currency exchange, tax and political risks. We have customers in over 55 countries internationally, which we service through our operations in the U.S. as well as from the United Kingdom, France, Bulgaria, Germany, Canada, Ireland and Australia (through wholly-owned subsidiaries). We expect our international operations to continue to grow. Among the risks we believe are most likely to affect us with respect to our international sales and operations are:

- economic conditions in various parts of the world;

Table of Contents

differing labor and employment regulations, especially in the European Union, where labor laws are generally more advantageous to employees as compared to the U.S., including hourly wage and overtime regulations and employee termination restrictions or related costs;

- multiple, conflicting and changing data privacy laws and regulations that result in increased complexity and costs;
- the difficulty of managing and staffing our international operations and the increased travel, infrastructure and legal compliance costs associated with multiple international locations;
- different and more stringent data protection, privacy and other laws, including data localization requirements;
- unexpected changes in regulatory requirements;
- less favorable intellectual property laws;
- new and different sources of competition;
- costs of compliance and penalties for noncompliance with foreign laws and laws applicable to companies doing business in foreign jurisdictions;
- multiple, conflicting and changing tax laws and regulations that may affect both our international and domestic tax liabilities and result in increased complexity and costs;
- availability of broadband and network connectivity required for certain of our products;
- difficulties in enforcing contracts and collecting accounts receivable, especially in developing countries; and
- tariffs and trade barriers, import and export controls and other regulatory or contractual limitations on our ability to sell or develop our solutions in certain foreign markets.

If we continue to expand our business globally, our success will depend, in large part, on our ability to anticipate and effectively manage these and other risks associated with our international operations. Our failure to manage any of these risks successfully could harm our international operations and reduce our international sales, adversely affecting our business, operating results and financial condition.

As we expand our software product portfolio, we could face increased competition as part of entering new markets.

The market for our products is competitive, and we expect competition to continue to increase in the future as we expand our product portfolio and features. We may not compete successfully against future potential competitors, especially those with significantly greater financial resources or brand name recognition. For example, we compete with sales enablement, configure-price-quote, revenue management, and through PROS Travel Commerce (formerly Vayant), we now compete with airline shopping and merchandising software. Large companies in these spaces may have advantages over us because of their greater brand name recognition, larger customer bases, broader product portfolios, larger distribution channels, or greater financial, technical and marketing resources. As a result, they may be able to adapt more quickly to new or emerging technologies and changes in customer requirements.

If our new products and product enhancements do not achieve sufficient market acceptance, our results of operations and competitive position could suffer.

We spend substantial amounts of time and money to enhance our existing products, as well as to research and develop new products. We introduce new products and incorporate additional features, improve functionality or add other enhancements to our existing products in order to meet our customers' demands. Our new products or enhancements could fail to attain sufficient market acceptance for many reasons, including:

- delays in introducing new, enhanced or modified products;
- defects, errors or failures in any of our products;
- inability to operate effectively with the networks of our prospective customers;
- inability to protect against new types of attacks or techniques used by hackers;
- negative publicity about the performance or effectiveness of our network security products;
- reluctance of customers to purchase products based on open source software; and
- disruptions or delays in the availability and delivery of our products.

Table of Contents

If our new products or enhancements do not achieve adequate acceptance in the market, our competitive position could be impaired, our revenue could be diminished and the effect on our operating results may be particularly acute because of the significant research and development, marketing, sales and other expenses we incurred in connection with the new product.

We focus primarily on sales, pricing and revenue management software, and if the markets for this software develop more slowly than we expect, our business could be harmed.

We derive most of our revenue from providing our solutions for selling, pricing and revenue management, implementation services and ongoing customer support. The sales and pricing market is evolving rapidly, and it is uncertain whether this software will achieve and sustain high levels of demand and market acceptance. Our success would depend on the willingness of businesses to use sales and pricing software in the manufacturing, distribution and services industries, including automotive and industrial, B2B services, cargo, chemicals and energy, consumer goods, insurance, food and beverage, healthcare, high tech, and travel.

Some businesses may be reluctant or unwilling to implement sales and pricing software for a number of reasons, including failure to understand the potential returns of improving their processes and lack of knowledge about the potential benefits that such software may provide. Some businesses may elect to improve their pricing processes through solutions obtained from their existing enterprise software providers, whose solutions are designed principally to address functional areas other than pricing. These enterprise solutions may appeal to customers that wish to limit the number of software vendors on which they rely and the number of different types of solutions used to run their businesses.

If businesses do not embrace the benefits of sales and pricing software, the sales and pricing software market may not continue to develop or may develop more slowly than we expect, either of which would significantly and adversely affect our revenue and operating results. Because the sales and pricing software market is developing and the manner of its development is difficult to predict, we may make errors in predicting and reacting to relevant business trends, which could harm our operating results.

We are subject to a lengthy sales cycle and delays or failures to complete sales may harm our business and cause our revenue and operating income to decline in the future.

While our sales cycle times have improved since we shifted to a cloud strategy in 2015 relative to our prior historical averages, our sales cycle may take several months to over a year. To sell our solutions successfully and obtain an executed contract, we often have to educate our potential customers about the benefits of our solutions. We expend substantial resources during our sales cycles with no assurance that a sale may ultimately result. The length of each individual sales cycle depends on many factors, a number of which we cannot control, including the customer's internal evaluation and approval process requirements as well as the customer's budget constraints. Any unexpected lengthening of the sales cycle or failure to secure anticipated orders could negatively affect our revenue. Furthermore, a delay in our ability to obtain a signed agreement or to complete certain contract requirements in a particular quarter could materially reduce our bookings in that quarter. Any significant failure to generate revenue or delays in recognizing revenue after incurring costs related to our sales or services process could also have a material adverse effect on our business, financial condition and results of operations.

Failure to sustain our historical renewal rates and pricing would adversely affect our future revenue and operating results.

Our subscription agreements are typically for an initial term of three years, and maintenance and support agreements are typically for an initial term of two years. Our customers have no obligation to renew their subscriptions for our

services after the expiration of their initial term, and some customers elect not to renew. Historically, maintenance and support revenue has represented a significant portion of our total revenue, including approximately 41%, 45% and 38% of our total revenue for the years ended December 31, 2017, 2016 and 2015, respectively. Subscription revenue has represented an increasingly significant portion of our total revenue, including approximately 36%, 25% and 17% of our total revenue for the years ended December 31, 2017, 2016 and 2015, respectively.

We cannot provide assurance that we will be able to accurately predict future customer renewal rates. Our customers' renewal rates may decline or fluctuate as a result of a number of factors, including their level of satisfaction with our services, our ability to continue to regularly add functionality, the reliability (including uptime) of our subscription services, the prices of our services, the actual or perceived information security of our systems and services, mergers and acquisitions affecting our customer base, reductions in our customers' spending levels, or declines in customer activity as a result of economic downturns or uncertainty in financial markets. If our customers choose not to renew their subscription, maintenance and support agreements with us on favorable terms or at all, our business, operating results and financial condition could be harmed. Our opportunity for future growth is also affected by our ability to sell additional features and services to our current customers, which depends on a number of

Table of Contents

factors, including our customers' satisfaction with our products and services, the prices of our solutions and general economic conditions. If our efforts to cross-sell and upsell to our customers are unsuccessful, the rate at which our business grows might decline.

We might not generate increased business from our customers, which could limit our revenue in the future.

We sell our software solutions to both new customers and existing customers. Many of our existing customers initially purchase our software solutions for a specific business segment or a specific geographic location within their organization and later purchase additional software solutions for the same or other business segments and geographic locations within their organization. These customers might not choose to make additional purchases of our software solutions or to expand their existing software solutions to other business segments. In addition, as we deploy new applications and features for our software solutions or introduce new software solutions, our current customers could choose not to purchase these new offerings. If we fail to generate additional business from our existing customers, our revenue could grow at a slower rate or even decrease.

Competition from vendors of sales, pricing, revenue management and configure-price-quote solutions as well as from companies internally developing their own solutions could adversely affect our ability to sell our solutions and could result in pressure to price our solutions in a manner that reduces our margins and harms our operating results.

The sales, pricing, revenue management and configure-price-quote software market is competitive, fragmented and rapidly evolving. Our software solutions compete with both solutions developed internally by businesses as well as those solutions offered by competitors. We believe our principal competition consists of sales, pricing, revenue management and configure-price-quote software vendors, including a number of vendors that provide portions of such software for specific industries; as well as large enterprise application providers that have developed offerings that include sales, pricing, revenue management and configure-price-quote functionality.

We expect additional competition from other established and emerging companies to the extent the sales, pricing, revenue management and configure-price-quote software market continues to develop and expand. We also expect competition to increase as a result of the entrance of new competitors in the market and industry consolidation, including through a merger or partnership of two or more of our competitors or the acquisition of a competitor by a larger company. A number of our current and potential competitors have larger installed bases of users, longer operating histories, broader distribution and greater name recognition than we have. In addition, many of these companies have significantly greater resources than we have. As a result, these companies may be able to respond more quickly to new or emerging technologies and changes in customer demands, and devote greater resources to the development, promotion and sale of their products.

Competition could seriously impede our ability to sell our software solutions and services on terms favorable to us. We do not know how our competition could set prices for their products. Businesses may internally develop solutions, rather than invest in commercially-available solutions. Our current and potential competitors may develop and market new technologies that render our existing or future solutions obsolete, unmarketable or less competitive. In addition, if these competitors develop solutions with similar or superior functionality to our solutions, or if they offer solutions with similar functionality at a substantially lower price than our solutions, we may need to decrease the prices for our solutions in order to remain competitive. If we are unable to maintain our current solutions, services and maintenance pricing due to competitive pressures, our margins could be reduced and our operating results could be adversely affected. We cannot provide assurance that we would be able to compete successfully against current or future competitors or that competitive pressures could not materially and adversely affect our business, financial condition and operating results.

Any unauthorized, and potentially improper, actions of our personnel could adversely affect our business, operating results and financial condition.

The recognition of our revenue depends on, among other things, the terms negotiated in our contracts with our customers. Our personnel may act outside of their authority and negotiate additional terms without our knowledge. We have implemented policies to help prevent and discourage such conduct, but there can be no assurance that such policies would be followed. For instance, in the event that our sales personnel negotiate terms that do not appear in the contract and of which we are unaware, whether such additional terms are written or verbal, we could be prevented from recognizing revenue in accordance with our plans. Furthermore, depending on when we learn of unauthorized actions and the size of the transactions involved, we may have to restate revenue for a previously reported period, which could seriously harm our business, operating results and financial condition.

We recently completed our third acquisition, and in the future may continue to enter into acquisitions that may be difficult to integrate, fail to achieve our strategic objectives, disrupt our business, dilute stockholder value or divert management attention.

Table of Contents

In August 2017, we completed our third acquisition with the purchase of Vayant Travel Technologies Inc. ("Vayant"). The purchase of Vayant has required and will continue to require significant management time and attention during the acquisition and integration process. In the future we may continue to acquire other businesses, technologies and products that we intend to complement our existing business, solutions, services and technologies. We cannot provide assurance that the acquisitions we have made or may make in the future could provide us with the benefits or achieve the results we anticipated when entering into the transaction. Acquisitions are typically accompanied by a number of risks, including:

- difficulties in integrating the operations and personnel of the acquired companies;
- difficulties in maintaining acceptable standards, controls, procedures and policies, including integrating financial reporting and operating systems, particularly with respect to foreign and/or public subsidiaries;
- disruption of ongoing business and distraction of management;
- inability to maintain relationships with customers of the acquired business;
- impairment of relationships with employees and customers as a result of any integration of new management and other personnel;
- difficulties in incorporating acquired technology and rights into our solutions and services;
- unexpected expenses resulting from the acquisition; and
- potential unknown liabilities associated with the acquisition.

In addition, we may incur debt, acquisition-related costs and expenses, restructuring charges and write-offs as a result of acquisitions. Acquisitions may also result in goodwill and other intangible assets that are subject to impairment tests, which could result in future impairment charges.

We may enter into negotiations for acquisitions that are not ultimately consummated. Those negotiations could result in diversion of management time and significant out-of-pocket costs. If we fail to evaluate and execute acquisitions successfully, we may not be able to achieve our anticipated level of growth and our business and operating results could be adversely affected.

If our goodwill or amortizable intangible assets become impaired, then we could be required to record a significant charge to earnings.

Under GAAP, we review our goodwill and amortizable intangible assets for impairment when events or changes in circumstances indicate the carrying value may not be recoverable. GAAP requires us to test for goodwill impairment at least annually. Factors that may be considered a change in circumstances indicating that the carrying value of our goodwill or amortizable intangible assets may not be recoverable include declines in stock price, market capitalization or cash flows and slower growth rates in our industry. We could be required to record a significant charge to earnings in our financial statements during the period in which any impairment of our goodwill or amortizable intangible assets were determined, negatively impacting our results of operations.

Any downturn in sales to our target markets could adversely affect our operating results.

Our success is highly dependent upon our ability to sell our software solutions to customers in the manufacturing, distribution and services industries, including automotive and industrial, B2B services, cargo, chemicals and energy, consumer goods, insurance, food and beverage, healthcare, high tech and travel. If we are unable to sell our software solutions effectively to customers in these industries, we may not be able to grow our business. It is uncertain whether our software solutions may achieve and sustain the levels of demand and market acceptance that we anticipate. Such uncertainty is attributable to, among other factors, the following:

- it may be more difficult than we currently anticipate to implement our software solutions in certain verticals within our target industries;

it may be more difficult than we currently anticipate to increase our customer base in our target industries; and our limited experience implementing our software solutions in certain verticals within our target industries.

Our revenue growth has historically been derived from customers in many major industries. Our revenue growth is highly dependent upon continued growth of market acceptance in these industries, and there can be no assurance our solutions may

Table of Contents

achieve or sustain widespread acceptance among customers in these industries. Failure to expand market acceptance of our solutions or maintain sales in these industries could adversely affect our operating results and financial condition.

Certain of our software solutions require implementation projects that are subject to significant risks and delays, which if any occurred could negatively impact the effectiveness of our software, resulting in harm to our reputation, business and financial performance.

The implementation of certain our software solutions involves complex, large-scale projects that require substantial support operations, significant resources and reliance on factors that are beyond our control. For example, the success of our implementation projects is heavily dependent upon the quality of data used by our software solutions, and the commitment of customers' resources and personnel to the projects. We may not be able to correct or compensate for weaknesses or problems in data, or any lack of our customers' commitment and investment in personnel and resources. If we are unable to successfully manage the implementation of our software solutions such that those products do not meet customer needs or expectations, we may become involved in disputes with our customers and our business, reputation and financial performance may be significantly harmed. If an implementation project for a large customer or a number of customers is substantially delayed or canceled, our ability to recognize the associated revenue and our operating results could be adversely affected.

If our executives and other key personnel are unable to effectively manage our business, or if we fail to attract additional qualified sales, marketing, professional services, product development and other personnel, our revenue and operating results could be adversely affected.

Our future success depends upon the performance and service of our executive officers and other key sales, marketing, development, science and professional services staff. The failure of our executives and key personnel to effectively manage our business or the loss of the services of our executive officers and other key personnel would harm our operations. In addition, our future success could depend in large part on our ability to attract and retain a sufficient number of highly qualified sales, marketing, professional services, product development and other personnel, and there can be no assurance that we may be able to do so. We have continued to add a significant number of new personnel to support our continued growth, and their ability to learn our business and manage it effectively could be important to our continued growth and expansion. In addition, given the highly sophisticated data science included in our solutions, the pool of data scientists and software developers qualified to work on our solutions is limited. The implementation of certain of our software solutions requires highly-qualified personnel, and hiring and retaining such personnel to support our growth may be challenging. Competition for such qualified personnel is intense, and we compete for these individuals with other companies that have greater financial, technical, marketing, service and other resources than we do. If our key personnel are unable to effectively manage our business, or if we fail to attract additional qualified personnel, our operating results could be adversely affected.

If we cannot maintain our corporate culture, we could lose the innovation, teamwork and passion that we believe contribute to our success, and our business may be harmed.

If we cannot maintain our corporate culture, we could lose the innovation, teamwork and passion that we believe contribute to our success, and our business may be harmed. We invest substantial time and resources in building and maintaining our culture. Any failure to preserve our culture could negatively affect our future success, including our ability to retain and recruit personnel and to effectively pursue our strategic objectives.

We incurred indebtedness by issuing the 2019 and 2047 convertible notes, and our debt repayment obligations may adversely affect our financial condition and cash flows from operations in the future.

In June 2017, we issued \$106.3 million principal amount of 2.0% convertible senior notes ("2047 Notes") due June 1, 2047, unless earlier redeemed, purchased or converted in accordance with their terms prior to such date. Each holder of the 2047 Notes has the right to require us to repurchase for cash, such holder's 2047 Notes on June 1, 2022 on the terms set forth in the note indenture. Interest is payable semi-annually in arrears on June 1 and December 1 of each year. In December 2014, we issued \$143.8 million principal amount of 2.0% convertible senior notes ("2019 Notes" and collectively with the 2047 Notes, the "Notes") due December 1, 2019, unless earlier purchased or converted. Interest is payable semi-annually in arrears on June 1 and December 1 of each year.

Our indebtedness could have important consequences because it may impair our ability to obtain additional financing in the future for working capital, capital expenditures, acquisitions and general corporate or other purposes, and a portion of our cash flows from operations may have to be dedicated to repaying the principal beginning in 2019 or earlier if necessary. Our ability to meet our debt obligations will depend on our future performance, which will be affected by financial, business, economic, regulatory and other factors. We cannot control many of these factors. Our future operations may not generate sufficient cash to enable us to

Table of Contents

repay our debt. If we fail to make a payment on our debt, we could be in default on such debt. If we are at any time unable to pay our indebtedness when due, we may be required to renegotiate the terms of the indebtedness, seek to refinance all or a portion of the indebtedness or obtain additional financing. There can be no assurance that, in the future, we will be able to successfully renegotiate such terms, that any such refinancing would be possible or that any additional financing could be obtained on terms that are favorable or acceptable to us.

Certain of our projects are accounted for on a percentage-of-completion method as well as fixed-fee arrangements and are based on our use of estimates, which if inaccurate, could reduce our revenue and profitability.

Timing of our revenue recognition on our contractual arrangements varies based on the nature of the performance obligations in each contract and the associated contract terms. For projects accounted for on a percentage-of-completion method, the effort required to complete our implementation may be difficult to estimate, as the length of the implementation depends on the number of software solutions purchased and the scope and complexity of the customer's deployment requirements. Similarly, we may price implementation arrangements on a fixed-fee basis. If we underestimate the amount of effort required to implement our software solutions under these fixed-fee arrangements, our profitability could be reduced. Moreover, if the actual costs of completing the implementation exceed the agreed upon fixed price, we could incur a loss on the arrangement. If we are unable to accurately estimate the overall total man-days required to implement our software solutions, such inaccuracies could result in estimated project costs exceeding contracted revenue, could also have a material effect on the timing of our revenue recognition, and could adversely impact our quarterly or annual operating results.

Changes in accounting principles or standards, or in the way they are applied, could result in unfavorable accounting charges or effects and unexpected financial reporting fluctuations, and could adversely affect our reported operating results.

We prepare our consolidated financial statements in conformity with GAAP. These principles are subject to interpretation by the SEC and various bodies formed to interpret and create appropriate accounting principles and guidance. A change in existing principles, standards or guidance, in particular those related to revenue recognition, can have a significant effect on our reported results, may retroactively affect previously reported results, could cause unexpected financial reporting fluctuations, and may require us to make costly changes to our operational processes and accounting systems.

The Financial Accounting Standards Board ("FASB") is currently working with the International Accounting Standards Board ("IASB") to converge certain accounting principles and to facilitate more comparable financial reporting between companies that are required to follow GAAP and those that are required to follow International Financial Reporting Standards ("IFRS"). These projects may result in different accounting principles under GAAP, which may have a material impact on the way in which we report financial results in areas including, but not limited to, principles for recognizing revenue, lease accounting, and financial statement presentation.

In addition, the SEC may make a determination in the future regarding the incorporation of IFRS into the financial reporting system for U.S. companies. Changes in accounting principles from GAAP to IFRS, or to converged accounting principles, may have a material impact on our financial statements and may retroactively affect the accounting treatment of previously reported transactions.

If we fail to develop or acquire new functionality to enhance our existing software solutions, we may not be able to grow our business and it could be harmed.

The sales, pricing, revenue management, shopping and merchandising software markets are characterized by:
• rapid technological developments;

newly emerging and changing customer requirements; and
frequent solution introductions, updates and functional enhancements.

We must introduce enhancements to our existing software solutions in order to meet our business plan, maintain or improve our competitive position, keep pace with technological developments, satisfy increasing customer requirements and increase awareness of software for sales, pricing, configure-price-quote, revenue management, shopping and merchandising generally and of our modern commerce software solutions in particular. Any new functionality we develop may not be introduced in a timely manner and may not achieve market acceptance sufficient to generate material revenue. Furthermore, certain of our competitors could be heavily investing in research and development, and may develop and market new solutions that may compete with, and may reduce the demand for, our software solutions. We cannot provide assurance that we could be successful in developing or otherwise acquiring, marketing and selling new functionality, or delivering updates and upgrades that meet changing industry

Table of Contents

standards and customer demands. In addition, we may experience difficulties that could delay or prevent the successful development, marketing and selling of such functionality. If we are unable to develop or acquire new functionality, enhance our existing software solutions or adapt to changing industry requirements to meet market demand, we may not be able to grow our business and our revenue and operating results would be adversely affected.

In addition, because our software solutions are intended to operate on a variety of technology platforms, we must continue to modify and enhance our software solutions to keep pace with changes in these platforms, as well as develop and maintain relationships with platform providers. Any inability of our software solutions to operate effectively with existing or future platforms, or our inability to develop or maintain relationships with significant platform providers, could reduce the demand for our software solutions, result in customer dissatisfaction and limit our revenue.

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

Our software solutions are complex and may contain undetected defects or errors. Several of our solutions have recently been developed and may therefore be more likely to contain undetected defects or errors. In addition, we frequently develop enhancements to our software solutions that may contain defects. We have not suffered significant harm from any defects or errors to date. We have in the past issued, and may in the future need to issue, corrective releases of our solutions to correct defects or errors, but we may not be able to detect and correct any such defects or errors before the final implementation of our software solutions. The occurrence of any defects or errors could result in:

- delayed market acceptance and lost sales of our software solutions;
- delays in payment to us by customers;
- damage to our reputation;
- diversion of our resources;
- legal claims, including product liability claims, against us;
- increased maintenance and support expenses; and
- increased insurance costs.

Our agreements with our customers typically contain provisions designed to limit our liability for defects and errors in our software solutions and damages relating to such defects and errors, but these provisions may not be enforced by a court or otherwise effectively protect us from legal claims. Our liability insurance may not be adequate to cover all of the costs resulting from these legal claims. Moreover, we cannot provide assurance that our current liability insurance coverage would continue to be available on acceptable terms. In addition, the insurer may deny coverage on any future claims. The successful assertion against us of one or more large claims that exceeds available insurance coverage, or the occurrence of changes in our insurance policies, including premium increases or the imposition of large deductible or co-insurance requirements, could have a material adverse effect on our business and operating results. Furthermore, even if we prevail in any litigation, we are likely to incur substantial costs and our management's attention may be diverted from our operations.

Intellectual property litigation and infringement claims may cause us to incur significant expense or prevent us from selling our software solutions.

Our industry is characterized by the existence of a large number of patents, trademarks and copyrights, and by frequent litigation based on allegations of infringement or other violations of intellectual property rights. A third-party may assert that our technology violates its intellectual property rights, or we may become the subject of a material intellectual property dispute. Sales, pricing, configure-price-quote, revenue management, shopping and merchandising solutions may become increasingly subject to infringement claims as the number of such commercially available solutions increases and the functionality of these solutions overlaps. In addition, changes in patent laws in the U.S.

may affect the scope, strength and enforceability of our patent rights or the nature of proceedings which may be brought by us related to our patent rights. Future litigation may involve patent holding companies or other adverse patent owners who have no relevant product revenue and against whom our own potential patents may therefore provide little or no deterrence. Regardless of the merit of any particular claim that our technology violates the intellectual property rights of others, responding to such claims may require us to:

18

Table of Contents

incur substantial expenses and expend significant management efforts to defend such claims;
pay damages, potentially including treble damages, if we are found to have willfully infringed such parties' patents or copyrights;
cease making, selling or using products that are alleged to incorporate the intellectual property of others;
distract management and other key personnel from performing their duties for us;
enter into potentially unfavorable royalty or license agreements in order to obtain the right to use necessary technologies; and
expend additional development resources to redesign our solutions.

Any licenses required as a result of litigation under any patent may not be made available on commercially acceptable terms, if at all. In addition, some licenses may be nonexclusive, and therefore our competitors may have access to the same technology licensed to us. If we fail to obtain a required license or are unable to design around a patent, we may be unable to effectively develop or market our solutions, which could limit our ability to generate revenue or maintain profitability.

Contract terms generally obligate us to defend and hold our customers harmless, and to a lesser extent to indemnify our customers for their use of the intellectual property associated with our software or for other third-party products that are incorporated into our solutions and that infringe the intellectual property rights of others. If we are unable to resolve our legal obligations by settling or paying an infringement claim or a related indemnification claim as described above, we may be required to compensate our customers under the contractual arrangement with such customers. Our intellectual property defense and indemnification obligations are generally contractually either capped at a very high amount or not capped at all.

If we fail to protect our proprietary rights and intellectual property adequately, our business and prospects may be harmed.

Our success could depend in part on our ability to protect our proprietary methodologies and intellectual property. We rely upon a combination of trade secrets, confidentiality policies, nondisclosure and other contractual arrangements, and patent, copyright and trademark laws to protect our intellectual property rights. We cannot, however, be certain that steps we take to protect our proprietary rights could prevent misappropriation of our intellectual property, or the development and marketing of similar and competing products and services by third parties.

We rely, in some circumstances, on trade secrets to protect our technology. Trade secrets, however, are difficult to protect. In addition, our trade secrets may otherwise become known or be independently discovered by competitors, and in such cases, we could not assert such trade secret rights against such parties. We seek to protect our proprietary technology and processes, in part, by confidentiality agreements with our employees, consultants, customers, scientific advisors and other contractors. These agreements may be breached, and we may not have adequate remedies for any such breach. To the extent that our employees, consultants or contractors use intellectual property owned by others in their work for us, disputes may arise as to the rights in related or resulting know-how and inventions.

The patent position of technology-oriented companies, including ours, is generally uncertain and involves complex legal and factual considerations. The standards that the U.S. Patent and Trademark Office use to grant patents are not always applied predictably or uniformly and can change. Accordingly, we do not know the degree of future protection for our proprietary rights or the breadth of claims allowed in any patents that may be issued to us or to others. Our patents may not contain claims sufficiently broad to protect us against third parties with similar technologies or products, or provide us with any competitive advantage. Moreover, our patents and any patent for which we have licensed or may license rights may be challenged, narrowed, invalidated or circumvented. If our patents are invalidated or otherwise limited, other companies may be better able to develop products that compete with ours, which could adversely affect our competitive business position, business prospects and financial condition.

Any patent application we submit may not result in an issued patent. Patent applications in the U.S. are typically not published until at least 18 months after filing or in some cases not at all, and publications of discoveries in industry-related literature lag behind actual discoveries. We cannot be certain that we were the first to invent the technologies claimed in any pending patent applications or that we were the first to file for patent protection. Additionally, the process of obtaining patent protection is expensive and time-consuming, and we may not be able to prosecute all necessary or desirable patent applications at a reasonable cost or in a timely manner. As a result, we may not be able to obtain adequate patent protection.

In addition, despite our efforts to protect our proprietary rights, unauthorized parties may be able to obtain and use information that we regard as proprietary. The issuance of a patent does not guarantee that it is valid or enforceable. As such, even if we obtain patents, they may not be valid or enforceable against third parties. In addition, the issuance of a patent does not

Table of Contents

guarantee that we have a right to practice the patented invention. Third parties may have blocking patents that could be used to prevent us from marketing or practicing our potentially patented products. As a result, we may be required to obtain licenses under these third-party patents. If licenses are not available to us on acceptable terms, or at all, we may not be able to make and sell our software solutions and competitors would be more easily able to compete with us.

We use open source software in our solutions that may subject our software solutions to general release or require us to re-engineer our solutions, which may cause harm to our business.

We use open source software in our solutions and may use more open source software in the future. From time to time, there have been claims challenging the ownership of open source software against companies that incorporate open source software into their products. As a result, we could be subject to lawsuits by parties claiming ownership of what we believe to be open source software. Some open source licenses contain requirements that we make available source code for modifications or derivative works we create based upon the open source software and that we license such modifications or derivative works under the terms of a particular open source license or other license granting third parties certain rights of further use. If we combine our proprietary software solutions with open source software in a certain manner, we could, under certain of the open source licenses, be required to release the source code of our proprietary software solutions. In addition to risks related to license requirements, usage of open source software can lead to greater risks than use of third-party commercial software, as open source licensors generally do not provide warranties or controls on origin of the software. In addition, open source license terms may be ambiguous and many of the risks associated with usage of open source cannot be eliminated, and could, if not properly addressed, negatively affect our business. If we were found to have inappropriately used open source software, we may be required to seek licenses from third parties in order to continue offering our software, to re-engineer our solutions, to discontinue the sale of our solutions in the event re-engineering cannot be accomplished on a timely basis or take other remedial action that may divert resources away from our development efforts, any of which could adversely affect our business, operating results and financial condition.

We utilize third-party software that we incorporate into our software solutions, and impaired relations with these third parties, defects in third-party software or a third party's inability or failure to enhance their software over time could adversely affect our operating performance and financial condition.

We incorporate and include third-party software into our software solutions. If our relations with any of these third parties are impaired, or if we are unable to obtain or develop a replacement for the software, our business could be harmed. The operation of our solutions could be impaired if errors occur in the third-party software that we utilize. It may be more difficult for us to correct any defects in third-party software because the software is not within our control. Accordingly, our business could be adversely affected in the event of any errors in this software. There can be no assurance that these third parties may continue to invest the appropriate levels of resources in their products and services to maintain and enhance the capabilities of their software.

Catastrophic events may disrupt our operations.

Our headquarters are located in Houston, Texas, from which we base our operations, and we conduct business in other domestic and international locations. We also rely on our network and third-party infrastructure and enterprise applications for our sales, marketing, development, operational support, and hosted services. Although we have contingency and business continuity plans in effect for natural disasters or other catastrophic events (including terrorist attacks, power loss, telecommunications failure, cyber-attacks and hurricanes), these events could disrupt our operations. Even though we carry business interruption insurance and typically have provisions in our contracts that protect us in certain events, we might suffer losses as a result of business interruptions that exceed the coverage available under our insurance policies or for which we do not have coverage. Any natural disaster or other

catastrophic event could create a negative perception in the marketplace, delay our product innovations, or lead to lengthy interruptions in our services, breaches of data security, and losses of critical data, all of which could have an adverse effect on our operating results.

We incur significant costs as a result of operating as a public company, and our management is required to devote substantial time to compliance initiatives.

As a public company, we incur significant legal, accounting and other expenses. The Sarbanes-Oxley Act of 2002 ("Sarbanes-Oxley") and the Dodd-Frank Wall Street Reform and Consumer Protection Act (the "Dodd-Frank Act"), and rules currently proposed or subsequently implemented by the SEC and NYSE impose heightened requirements on public companies. Our management and other personnel devote a substantial amount of time to these compliance initiatives. We may also need to hire additional personnel to support our compliance requirements. Moreover, these rules and regulations increase our legal and financial costs and make some activities more time-consuming.

Table of Contents

If we fail to continue to maintain internal controls over financial reporting in accordance with Section 404 of the Sarbanes-Oxley Act, our market price may be adversely affected.

Section 404 of the Sarbanes-Oxley Act requires our management to assess the effectiveness of our internal control over financial reporting and to provide a report by our registered independent public accounting firm addressing the effectiveness of our internal control over financial reporting. If we are unable to continue to assert that our internal controls over financial reporting are effective, or if a material weakness is identified in our internal controls over financial reporting, or if we are unable to implement internal controls over financial reporting for our acquisitions, our financial results may be adversely affected and we could lose investor confidence in the reliability of our financial statements. Accordingly failure to maintain effective controls over financial reporting may have an adverse effect on the market price of our common stock.

Risks relating to ownership of our common stock, the 2019 Notes and 2047 Notes

Market volatility may affect our stock price and the value of your investment.

The market price for our common stock, and the software industry generally, has been and is likely to continue to be volatile. Volatility could make it difficult to trade shares of our common stock at predictable prices or times. Many factors could cause the market price of our common stock to be volatile, including the following:

- variations in our quarterly or annual operating results;
- decreases in market valuations of comparable companies;
- fluctuations in stock market prices and volumes;
- decreases in financial estimates by equity research analysts;
- announcements by our competitors of significant contracts, new solutions or enhancements, acquisitions, distribution partnerships, joint ventures or capital commitments;
- departure of key personnel;
- changes in governmental regulations and standards affecting the software industry and our software solutions;
- sales of common stock or other securities by us in the future;
- damages, settlements, legal fees and other costs related to litigation, claims and other contingencies;
- deterioration of the general U.S. and global economic condition; and
- other risks described elsewhere in this section.

In the past, securities class action litigation often has been initiated against a company following a period of volatility in the market price of the company's securities. If class action litigation is initiated against us, we may incur substantial costs and our management's attention could be diverted from our operations. All of these factors could cause the market price of our stock to decline, and you may lose some or all of your investment.

Historically, shares of our common stock have been relatively illiquid and trading of our shares could adversely affect the market price of our common stock.

Our common stock has historically been thinly traded, and we have a relatively small public float. Our common stock may be less liquid than the stock of companies with a broader public ownership. In addition, sales of a large volume of our common stock by us or our current or future stockholders, or the perception that sales could occur, may also have a significant impact on its trading price.

Our directors, executive officers, and certain significant stockholders hold a significant portion of our outstanding shares.

Our directors and executive officers collectively control approximately 16% of our issued and outstanding common shares, and together with certain significant stockholders, including investment funds associated with Brown Capital Management, D.F. Dent & Company, Riverbridge Partners, Conestoga Capital Advisors, Daruma Capital Management and BlackRock, control approximately 64% of our issued and outstanding common shares. In the event that these stockholders each independently decided to vote for or against matters requiring stockholder approval, they could influence such matters in ways that may not align with your specific interests as a stockholder, including the election of directors and approval of significant corporate transactions. This

Table of Contents

concentration of ownership could affect the market price of our shares if there is a sale by this group of stockholders, and could also have the effect of delaying or preventing a change in control of us even if such change of control could be beneficial to you as a stockholder.

If equity research analysts cease to publish research or reports about us or if they issue unfavorable commentary or downgrade our common stock, the price of our common stock could decline.

The trading market for our common stock relies in part on the research and reports that equity research analysts publish about us and our business. The price of our stock could decline if one or more equity research analysts downgrade our stock or if those analysts issue other unfavorable commentary or cease publishing reports about our business.

Anti-takeover provisions in our Certificate of Incorporation and Bylaws and under Delaware law could make an acquisition of us, more difficult and may prevent attempts by our stockholders to replace or remove our current management.

Our Certificate of Incorporation and Bylaws and Section 203 of the Delaware General Corporation Law contain provisions that might enable our management to resist a takeover of our company. These provisions include the following:

- the division of our board of directors into three classes to be elected on a staggered basis, one class each year;
- a prohibition on actions by written consent of our stockholders;
- the elimination of the right of stockholders to call a special meeting of stockholders;
- a requirement that stockholders provide advance notice of any stockholder nominations of directors or any proposal of new business to be considered at any meeting of stockholders;
- a requirement that a supermajority vote be obtained to amend or repeal certain provisions of our certificate of incorporation; and
- the ability of our board of directors to issue preferred stock without stockholder approval.

In addition, because we are incorporated in Delaware, we are governed by the provisions of Section 203 of the Delaware General Corporation Law, which limits the ability of stockholders owning in excess of 15% of our outstanding voting stock to merge or combine with us. Although we believe these provisions collectively provide for an opportunity to obtain higher bids by requiring potential acquirors to negotiate with our board of directors, they would apply even if an offer were considered beneficial by some stockholders. In addition, these provisions may frustrate or prevent any attempts by our stockholders to replace or remove our current management by making it more difficult for stockholders to replace members of our board of directors, which is responsible for appointing the members of our management.

We do not intend to pay dividends on our common stock in the foreseeable future.

We do not currently anticipate paying any cash dividends on our common stock in the foreseeable future. We currently anticipate that we will retain all of our available cash, if any, for use as working capital, repayment of debt and for other general corporate purposes. Any payment of future dividends would be at the discretion of our board of directors and would depend upon, among other things, our earnings, financial condition, capital requirements, level of indebtedness, statutory and contractual restrictions applying to the payment of dividends and other considerations that the board of directors deems relevant.

The accounting method for convertible debt securities that may be settled in cash, such as the 2019 Notes and 2047 Notes, could have a material effect on our reported financial results.

In May 2008, FASB, issued FASB Staff Position No. APB 14-1, Accounting for Convertible Debt Instruments That May Be Settled in Cash Upon Conversion (Including Partial Cash Settlement), which has subsequently been codified as Accounting Standards Codification 470-20, Debt with Conversion and Other Options, which we refer to as ASC 470-20. Under ASC 470-20, an entity must separately account for the liability and equity components of the convertible debt instruments (such as the Notes) that may be settled entirely or partially in cash upon conversion in a manner that reflects the issuer's economic interest cost. The effect of ASC 470-20 on the accounting for the Notes is that the equity component is required to be included in the additional paid-in capital section of stockholders' equity on our consolidated balance sheet and the value of the equity component would be treated as original issue discount for purposes of accounting for the debt component of the Notes. As a result, we will be required to record a greater amount of non-cash interest expense in current periods presented as a result of the amortization of the discounted carrying value of the Notes to their face amount over the term of the Notes. We will report lower net income in our financial results because ASC 470-20 will require interest to include both the current period's amortization of the debt discount and the instrument's coupon interest, which could adversely affect our reported or future financial results, the trading price of our common stock and

Table of Contents

the trading price of the Notes. In addition, under certain circumstances, convertible debt instruments (such as the Notes) that may be settled entirely or partly in cash are currently accounted for utilizing the treasury stock method, the effect of which is that any shares issuable upon conversion of the Notes are not included in the calculation of diluted earnings per share except to the extent that the conversion value of the Notes exceeds their principal amount. Under the treasury stock method, for diluted earnings per share purposes, the transaction is accounted for as if the number of shares of common stock that would be necessary to settle such excess, if we elected to settle such excess in shares, are issued. We cannot be sure that the accounting standards in the future will continue to permit the use of the treasury stock method. If we are unable to use the treasury stock method in accounting for the shares issuable upon conversion of the Notes, then our diluted earnings per share would be adversely affected.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

Our headquarters are located in Houston, Texas, where we lease approximately 98,000 square feet of office space. We also lease a number of smaller regional offices, including, but not limited to London, England; Toulouse, France; Sofia, Bulgaria; and San Francisco, California, which range from 3,000 to 23,000 square feet. We believe our existing facilities are sufficient for our current needs. We may add new facilities and expand our existing facilities as we add employees, and we believe that suitable additional or substitute space will be available as needed to accommodate any such expansion of our operations.

Item 3. Legal Proceedings

In the ordinary course of our business, we may be involved in various legal proceedings and claims. The outcomes of these matters are inherently unpredictable. We are not currently involved in any outstanding litigation that we believe, individually or in the aggregate, will have a material adverse effect on our business, results of operations or financial condition.

Item 4. Mine Safety Disclosures

Not applicable.

Table of Contents

Part II

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

Market information, holders and dividends

Our common stock is listed on the NYSE under the symbol "PRO". The following table sets forth the high and low prices for shares of our common stock, as reported by the NYSE for the periods indicated.

| | Price Range of Common Stock | |
|------------------------------|-----------------------------------|---------|
| | Low | High |
| Year ended December 31, 2017 | | |
| First Quarter | \$20.56 | \$24.28 |
| Second Quarter | \$22.51 | \$29.87 |
| Third Quarter | \$23.41 | \$29.47 |
| Fourth Quarter | \$22.45 | \$28.29 |
| Year ended December 31, 2016 | | |
| First Quarter | \$9.28 | \$22.20 |
| Second Quarter | \$10.74 | \$17.53 |
| Third Quarter | \$17.06 | \$22.79 |
| Fourth Quarter | \$20.76 | \$25.55 |

On February 12, 2018 there were 55 stockholders of record of our common stock. Since 2007, we have not declared or paid any dividends on our common stock. We currently expect to retain all remaining available funds and any future earnings for use in the operation and development of our business. Accordingly, we do not anticipate declaring or paying cash dividends on our common stock in the foreseeable future.

Performance graph

The following performance graph and related information shall not be deemed "soliciting material" or to be "filed" with the SEC, nor shall such information be incorporated by reference into any future filing under the Securities Act or Exchange Act, except to the extent that we specifically incorporate it by reference into such filing.

The graph below presents a five-year comparison of the relative investment performance of our common stock, the Standard & Poor's 500 Stock Index ("S&P 500"), and the Russell 2000 Index for the period commencing on December 31, 2012, and ending December 31, 2017. The graph is presented pursuant to the SEC rules and is not meant to be an indication of our future performance.

Table of Contents

The graph assumes that \$100 was invested on December 31, 2012, in our common stock, the S&P 500 and the (1)Russell 2000 Index and further assumes all dividends were reinvested. No cash dividends have been paid on our common stock for the periods presented above.

| | 12/31/2013 | 12/31/2014 | 12/31/2015 | 12/31/2016 | 12/31/2017 |
|--------------------|------------|------------|------------|------------|------------|
| PRO | \$ 218.15 | \$ 150.25 | \$ 125.97 | \$ 117.66 | \$ 144.61 |
| S&P 500 | \$ 129.60 | \$ 144.36 | \$ 143.31 | \$ 156.98 | \$ 187.47 |
| Russell 2000 Index | \$ 137.00 | \$ 141.84 | \$ 133.74 | \$ 159.78 | \$ 180.79 |

Issuer purchase of equity securities

On August 25, 2008, we announced that the Board of Directors authorized a stock repurchase program for the purchase of up to \$15.0 million of our common stock. Under the board-approved repurchase program, share purchases may be made from time to time in the open market or through privately negotiated transactions depending on market conditions, share price, trading volume and other factors, and such purchases, if any, will be made in accordance with applicable insider trading and other securities laws and regulations. These repurchases may be commenced or suspended at any time or from time to time without prior notice.

During 2017, we did not make any purchases of our common stock under this program. As of December 31, 2017, \$10.0 million remains available under the stock repurchase program.

Recent sales of unregistered securities

There were no unregistered sales of equity securities for the year ended December 31, 2017.

Table of Contents

Item 6. Selected financial data

The following selected consolidated financial data presented under the captions "Selected consolidated statement of operations data" and "Selected consolidated balance sheet data" are derived from our Consolidated Financial Statements. The selected consolidated financial data set forth below should be read in conjunction with, and is qualified by reference to, "Management's Discussion and Analysis of Financial Condition and Result of Operations" and our Consolidated Financial Statements and the related notes included elsewhere in this report. As presented in the table, amounts are in thousands (except per share data).

| | Year Ended December 31, | | | | |
|--|-------------------------|-------------|-------------|-------------|-----------|
| | 2017 | 2016 | 2015 | 2014 | 2013 |
| Selected consolidated statement of operations data: | | | | | |
| Total revenue | \$168,816 | \$153,276 | \$168,246 | \$185,829 | \$144,837 |
| Gross profit | 100,250 | 89,923 | 106,836 | 127,743 | 101,702 |
| (Loss) Income from operations | (64,943) | (65,398) | (55,497) | (22,407) | 3,538 |
| Net (loss) income | (77,926) | (75,225) | (65,811) | (37,551) | 3,446 |
| Net (loss) income attributable to common stockholders | \$(77,926) | \$(75,225) | \$(65,811) | \$(36,644) | \$3,446 |
| Net (loss) income attributable to common stockholders per share: | | | | | |
| Basic | (2.46) | (2.47) | (2.23) | (1.27) | 0.12 |
| Diluted | (2.46) | (2.47) | (2.23) | (1.27) | 0.11 |
| Weighted average number of shares: | | | | | |
| Basic | 31,627 | 30,395 | 29,578 | 28,915 | 28,004 |
| Diluted | 31,627 | 30,395 | 29,578 | 28,915 | 30,114 |
| Selected consolidated balance sheet data: | | | | | |
| Cash and cash equivalents, unrestricted | \$160,505 | \$118,039 | \$161,770 | \$161,019 | \$44,688 |
| Working capital | 100,031 | 76,936 | 124,571 | 151,903 | 72,127 |
| Total assets | 288,683 | 227,654 | 263,211 | 300,125 | 179,828 |
| Long-term obligations | 233,637 | 134,327 | 121,443 | 112,740 | 3,523 |
| Total stockholders' equity | \$(46,979) | \$(3,394) | \$55,414 | \$98,999 | \$111,303 |

Table of Contents

Item 7. Management's discussion and analysis of financial condition and results of operations

Overview

PROS is a cloud software company powering the shift to modern commerce by helping companies create personalized and frictionless buying experiences for their customers. Fueled by artificial intelligence, machine learning and proven science, our solutions make it possible for companies to price, configure and sell their products and services in an omnichannel environment with speed, precision and consistency. Our customers benefit from decades of data science expertise infused into our industry solutions. We also provide professional services to implement our software solutions.

Executive Summary

In 2017, we reached several key milestones in our cloud transformation efforts while continuing to enable our customers to leverage our data science driven solutions to help them compete in modern commerce. In 2017, we returned to year-over-year revenue growth. In the fourth quarter of 2017, our subscription revenue exceeded maintenance revenue for the first time, and we also generated positive free cash flow again. Other notable items for the year included:

• Subscription revenue increased 59% in 2017 over 2016;

• Recurring revenue, which consists of maintenance and subscription revenue, grew by 22% in 2017 over 2016;

• Annualized Recurring Revenue ("ARR") was \$160.6 million as of December 31, 2017, up 31% year-over-year;

• Extended PROS modern commerce leadership position in the travel industry by introducing shopping, pricing and merchandising solutions through the acquisition of Vayant Travel Technologies, Inc. ("Vayant") based in Sofia, Bulgaria;

• Released numerous new innovations enabling modern commerce, including the introduction of Opportunity Detection, to help uncover trends in buying behavior and identify new sales opportunities, the introduction of Monet™, PROS artificial intelligence analyst that delivers data science-driven insights in PROS solutions, and the launch of PROS next-generation Guidance solution, providing customers with an unprecedented level of transparency and self-service capabilities in the PROS cloud;

• Attained ISO/IEC 27001: 2013 certification, underscoring our commitment to customers by achieving the industry's most rigorous requirements for cloud security, data privacy, governance, and compliance; and

• Successfully completed a private offering of \$106.3 million aggregate principal amount at maturity of convertible senior notes due 2047.

ARR is one of our key performance metrics to assess the health and trajectory of our overall business. ARR should be viewed independently of revenue, deferred revenue and any other GAAP measure as ARR is a performance metric and is not intended to be combined with any of these items. ARR is defined as contracted recurring revenue, including contracts with a future start date, together with annualized overage fees incurred above contracted minimum transactions, and excludes license agreements recognized as license revenue in accordance with GAAP. Total ARR as of December 31, 2017 was \$160.6 million, up from \$122.2 million as of December 31, 2016.

Cash used in operating activities was \$25.3 million for the year ended December 31, 2017, as compared to \$14.3 million for the year ended December 31, 2016, primarily due to a change in working capital as a result of a decrease in accrued payroll and other employee benefits, and an increase in our prepaid assets arising from payments for cloud infrastructure. We expect our operating activities to provide cash in future years as we accumulate more annual subscription accounts.

Free cash flow is another key metric to assess the strength of our business. Free cash flow is a non-GAAP financial measure which is defined as net cash provided or used by operating activities, less additions to property, plant and equipment, purchases of other (non-acquisition-related) intangible assets and capitalized internal-use software development costs. We believe free cash flow may be useful to investors and other users of our financial information

in evaluating the amount of cash generated by our business operations. Free cash flow use for the year ended December 31, 2017 was \$29.5 million, compared to \$24.3 million for the year ended December 31, 2016. The following is a reconciliation of free cash flow to the most comparable GAAP measure, net cash used in operating activities:

27

Table of Contents

| | Year Ended | |
|---|--------------|------------|
| | December 31, | |
| | 2017 | 2016 |
| Net cash used in operating activities | \$(25,313) | \$(14,345) |
| Purchase of property and equipment | (1,286) | (7,241) |
| Purchase of intangible asset | (125) | (1,625) |
| Capitalized internal-use software development costs | (2,797) | (1,048) |
| Free Cash Flow | \$(29,521) | \$(24,259) |

Financial Performance Summary

Recurring revenue, which is comprised of our subscription and maintenance revenue, accounted for 77% of our total revenue for the year ended December 31, 2017. Total recurring revenue was \$129.9 million for the year ended December 31, 2017 as compared to \$106.7 million for the year ended December 31, 2016, an increase of approximately \$23.2 million, or 22%, as a result of the transition of our business toward subscription services.

Total revenue for the year ended December 31, 2017, increased approximately \$15.5 million to \$168.8 million from \$153.3 million for the year ended December 31, 2016, representing a 10% increase. This increase in total revenue was primarily attributable to an increase of 59% in subscription revenue, which was expected as we continue to transition the business toward subscription services.

Total deferred revenue was \$95.2 million as of December 31, 2017, as compared to \$79.7 million as of December 31, 2016, an increase of \$15.5 million, or 19%, primarily due to an increase in our subscription deferred revenue. Recurring deferred revenue, which includes both subscription and maintenance deferred revenue, was \$80.3 million as of December 31, 2017 and increased 30% as compared to December 31, 2016.

Revenue by geography

The following geographic information is presented for the years ended December 31, 2017, 2016 and 2015. PROS categorizes geographic revenues based on the location of our customer's headquarters.

| | Year Ended December 31, | | | | | |
|--------------------------|-------------------------|---------|-----------|---------|-----------|---------|
| | 2017 | | 2016 | | 2015 | |
| | Revenue | Percent | Revenue | Percent | Revenue | Percent |
| United States of America | \$63,097 | 37 % | \$56,774 | 37 % | \$63,754 | 38 % |
| Europe | 51,273 | 30 % | 44,655 | 29 % | 47,514 | 28 % |
| The rest of the world | 54,446 | 32 % | 51,847 | 34 % | 56,978 | 34 % |
| Total revenue | \$168,816 | 100 % | \$153,276 | 100 % | \$168,246 | 100 % |

Acquisitions

On August 3, 2017, we acquired Vayant, a privately held company based in Sofia, Bulgaria, for total cash consideration, net of cash acquired, of approximately \$34.1 million. Vayant is a cloud software company that provides advanced shopping, merchandising and inspirational travel solutions. The acquisition of Vayant strengthens our modern commerce solutions for the travel industry and positions us to deliver greater value to our travel customers through an end-to-end offer optimization solution designed to help travel companies deliver personalized offers and expanded choices that drive loyalty and growth.

Acquisitions are an element of our long-term corporate strategy. We believe future acquisitions could strengthen our competitive position, enhance the products and services that we can offer to customers, expand our customer base, grow our revenues and increase our overall value.

Financing activities

In June 2017, we issued \$106.3 million in aggregate principal amount of 2.0% convertible senior notes due June 1, 2047, unless repurchased, redeemed or converted in accordance with their terms prior to such date. Interest is payable semiannually in arrears on June 1 and December 1 of each year, commencing on December 1, 2017.

Table of Contents

Backlog

Backlog represents deferred revenue on our consolidated balance sheet together with expected future billings that are contractually committed under our existing agreements that we have not yet been able, contractually, to invoice. Deferred revenue consists of billings made and payments received in advance of revenue recognition for our services pursuant to contractual commitments under our existing customer agreements, and does not represent the total contract value of existing multi-year agreements. To the extent future invoicing is determined to be certain, we consider that future invoicing to be included in our non-cancelable backlog. As of December 31, 2017, we had backlog of approximately \$275.6 million, as compared to backlog of approximately \$215.4 million as of December 31, 2016. Approximately \$154.7 million of our backlog as of December 31, 2017 was not reasonably expected to be recognized as revenue during fiscal year 2018.

We have aligned our backlog definition with the concepts and requirements of Accounting Standards Update No. 2014-09, "Revenue from Contracts with Customers (Topic 606)" ("ASU 2014-09") in anticipation of the upcoming adoption of the new revenue standard in the first quarter of 2018. Backlog previously reported as of December 31, 2016 was \$251 million, which included assumptions around maintenance renewals.

Backlog varies from period to period based upon the timing and duration of customer agreements and customer renewals, and changes in foreign currency fluctuations and therefore may not be a meaningful indicator of future revenue to be recognized in any particular period.

Income Taxes

On December 22, 2017 the United States enacted the Tax Cuts and Jobs Act (the "Act"). The Act significantly changes U.S. corporate income tax laws by, among other things, reducing the U.S. corporate income tax rate to 21% effective January 1, 2018 and creating a territorial tax system with a one-time mandatory repatriation tax on previously deferred foreign earnings of U.S. subsidiaries. The provisions of the Act are not expected to have a significant impact on our effective tax rate due to the full valuation allowance on our net deferred tax asset position in the U.S. See Note 11 of our Notes to Consolidated Financial Statements for additional information.

Factors Affecting Our Performance

Key factors and trends that have affected and we believe will continue to affect our operating results include:

Cloud Transition. In 2015, we began our transition to a cloud business to help accelerate adoption of our solutions and drive recurring revenue. The implementation of this cloud strategy has resulted in more sales of subscription-based solutions and very few licenses since that time and we expect this trend to continue. This increase in the sales of subscription-based solutions has resulted in an increase in our subscription revenue, and deferred more of our revenue recognition to later periods than we experienced prior to 2015. We also expect that over time, additional sales of our cloud-based solutions will result in a decrease in our maintenance and support revenue, particularly as existing customers migrate from our on-premise solutions to our cloud solutions.

B2B Buying Preferences Driving Technology Adoption. B2B buyers are increasingly demanding the same type of buying experience that they enjoy as consumers. For example, buyers increasingly prefer to buy online when they have already decided what to buy, and often prefer not to interact with a sales representative as their primary source of research. In response, we believe that businesses are increasingly looking to modernize their sales process by adopting technologies which provide frictionless, real-time, and personalized experiences across sales channels. We believe we are uniquely positioned to help power these experiences with our machine learning and data science solutions that help provide dynamic, personalized offers and pricing with consistency across sales channels.

Continued Investments. We are focused on creating awareness for our solutions, expanding our customer base and growing our recurring revenues. While we incurred losses in 2017, we believe our market is large and underpenetrated and therefore we intend to continue investing to grow our recurring revenue and support our long-term initiatives. We plan to continue to invest in product development to enhance our existing technologies and develop new applications and technologies. In addition, we plan to continue to expand our ability to sell our subscription offerings globally through investments in sales, marketing, cloud support, security and infrastructure.

Sales Mix Impacts Revenue Recognition Timing. The mix of the software applications in which our customer subscribes can affect our financial performance in a given period due to our determination if the professional services have stand-alone value. Professional services deemed to have stand-alone value are accounted for separately from subscription

Table of Contents

services and typically recognized as the services are performed. Where we determine the professional services do not have stand-alone value, we treat the transaction as a single element, the professional services revenue is deferred until the customer commences use of the subscription services, and the professional services revenue is recognized over the remaining term of the arrangement. If more of our professional services are determined not to have stand-alone value, this would result in a deferral of services revenue and services revenue recognized over a longer period of time, which would have a negative near-term financial impact.

Description of Key Components of our Operating Results Revenue

We derive our revenues primarily from recurring revenue, which includes subscription and maintenance and support services. Recurring revenues accounted for 77% of our total revenue in 2017.

Subscription services. Subscription services fees are generally recognized ratably as revenue over the customer contract term. Our subscription contracts typically have a term of two to five years and are non-cancellable. We generally invoice our customers annually in advance. Amounts that have been invoiced are initially recorded as deferred revenue.

For our subscription services that include professional services, we evaluate the nature and scope to determine if the professional services have stand-alone value. If we determine the professional services have stand-alone value, the subscription services are accounted for separately from the professional services and the subscription services revenue recognition commences when the customer has access to the application. If we determine the professional services do not have stand-alone value, we treat the transaction as a single element, the subscription services and professional services revenue is deferred until the customer commences use of the subscription services, and recognized over the remaining term of the arrangement.

Maintenance and support. Maintenance and support revenue includes post-implementation customer support provided to our customers who purchased perpetual software licenses and the right to unspecified software updates and enhancements on a when-and-if-available basis. We recognize revenue from maintenance and support arrangements ratably over the period in which the services are provided.

License. We derive our license revenue from the sale of perpetual licenses. License revenue is recognized either upon software delivery or together with the professional services over time using the percentage-of-completion method or completed contract method.

Professional services. Professional services revenues are generally recognized as the services are rendered for time and material contracts, or on a proportional performance basis for fixed price contracts. The majority of our professional services contracts are on a time and materials basis.

For our subscription services that include professional services, we evaluate the nature and scope to determine whether the professional services have stand-alone value. Professional services deemed to have stand-alone value are accounted for separately from subscription services and typically recognized as the services are performed. If we determine the professional services do not have stand-alone value, we treat the transaction as a single element, the professional services revenue is deferred until the customer commences use of the subscription services, and the professional services revenue is recognized over the remaining term of the arrangement.

Cost of revenue

Cost of subscription. Cost of subscription includes those costs related to supporting our subscription services, principally (a) personnel costs, which include our employees, third-party contractors and noncash share-based compensation expense, (b) expenses related to operating our cloud infrastructure, (c) amortization of capitalized

software for internal use, and (d) an allocation of depreciation, amortization of intangibles, facilities and information technology ("IT") support costs, including data center costs, and other costs incurred in providing subscription services to our customers.

Cost of maintenance and support. Cost of maintenance and support consists largely of personnel related expenses and an allocation of depreciation, amortization of intangibles, facilities and IT support costs and other costs incurred in providing maintenance and support services to our customers.

Cost of license. Cost of license consists of third-party fees for our licensed software and an allocation of the amortization of intangibles.

Table of Contents

Cost of services. Cost of services includes those costs related to professional services and implementation of our solutions, principally (a) personnel costs, which include our employees and employee benefits, third-party contractors and noncash share-based compensation expense, (b) billable and non-billable travel, (c) amortization of capitalized software for internal use, and (d) an allocation of depreciation, facilities and IT support costs and other costs incurred in providing professional services to our customers. Cost of providing professional services may vary from quarter to quarter depending on a number of factors, including the amount of professional services required to implement and configure our solutions.

Operating expenses

Selling and marketing. Selling and marketing expenses principally consist of (a) personnel costs, which include our employees and employee benefits, third-party contractors, sales commissions related to selling and marketing personnel and noncash share-based compensation expense (b) sales and marketing programs such as lead generation programs, company awareness programs, conferences, hosting and participation in industry trade shows, and other sales and marketing programs, (c) travel and other out-of-pocket expenses, (d) amortization expenses associated with acquired intangible assets, and (e) an allocation of depreciation, facilities and IT support costs and other costs.

General and administrative. General and administrative expenses consist primarily of expenditures for executive, accounting and finance, legal, IT and human resources support functions. General and administrative expenses principally consist of (a) personnel costs, which include our employees and employee benefits, third-party contractors and noncash share-based compensation expense, (b) travel and other out-of-pocket expenses, (c) accounting, legal and other professional fees, and (d) an allocation of depreciation, facilities and IT support costs and other costs.

Research and development. Research and development expenses principally consist of (a) personnel costs, which include our employees and employee benefits and third-party contractors, which are comprised of software developers, scientists and product managers working on enhancements of existing solutions, the development of new solutions, scientific research, quality assurance and testing and noncash share-based compensation expense and (b) an allocation of depreciation, facilities and IT support costs and other costs.

Results of operations

Comparison of year ended December 31, 2017 with year ended December 31, 2016

Revenue:

| (Dollars in thousands) | For the Year Ended December 31, 2017 | | 2016 | | Variance \$ | Variance % |
|---|---|-----------------------------|-----------|-----------------------------|-------------|------------|
| | Amount | Percentage of total revenue | Amount | Percentage of total revenue | | |
| Subscription | \$60,539 | 36 % | \$38,158 | 25 % | \$22,381 | 59 % |
| Maintenance and support | 69,408 | 41 % | 68,565 | 45 % | 843 | 1 % |
| Total subscription, maintenance and support | 129,947 | 77 % | 106,723 | 70 % | 23,224 | 22 % |
| License | 5,562 | 3 % | 11,814 | 7 % | (6,252) | (53)% |
| Services | 33,307 | 20 % | 34,739 | 23 % | (1,432) | (4)% |
| Total revenue | \$168,816 | 100 % | \$153,276 | 100 % | \$15,540 | 10 % |

Subscription revenue. Subscription revenue increased primarily due to an increase in the number of subscriptions purchased by new and existing customers, with the total number of customers generating subscription revenue increasing by 36% for the year ended December 31, 2017. The increase in subscription revenue also included \$3.3 million from our acquisition of Vayant. We expect our subscription revenue will continue to increase as we focus on subscription-based sales and phase out license offerings. We continued to invest in customer programs and initiatives which helped keep our attrition rate fairly consistent as compared to the prior year. Our ability to maintain consistent

customer attrition rates will play a role in our ability to continue to grow our subscription revenue. Maintenance and support. The modest increase in maintenance and support revenue was principally a result of the timing of certain cash collections. While, we continued to invest in customer programs and initiatives which helped keep our attrition rate consistent as compared to the prior year, we expect that over time, our plan to sell fewer licenses and more cloud-based solutions will result in a decrease in our maintenance and support as existing customers migrate from our on-premise solutions to

Table of Contents

our cloud solutions. We also expect to increase our focus on migrating our legacy on-premises software customers to our latest cloud solutions in 2018, which if successful, would further decrease maintenance revenue.

License revenue. License revenue decreased primarily due to the completion of several large perpetual license projects related to agreements executed prior to our cloud transition, and our strategy to sell fewer licenses and more subscription services, resulting in lower future license revenue and higher subscription services revenue.

Services revenue. Services revenue declined primarily as a result of large customer implementations completed in 2016 and fewer similar large implementations completed in 2017. The decrease was also due to lower levels of professional services required on our new subscription sales as well as on certain subscription contracts where subscription and services revenue is deferred until the customer commences use of the subscription because the professional services were deemed to not have stand-alone value. Services revenue varies from period to period depending on different factors, including the level of professional services required to implement our solutions, the timing of services revenue recognition on certain subscription contracts and any additional professional services requested by our customers during a particular period.

Cost of revenue and gross profit.

| (Dollars in thousands) | For the Year Ended December 31, 2017 | | 2016 | | Variance \$ | Variance % |
|---|---|-----------------------------|----------|-----------------------------|-------------|------------|
| | Amount | Percentage of total revenue | Amount | Percentage of total revenue | | |
| Cost of subscription | \$27,858 | 17 % | \$17,379 | 11 % | \$ 10,479 | 60 % |
| Cost of maintenance and support | 11,693 | 7 % | 13,681 | 9 % | (1,988) | (15)% |
| Total cost of subscription, maintenance and support | 39,551 | 23 % | 31,060 | 20 % | 8,491 | 27 % |
| Cost of license | 282 | — % | 246 | — % | 36 | 15 % |
| Cost of services | 28,733 | 17 % | 32,047 | 21 % | (3,314) | (10)% |
| Total cost of revenue | \$68,566 | 41 % | \$63,353 | 41 % | \$ 5,213 | 8 % |
| Gross profit | \$100,250 | 59 % | \$89,923 | 59 % | \$ 10,327 | 11 % |

Cost of subscription. Cost of subscription increased primarily as a result of a \$9.7 million increase in infrastructure cost to support our current and anticipated subscription customer base, and includes \$2.5 million related to the acquisition of Vayant. The remaining increase of \$0.8 million was related to personnel cost to support our subscription customer base, which included \$0.2 million related to the Vayant acquisition. Our subscription gross profit percentage was 54% for each of the years ended December 31, 2017 and 2016.

Cost of maintenance and support. The cost of maintenance and support declined primarily due to a decrease in personnel cost mainly due to efficiencies in employee related costs. Maintenance and support gross profit percentages for the years ended December 31, 2017 and 2016, were 83% and 80%, respectively.

Cost of license. Cost of license consists of third-party fees for licensed software and remained relatively consistent year-over-year. License gross profit percentages for the years ended December 31, 2017 and 2016, were 95% and 98%, respectively.

Cost of services. The decrease in cost of services was generally commensurate with our decline in services revenue, and was primarily attributable to decreases in both personnel cost for our software implementations of \$2.7 million, and in overhead expenses of \$0.6 million. Services gross profit percentages for the years ended December 31, 2017 and 2016, were 14% and 8%, respectively. Services gross profit percentages vary period to period depending on different factors, including the level of professional services required to implement our solutions, our effective man-day rates and the utilization of our professional services personnel. We plan to add additional employees in our

professional services organization to support our anticipated growth in the number of customers purchasing our subscription services.

Gross profit. The increase in overall gross profit for the year ended December 31, 2017 was principally attributable to an increase of 10% in total revenue as compared to the same period in 2016.

Table of Contents

Operating expenses:

| (Dollars in thousands) | For the Year Ended December 31, 2017 | | 2016 | | Variance \$ | Variance % |
|----------------------------|---|-----------------------------------|-----------|-----------------------------------|-------------|------------|
| | Amount | Percentage of total revenue | Amount | Percentage of total revenue | | |
| Selling and marketing | \$68,116 | 40 % | \$63,980 | 42 % | \$ 4,136 | 6 % |
| General and administrative | 40,336 | 24 % | 38,537 | 25 % | 1,799 | 5 % |
| Research and development | 56,021 | 33 % | 52,804 | 34 % | 3,217 | 6 % |
| Acquisition-related | 720 | — % | — | — % | 720 | — % |
| Total operating expenses | \$165,193 | 98 % | \$155,321 | 101 % | \$ 9,872 | 6 % |

Selling and marketing. Our personnel cost increased by \$2.1 million primarily due to our continued investments in sales and marketing as we focus on adding new customers and increasing penetration within our existing customer base. This was partially offset by a decrease of \$1.2 million in severance expense associated with the change in employment status of our former Chief Operating Officer in July 2016. In addition, there was an increase of \$3.2 million in non-personnel cost, which included \$1.1 million intangible amortization related to our acquisition of Vayant, an increase of \$0.8 million for sales and marketing events, an increase of \$0.7 million in travel expenses, an increase of \$0.5 million of recruiting expense, and an increase of \$0.1 million for facility and other overhead expense. General and administrative expenses. The increase in general and administrative expenses was primarily attributable to an increase of \$2.1 million in noncash share-based compensation expense and \$0.7 million of personnel and other general and administrative costs related to our acquisition of Vayant. This increase was partially offset by a decrease of \$0.4 million in our use of contract labor, a decrease of \$0.4 million in other overhead expenses, and a decrease of \$0.2 million in bad debt expense.

Research and development expenses. Personnel cost increased \$3.4 million, which included \$1.0 million related to our acquisition of Vayant. Personnel cost increased primarily due to our continued investment in headcount to develop new and improve existing technologies, partially offset by an \$1.5 million increase in capitalized internal-use software development costs. The remaining increase of \$1.3 million was attributable to non-personnel cost and related overhead expenses associated with higher personnel cost.

Acquisition-related expenses. Acquisition-related expenses were \$0.7 million for the year ended December 31, 2017 consisting primarily of advisory, legal, accounting and other professional fees, and retention bonuses related to our acquisition and integration of Vayant.

Other income (expense), net:

| (Dollars in thousands) | For the Year Ended December 31, 2017 | | 2016 | | Variance \$ | Variance % |
|--|---|-----------------------------------|-----------|-----------------------------------|-------------|------------|
| | Amount | Percentage of total revenue | Amount | Percentage of total revenue | | |
| Convertible debt interest and amortization | \$(13,218) | (8)% | \$(9,319) | (6)% | \$(3,899) | 42% |
| Other income (expense), net | \$384 | —% | \$(38) | —% | \$422 | (1,111)% |

Convertible debt interest and amortization. Convertible debt interest and amortization expense for each of the years ended December 31, 2017 and 2016 relates to coupon interest and amortization of debt discount and issuance costs attributable to our 2019 Notes and our 2047 Notes. The increase in convertible debt interest and amortization primarily relates to our 2047 Notes issued in June 2017.

Other income (expense), net. Other income (expense), net increased during the year ended December 31, 2017, primarily due to the higher impact of movements in foreign currency exchange rates during the period.

Table of Contents

Income tax provision:

| | For the Year Ended December 31, | | | | | |
|------------------------|---------------------------------------|-------|-------------|------------|---|--|
| (Dollars in thousands) | 2017 | 2016 | Variance \$ | Variance % | | |
| Effective tax rate | — | (1)% | n/a | 1 | % | |
| Income tax provision | \$149 | \$470 | \$ (321) | (68)% | | |

Our tax provision for the year ended December 31, 2017 primarily consisted of foreign taxes and state taxes not based on income.

Our 2017 and 2016 effective tax rates had an unusual relationship to pretax loss from operations as a result of the presence of a valuation allowance on our net deferred tax assets. Our income tax provisions in 2017 and 2016 only included foreign taxes and state taxes not based on pre-tax income, resulting in an effective tax rate of 0% and (1)%, respectively. The difference between the effective tax rates and the federal statutory rate of 34% for the years ended December 31, 2017 and 2016 was primarily due to the increase in our valuation allowance of \$5.9 million and \$26.6 million, respectively.

On December 22, 2017 the United States enacted the Tax Cuts and Jobs Act. The Act significantly changes U.S. corporate income tax laws by, among other things, reducing the U.S. corporate income tax rate to 21% effective January 1, 2018 and creating a territorial tax system with a one-time mandatory repatriation tax on previously deferred foreign earnings of U.S. subsidiaries. See Note 11 of our Notes to Consolidated Financial Statements for additional information.

As of December 31, 2017 and 2016, we had a valuation allowance on our net deferred tax assets of \$74.2 million and \$69.0 million, respectively. The increase was principally attributed to an additional valuation allowance recorded on our current year's tax loss and increases in our noncash share-based compensation of \$39.9 million partially offset by a downward adjustment to our valuation allowance related to global tax reform of \$34.0 million.

Comparison of year ended December 31, 2016 with year ended December 31, 2015

Revenue:

| (Dollars in thousands) | For the Year Ended December 31, 2016 | | 2015 | | Variance \$ | Variance % |
|---|---|-----------------------------------|-----------|-----------------------------------|-------------|------------|
| | Amount | Percentage of total revenue | Amount | Percentage of total revenue | | |
| Subscription | \$38,158 | 25 % | \$28,989 | 17 % | \$9,169 | 32 % |
| Maintenance and support | 68,565 | 45 % | 63,666 | 38 % | 4,899 | 8 % |
| Total subscription, maintenance and support | 106,723 | 70 % | 92,655 | 55 % | 14,068 | 15 % |
| License | 11,814 | 8 % | 32,716 | 19 % | (20,902) | (64)% |
| Services | 34,739 | 23 % | 42,875 | 25 % | (8,136) | (19)% |
| Total revenue | \$153,276 | 100 % | \$168,246 | 100 % | \$(14,970) | (9)% |

Subscription revenue. Subscription revenue increased primarily due to an increase in the number of subscriptions purchased by new and existing customers, with the total number of customers generating subscription revenue increasing 16% for the year ended December 31, 2016.

Maintenance and support. The increase in maintenance and support revenue was principally a result of an increase in maintenance from our existing customers.

License revenue. Our license revenue depends on the amount of perpetual licenses sold in the period, as well as the timing of revenue recognition. As a result of our cloud strategy, we sold fewer perpetual licenses and experienced a

corresponding decrease in license revenue, which included a decrease of \$13.2 million in license revenue recognized on a percentage of completion basis, and \$7.7 million in license revenue recognized upon software delivery.

Services revenue. Services revenue declined primarily as a result of several customer implementations completed in 2015 or early 2016 with significant professional services. Services revenue also declined due to lower levels of professional services required for our new subscription sales, as well as professional services revenue on certain subscription contracts which was deferred until the customer commences use of the subscription services because the professional services were deemed not to have stand-alone value.

Table of Contents

Cost of revenue and gross profit:

| (Dollars in thousands) | For the Year Ended December 31, | | | | | | | | | |
|---|---------------------------------|-----------------------------|---|-----------|-----------------------------|---|-------------|------|------------|--|
| | 2016 | | | 2015 | | | Variance \$ | | Variance % | |
| | Amount | Percentage of total revenue | | Amount | Percentage of total revenue | | | | | |
| Cost of subscription | \$17,379 | 11 | % | \$12,786 | 8 | % | \$4,593 | 36 | % | |
| Cost of maintenance and support | 13,681 | 9 | % | 12,173 | 7 | % | 1,508 | 12 | % | |
| Total cost of subscription, maintenance and support | 31,060 | 20 | % | 24,959 | 15 | % | 6,101 | 24 | % | |
| Cost of license | 246 | — | % | 304 | — | % | (58) | (19) | % | |
| Cost of services | 32,047 | 21 | % | 36,147 | 21 | % | (4,100) | (11) | % | |
| Total cost of revenue | \$63,353 | 41 | % | \$61,410 | 37 | % | \$1,943 | 3 | % | |
| Gross profit | \$89,923 | 59 | % | \$106,836 | 63 | % | \$(16,913) | (16) | % | |

Cost of subscription. Cost of subscription increased primarily as a result of a \$4.1 million increase in infrastructure costs and a \$0.5 million increase in personnel costs to support our current and anticipated future subscription customer base. Our subscription gross profit percentage for the years ended December 31, 2016 and 2015, was 54% and 56%, respectively.

Cost of maintenance and support. Cost of maintenance and support increased primarily due to an increase in personnel cost to support our current customer base. Maintenance and support gross margins for the years ended December 31, 2016 and 2015 were 80% and 81%, respectively.

Cost of license. Cost of license consists of third-party fees for licensed software and remained relatively consistent year over year. License gross profit percentages for the years ended December 31, 2016 and 2015, were 98% and 99%, respectively.

Cost of services. Cost of services decreased primarily due to a decrease in personnel costs used in our software implementations of \$4.0 million and a decrease in other overhead expenses of \$0.1 million. Services gross profit percentages for the years ended December 31, 2016 and 2015, were 8% and 16%, respectively.

Gross profit. The decrease in overall gross profit for the year ended December 31, 2016 was principally attributable to a decrease of 9% in total revenue and an increase of 3% in total cost of revenue as compared to the same period in 2015.

Operating expenses:

| (Dollars in thousands) | For the Year Ended December 31, | | | | | | | | | |
|----------------------------|---------------------------------|-----------------------------|---|-----------|-----------------------------|---|-------------|-------|------------|--|
| | 2016 | | | 2015 | | | Variance \$ | | Variance % | |
| | Amount | Percentage of total revenue | | Amount | Percentage of total revenue | | | | | |
| Selling and marketing | \$63,980 | 42 | % | \$74,146 | 44 | % | \$(10,166) | (14) | % | |
| General and administrative | 38,537 | 25 | % | 38,517 | 23 | % | 20 | — | % | |
| Research and development | 52,804 | 34 | % | 46,780 | 28 | % | 6,024 | 13 | % | |
| Impairment charges | — | — | % | 2,890 | 2 | % | (2,890) | (100) | % | |
| Total operating expenses | \$155,321 | 101 | % | \$162,333 | 96 | % | \$(7,012) | (4) | % | |

Selling and marketing expenses. The decrease in selling and marketing expenses was primarily attributable to a decrease of \$4.7 million in noncash share-based compensation expense primarily related to the cancellation of certain equity awards associated with the change in employment status of our former Chief Operating Officer, a \$2.8 million decrease in sales commissions as a result of capitalizing more sales commissions, a \$1.5 million decrease in marketing

event costs, a \$1.3 million decrease in intangible amortization expense, a \$1.2 million decrease in travel expenses and a \$0.3 million decrease in other overhead expenses. The decrease was partially offset by a \$1.6 million increase in personnel costs.

General and administrative expenses. General and administrative expenses remained overall unchanged for the year ended December 31, 2016 as compared to the same period in 2015, as a result of our specific efforts to control the growth and scale the capacity of our corporate overhead functions.

Table of Contents

Research and development expenses. Research and development expense increased primarily as a result of an increase of \$5.3 million in personnel costs due to higher headcount to support our current and future product development and an increase of \$0.7 million of non-personnel cost and related overhead expenses associated with higher personnel cost. Impairment charges. During the year ended December 31, 2015 we recorded \$2.9 million of impairment charges related to internally developed software. This impairment resulted from a reduction of projected cash flows for product groups based on revisions to our projections during the year and was recorded to reduce the carrying value to fair value. This reduction reflected changes to our plans for certain product groups in connection with changes in future product launches and support. We did not record an impairment charge in 2016.

Other expense, net:

| (Dollars in thousands) | For the Year Ended December 31, | | Variance \$ | Variance % |
|--|---------------------------------|-----------------------------------|----------------|-----------------------------------|
| | 2016 | 2015 | | |
| | Amount | Percentage of total revenue | Amount | Percentage of total revenue |
| Convertible debt interest and amortization | \$ (9,319) | (6)% | \$ (8,914) | (5)% |
| Other expense, net | \$ (38) | — % | \$ (661) | — % |
| | | | \$ 623 | (94)% |

Convertible debt interest and amortization. The convertible debt interest and amortization expense for each of the years ended December 31, 2016 and 2015 related to coupon interest and amortization of debt discount and issuance costs attributable to our senior notes issued in December 2014 and mature in December 2019.

Other expense, net. Other expense, net decreased by \$0.6 million during the year ended December 31, 2016, primarily due to the reduced impact of movements in foreign currency exchange rates during the period.

Income tax provision:

| (Dollars in thousands) | For the Year Ended December 31, | | Variance \$ | Variance % |
|--------------------------------|---------------------------------------|-------|----------------|---------------|
| | 2016 | 2015 | | |
| Effective tax rate | (1)% | (1)% | n/a | — % |
| Income tax (benefit) provision | \$470 | \$739 | \$ (269) | (36)% |

Income tax (benefit) provision. Our tax provision for the year ended December 31, 2016 primarily consisted of foreign taxes and state taxes not based on loss before income tax provision.

Our 2016 and 2015 effective tax rates had an unusual relationship to pretax loss from operations as a result of the presence of a valuation allowance on our net deferred tax assets. Our income tax provisions in 2016 and 2015 only included foreign taxes and state taxes not based on pre-tax income, resulting in an effective tax rate of (1)% in both periods. The difference between the effective tax rates and the federal statutory rate of 34% for the years ended December 31, 2016 and 2015 was primarily due to the increase in our valuation allowance of \$26.6 million and \$20.9 million, respectively.

As of December 31, 2016 and 2015, we had a valuation allowance on our net deferred tax assets of \$69.0 million and \$44.3 million, respectively. The increase was principally attributed to an additional valuation allowance recorded on our current year's tax loss and increases in our noncash share-based compensation.

Liquidity and capital resources

At December 31, 2017, we had \$160.5 million of cash and cash equivalents and \$100.0 million of working capital as compared to \$118.0 million of cash and cash equivalents and \$76.9 million of working capital at December 31, 2016.

In addition, we had zero and \$16.0 million of short-term investments as of December 31, 2017 and 2016, respectively.

Our principal sources of liquidity are our cash and cash equivalents, short-term investments, cash flows generated from operations and potential borrowings under our secured Credit Agreement ("Revolver") with the lenders party thereto and Wells Fargo Bank, National Association as agent for the lenders party thereto. In December 2014, we issued the 2019 Notes and in June 2017, we issued the 2047 Notes to supplement our overall liquidity position. Our material drivers or variants of operating cash flow are net income (loss), noncash expenses (principally share-based compensation, intangible amortization and amortization of

Table of Contents

debt discount and issuance costs) and the timing of periodic invoicing and cash collections related to licenses, subscriptions and support for our software and related services. Our operating cash flows are also impacted by the timing of payments to our vendors and the payments of our other liabilities. We generally pay our vendors and service providers in accordance with the invoice terms and conditions.

We believe our existing cash, cash equivalents and short-term investments balances, including funds provided by the issuance of our Notes, funds available under our Revolver and our current estimates of future operating cash flows, will provide adequate liquidity and capital resources to meet our operational requirements, anticipated capital expenditures and coupon payments for our Notes for the next twelve months. Our future working capital requirements will depend on many factors, including the operations of our existing business, potential growth of our subscription services, future acquisitions we might undertake, and expansion into complementary businesses. If such need arises, we may raise additional funds through equity or debt financings.

The following table presents key components of our Consolidated Statements of Cash Flows for the years ended December 31, 2017, 2016 and 2015:

| (Dollars in thousands) | For the Year Ended December 31, | | |
|---|---------------------------------|-------------|-----------|
| | 2017 | 2016 | 2015 |
| Net cash (used in) provided by operating activities | \$(25,313) | \$(14,345) | \$15,532 |
| Net cash used in investing activities | (22,346) | (25,404) | (9,424) |
| Net cash provided by (used in) financing activities | 90,654 | (3,684) | (5,554) |
| Cash and cash equivalents (beginning of period) | 118,039 | 161,770 | 161,019 |
| Cash and cash equivalents (end of period) | \$160,505 | \$118,039 | \$161,770 |

Net cash (used in) provided by operating activities

Cash used in operating activities in 2017 and 2016 was \$25.3 million and \$14.3 million, respectively, compared with cash provided by operating activities of \$15.5 million in 2015. Cash used in operating activities has historically been affected by the amount of net income adjusted for non-cash items such as depreciation and amortization and share-based compensation and changes in working capital, which is impacted by the timing of payments against accounts payable, accrued expenses and the timing of collections from our customers, which is the largest source of operating cash. The \$11.0 million decrease in net cash from operations as compared to 2016 was primarily due to a \$13.8 million decrease in working capital as a result of a decrease in accrued payroll and other employee benefits, and an increase in our prepaid assets for advance payments on our cloud infrastructure.

For 2016, net cash used in operating activities was primarily related to a decrease in net cash from operations compared to 2015 mainly due to our transition to a cloud strategy as on-premise software sales were replaced with annual subscription services, and the net impact of working capital changes, primarily driven by reduced cash generated from accounts receivable, partially offset by an increase in cash associated with deferred revenue.

For 2015, net cash provided by operating activities was primarily comprised of cash provided from net changes in working capital, including a \$32.3 million decrease in accounts receivable due to higher collections, partially offset by our \$65.8 million net loss and the net effect of non-cash items.

Net cash used in investing activities

Cash used in investing activities for 2017, 2016 and 2015 was \$22.3 million, \$25.4 million and \$9.4 million, respectively. For 2017, net cash used in investing activities was primarily related to our acquisition of Vayant, partially offset by the cash inflow from the maturities of short-term investments. In addition, we incurred capitalized internal-use software development costs on our subscription service solutions of \$2.8 million, capital expenditures of \$1.3 million and we paid \$0.1 million for an intangible (non-acquisition) asset.

For 2016 and 2015, net cash used in investing activities was primarily the result of the timing of purchases and maturities of short-term investments and capital expenditures of \$7.2 million and \$6.8 million, respectively. During 2016, we also paid \$2.0 million for a cost method investment, paid \$1.6 million for an intangible (non-acquisition) asset and incurred capitalized internal-use software development costs on our subscription service solutions of \$1.0

million.

Net cash provided by (used in) financing activities

Cash provided by financing activities for 2017 was \$90.7 million, compared with cash used in financing activities in 2016 and 2015 of \$3.7 million and \$5.6 million, respectively. For 2017, the total increase of \$94.3 million in net cash provided

37

Table of Contents

by financing activities primarily consisted of the proceeds of \$93.5 million from the issuance of our 2047 Notes, also higher proceeds from the exercise of stock options and employee stock plans of \$5.4 million and \$0.4 million, respectively, partially offset by payment of \$3.0 million of debt issuance cost on our 2047 Notes, an increase of \$1.9 million in tax withholdings on vesting of employee share-based awards and payment of \$0.2 million in debt issuance costs on the Revolver renewal.

For 2016 and 2015, net cash used in financing activities was primarily the result of tax withholdings on vesting of employee share-based awards of \$5.5 million and \$5.1 million, respectively. During 2016 and 2015, we had proceeds from employee stock plans and the exercises of stock options of \$2.0 million and \$1.5 million, respectively. For 2015, we also paid \$1.3 million of contingent consideration related to the PROS France acquisition.

Stock repurchases

In August 2008, our Board of Directors authorized a stock repurchase program for the purchase of up to \$15.0 million of our common stock. No shares were repurchased during the years ended December 31, 2017, 2016 and 2015, respectively. As of December 31, 2017, \$10.0 million remained available in the stock repurchase program. The repurchase of stock, if continued, will be funded primarily with existing cash balances. The timing of any repurchases will depend upon various factors including, but not limited to, market conditions, the market price of our common stock and management's assessment of our liquidity and cash flow needs. For additional information on the stock repurchase program see "Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities."

Off-Balance Sheet Arrangements and Contractual Obligations

We do not have any relationships with unconsolidated entities or financial partnerships, such as variable interest entities, which would have been established for the purpose of facilitating off-balance sheet arrangements or other contractually narrow or limited purposes. Our principal commitments as of December 31, 2017 consist of obligations under operating leases and various service agreements. See Note 14 of our Notes to Consolidated Financial Statements for additional information regarding our contractual commitments.

Contractual Obligations

The following table sets forth our contractual obligations as of December 31, 2017:

| (Dollars in thousands) | Payment due by period | | | | |
|-------------------------------|-----------------------|---------------------|-----------|-----------|----------------------|
| | Total | Less than 1 year | 1-3 years | 3-5 years | More than 5 years |
| Notes, including interest | \$265,318 | \$5,000 | \$150,875 | \$3,193 | \$106,250 |
| Operating leases | 9,814 | 3,674 | 4,443 | 1,652 | 45 |
| Purchase commitments | 20,171 | 8,174 | 11,997 | — | — |
| Total contractual obligations | \$295,303 | \$16,848 | \$167,315 | \$4,845 | \$106,295 |

Notes

As of December 31, 2017, our outstanding notes payable consist of the 2019 Notes and the 2047 Notes. Interest on these notes is payable semi-annually, in arrears on June 1 and December 1 of each year. At December 31, 2017, our maximum commitment for interest payments under the Notes was \$15.3 million for the remaining duration of the Notes.

Covenants

Our credit facility contains affirmative and negative covenants, including covenants which restrict our ability to, among other things, create liens, incur additional indebtedness and engage in certain other transactions, in each case

subject to certain exclusions. In addition, our credit facility contains certain financial covenants which become effective in the event our liquidity falls below \$50 million or upon the occurrence of an event of default. As of December 31, 2017, we were in compliance with all financial covenants in the credit facility.

Table of Contents

Critical accounting policies and estimates

Our consolidated financial statements are prepared in accordance with accounting principles generally accepted in the United States. The preparation of these consolidated financial statements requires us to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenues, costs and expenses, and related disclosures. Actual results could differ from those estimates. The complexity and judgment of our estimation process and issues related to the assumptions, risks and uncertainties inherent in the application of the percentage-of-completion method of accounting could affect the amounts of revenue, expenses, unbilled receivables and deferred revenue. Estimates are also used for, but not limited to, receivables, allowance for doubtful accounts, useful lives of assets, depreciation, income taxes and deferred tax asset valuation, valuation of stock options, other current liabilities and accrued liabilities. Numerous internal and external factors can affect estimates. Our management has reviewed these critical accounting policies, our use of estimates and the related disclosures with our Audit Committee.

We believe the critical accounting policies listed below affect significant judgment and estimates used in the preparation of our Consolidated Financial Statements.

Revenue recognition

We derive our revenues primarily from subscription services fees, professional services, the perpetual licensing of our software products and the associated software maintenance and support services.

We commence revenue recognition when all of the following criteria are met:

- there is persuasive evidence of an arrangement;
- the service has been or is being provided to the customer;
- collection of the fee is reasonably assured; and
- the amount of fees to be paid by the customer is fixed and determinable.

Subscription services revenue

Subscription services revenue is generally recognized ratably over the contractual term of the arrangement beginning on the date that our service is made available to the customer, assuming all other revenue recognition criteria have been met. Our subscription contracts do not provide customers with the right to take possession of the software supporting the applications and, as a result, are accounted for as service contracts. Any revenue related to up-front activation or set-up fees are deferred and recognized ratably over the estimated period that the customer benefits from the related services. Direct and incremental costs related to up-front activation or set-up activities are capitalized until the date our service is made available and then expensed ratably over the estimated period that the customer benefits from the related services.

For our subscription services that include professional services, we determine whether the professional services have stand-alone value. Professional services deemed to have stand-alone value are accounted for separately from subscription services and the subscription services revenue recognition commences on the date that our subscription services are made available to the customer. If determined that the professional services do not have stand-alone value, the transaction is treated as a single element and the subscription services and professional services revenue is deferred until the customer commences use of the subscription services, and the subscription services and the professional services revenue is recognized over the remaining term of the arrangement.

Maintenance and support revenue

Maintenance and support revenue includes post-implementation customer support and the right to unspecified software updates and enhancements on a when-and-if-available basis. We recognize revenue from maintenance arrangements ratably over the period in which the services are provided. There are limited instances where we

recognize maintenance and support revenue at the latter of when the services are provided and when payment is received based on our belief that collectability is not reasonably assured.

License revenue

We derive the majority of our license revenue from the sale of perpetual licenses. For software license arrangements that do not require significant modification or customization of the underlying software, we recognize software licenses revenues upon software delivery, assuming all other revenue recognition criteria have been met.

Table of Contents

We evaluate the nature and scope of professional services for each arrangement, and if we determine that the professional services revenue should not be accounted for separately from license revenue, the license revenue is recognized together with the professional services revenue using the percentage-of-completion method or completed contract method. The completed contract method is also used for contracts where there is a risk over final acceptance by the customer or for contracts that are short-term in nature.

The percentage-of-completion method is measured by the percentage of man-days incurred during the reporting period as compared to the estimated total man-days necessary for each contract for implementation of the software solutions. We believe that for each such project, man-days expended in proportion to total estimated man-days at completion represents the most reliable and meaningful measure for determining a project's progress toward completion. Under our fixed-fee arrangements, should a loss be anticipated on a contract, the full amount of the loss is recorded when the loss is determinable.

We also license software solutions under term license agreements that typically include maintenance during the license term. When maintenance is included for the entire term of the term license, there is no renewal rate and we have not established vendor specific objective evidence ("VSOE") of fair value for the maintenance on term licenses. For term license agreements, revenue and the associated costs are deferred until the delivery of the solution and recognized ratably over the remaining license term.

Professional services revenue

Professional services revenues are generally recognized as the services are rendered for time and material contracts, or on a proportional performance basis for fixed price contracts. The majority of our professional services contracts are on a time and materials basis. Training revenues are recognized as the services are rendered.

For our subscription services that include professional services, we determine whether the professional services have stand-alone value. Professional services deemed to have stand-alone value are accounted for separately from subscription services and typically recognized as the services are performed. If determined that the professional services do not have stand-alone value, the transaction is treated as a single element, the professional services revenue is deferred until the customer commences use of the subscription services, and the professional services revenue is recognized over the remaining term of the arrangement.

For software license arrangements that include professional services, we determine whether the professional services are considered essential to the functionality of the software using factors such as: the nature of its software products; whether they are ready for use by the customer upon receipt; the nature of professional services; the availability of services from other vendors; whether the timing of payments for license revenue coincides with performance of services; and whether milestones or acceptance criteria exist that affect the realizability of the software license fee. For professional services considered essential to the functionality of the software, the license revenue is recognized together with the professional services revenue using the percentage-of-completion method or completed contract method. The completed contract method is also used for contracts where there is a risk over final acceptance by the customer or for contracts that are short-term in nature.

Multiple element arrangements

For arrangements with multiple deliverables, we evaluate whether the individual deliverables qualify as separate units of accounting. In order to treat deliverables in a multiple deliverable arrangement as separate units of accounting, the deliverables must have stand-alone value upon delivery. If the deliverables have stand-alone value upon delivery, we account for each deliverable separately and revenue is recognized for the respective deliverables as they are delivered.

When multiple deliverables included in an arrangement are separable into different units of accounting, the arrangement consideration is allocated to the identified separate units of accounting based on their relative selling price. Multiple deliverable arrangement accounting guidance provides a hierarchy when determining the relative selling price for each unit of accounting. VSOE of selling price, based on the price at which the item is regularly sold by the vendor on a stand-alone basis, should be used if it exists. If VSOE of selling price is not available, third-party evidence ("TPE") of selling price is used to establish the selling price if it exists. If neither VSOE nor TPE exist for a deliverable, arrangements with multiple deliverables can be separated into discrete units of accounting based on our best estimate of selling price ("BESP"). The objective of BESP is to determine the price at which we would transact a sale if the product or service were sold on a stand-alone basis. The amount of arrangement fee allocated is limited by contingent revenues, if any. For transactions that only include software and software-related elements, we continue to account for such arrangements under the software revenue recognition standards which require us to establish VSOE of fair value to allocate arrangement consideration to multiple deliverables.

Table of Contents

For multiple-element arrangements that contain software and nonsoftware elements such as our subscription services, we allocate revenue between the software and software related elements as a group and any nonsoftware elements based on a relative fair value allocation. We determine fair value for each deliverable using the selling price hierarchy described above and utilizing VSOE of fair value if it exists.

We apply the residual method to recognize revenue for the delivered elements in stand-alone software transactions. Under the residual method, the amount of revenue allocated to delivered elements equals the total arrangement consideration, less the aggregate fair value of any undelivered elements, typically maintenance, provided that VSOE of fair value exists for all undelivered elements. VSOE of fair value is based on the price charged when the element is sold separately or, in the case of maintenance, substantive renewal rates for maintenance.

Revenue that has been recognized, but for which we have not invoiced the customer, is recorded as unbilled receivables. Invoices that have been issued before revenue has been recognized are recorded as deferred revenue in the accompanying consolidated balance sheets.

Allowance for doubtful accounts

In addition to our initial credit evaluations at the inception of arrangements, we regularly assess our ability to collect outstanding customer invoices. To do so, we make estimates of the collectability of accounts receivable. We provide an allowance for doubtful accounts when we determine that the collection of an outstanding customer receivable is not probable. We also analyze accounts receivable and historical bad debt experience, customer creditworthiness, changes in customer payment history and industry concentration on an aggregate basis when evaluating the adequacy of the allowance for doubtful accounts. If any of these factors change, our estimates may also change, which could affect the level of our future provision for doubtful accounts.

Deferred commissions

Sales commissions earned by our sales force are considered to be direct sales commissions when they are associated specifically with a non-cancellable subscription contract. Direct sales commissions are deferred when earned and amortized over the same period that revenues are recognized for the related non-cancellable subscription contract. During the year ended December 31, 2017, we deferred \$4.0 million of commissions and we amortized \$2.5 million to sales and marketing expenses in the accompanying consolidated statements of operations. During the year ended December 31, 2016, we deferred \$4.3 million of commissions and we amortized \$1.9 million to sales and marketing expenses. Total deferred commissions on our consolidated balance sheets were \$6.3 million and \$4.8 million as of December 31, 2017 and 2016, respectively.

Noncash share-based compensation

We have three noncash share-based compensation plans, the 1999 equity incentive plan, the 2007 equity incentive plan, and the 2017 equity incentive plan which authorize the discretionary granting of various types of stock awards to key employees, officers, directors and consultants. Our 1999 equity incentive plan was terminated in March 2007 for purposes of granting any future equity awards. Our 2007 equity incentive plan was adopted in March 2007 and expired in March 2017. Our 2017 equity incentive plan was adopted in May 2017. We may provide noncash share-based compensation through the grant of: (i) restricted stock awards; (ii) restricted stock unit awards - time, performance and market-based ("RSUs"); (iii) stock options; (iv) stock appreciation rights ("SARs"); (v) phantom stock; and (vi) performance awards, such as market stock units ("MSUs"). In February 2014, we granted inducement awards in an aggregate amount of up to 308,250 shares in accordance with NYSE Rule 303A.08. These inducement awards were in the form of RSUs and MSUs granted to our former Chief Operating Officer and RSUs granted to certain new employees in connection with our acquisitions of PROS France and SignalDemand, Inc.

As of December 31, 2017, we have granted stock options, stock appreciation rights, restricted stock units and market stock units. RSUs granted include time-based and market-based awards in which the number of shares that vest are

based upon attainment of target average per share closing price over a requisite trading period. Noncash share-based compensation expense is measured at the grant date based on the fair value of the award and is recognized as expense on a straight-line basis over the requisite service period, which is generally the vesting period. The fair value of the RSUs (time-based and performance-based) is based on the closing price of our stock on the date of grant. The fair value and the derived service period of the market-based RSUs is estimated on the date of grant using a Monte Carlo simulation model. The model requires the use of a number of assumptions including the expected volatility of our stock, our risk-free interest rate and expected dividends. Our expected volatility at the date of grant is based on our historical volatility over the performance period.

Table of Contents

We estimate the fair value of stock options and SARs using the Black-Scholes option pricing model, which requires us to use significant judgment to make estimates regarding the expected life of the award, volatility of our stock price, the risk-free interest rate and the dividend yield of our stock over the life of the award. The expected life of the award is a historical weighted average of the expected lives of similar securities of comparable public companies. We estimate volatility using our historical volatility. The risk-free interest rate assumption is based on observed interest rates appropriate for the terms of our awards. The dividend yield assumption is based on our expectation of paying no dividends.

As we issue stock options and SARs, we evaluate the assumptions used to value our stock option awards and SARs. If factors change and we employ different assumptions, noncash share-based compensation expense may differ significantly from what we have recorded in the past. If there are any modifications or cancellations of the underlying unvested securities, we may be required to accelerate, increase or cancel any remaining unearned noncash share-based compensation expense. Future noncash share-based compensation expense and unearned noncash share-based compensation will increase to the extent that we grant additional equity awards to employees.

We estimate the number of awards that will be forfeited and recognize expense only for those awards that ultimately are expected to vest. Significant judgment is required in determining the adjustment to noncash share-based compensation expense for estimated forfeitures. Noncash share-based compensation expense in a period could be impacted, favorably or unfavorably, by differences between forfeiture estimates and actual forfeitures.

MSUs are performance-based awards that cliff vest based on our shareholder return relative to the total shareholder return of the Russell 2000 Index ("Index") over the three year periods ending December 31, 2016, December 31, 2017, March 2, 2018, February 28, 2019, February 28, 2020 and October 9, 2020 ("Performance Period"), respectively. The MSUs vest on January 1, 2016, January 1, 2017, January 1, 2018, March 3, 2018, March 1, 2019, March 1, 2020 and October 9, 2020, respectively. The maximum number of shares issuable upon vesting is 200% of the MSUs initially granted based on the average price of our common stock relative to the Index during the Performance Period. We estimate the fair value of MSUs on the date of grant using a Monte Carlo simulation model. The determination of fair value of the MSUs is affected by our stock price and a number of assumptions including the expected volatilities of our stock and the Index, the risk-free interest rate and expected dividends. Our expected volatility at the date of grant was based on the historical volatilities of our stock and the Index over the Performance Period.

We record deferred tax assets for stock based compensation awards that will result in future deductions on our income tax returns, based on the amount of stock based compensation recognized at the statutory tax rate in the jurisdiction in which we will receive a tax deduction. Because the deferred tax assets we record are based upon the stock based compensation expenses in a particular jurisdiction, the aforementioned inputs that affect the fair values of our stock awards may also indirectly affect our income tax expense. In addition, differences between the deferred tax assets recognized for financial reporting purposes and the actual tax deduction reported on our income tax returns are recorded in our income tax (expense) income.

At December 31, 2017, we had \$31.4 million of total unrecognized compensation costs related to noncash share-based compensation arrangements for stock options, SARs, RSUs and MSUs granted. These costs will be recognized over a weighted-average period of 2.3 years.

Accounting for income taxes

We estimate our income taxes based on the various jurisdictions where we conduct business and we use estimates in determining our provision for income taxes. We estimate separately our deferred tax assets, related valuation allowances, current tax liabilities and deferred tax liabilities. The calculation of our tax liabilities involves dealing with uncertainties in the application of complex tax rules and the potential for future adjustment of our uncertain tax positions by the U.S. Internal Revenue Service or other taxing jurisdictions. We estimate our current tax liability and assess temporary differences that result from differing treatments of certain items for tax and accounting purposes. These differences result in deferred tax assets and liabilities, which we show on our balance sheet. At December 31, 2017, our deferred tax assets consisted primarily of temporary differences related to noncash share-based compensation, R&E tax credit carryforwards and net operating losses.

We review the realizability of our deferred tax asset on a quarterly basis, or whenever events or changes in circumstances indicate that a review is required. In determining the requirement for a valuation allowance, the historical and projected financial results of the legal entity or consolidated group recording the net deferred tax asset are considered, along with any other positive or negative evidence. Since future financial results may differ from previous estimates, periodic adjustments to our valuation allowances may be necessary. We continually perform an analysis related to the realizability of our deferred tax assets. As a result, and after considering tax planning initiatives and other positive and negative evidence, we determine that it is more likely than not that our net deferred tax assets will not be realized. During 2017, there was not sufficient positive evidence to outweigh the current and historic negative evidence to determine that it was more likely than not that our net deferred tax assets would not be realized. Therefore, we continue to have a valuation allowance against net deferred tax assets as of December 31, 2017.

Table of Contents

We account for uncertain income tax positions recognized in our financial statements in accordance with the Income Tax Topic of the Accounting Standards Codification ("ASC"), issued by the FASB. This interpretation requires companies to use a prescribed model for assessing the financial recognition and measurement of all tax positions taken or expected to be taken in their tax returns. This guidance provides clarification on recognition, classification, interest and penalties, accounting in interim periods, disclosures and transition. Please see Note 11 to the Consolidated Financial Statements for more information.

Business combinations

We record tangible and intangible assets acquired and liabilities assumed in business combinations under the purchase method of accounting. Amounts paid for each acquisition are allocated to the assets acquired and liabilities assumed based on their fair values at the date of acquisition. We then allocate the purchase price in excess of net tangible assets acquired to identifiable intangible assets based on detailed valuations that use information and assumptions provided by management. We allocate any excess purchase price over the fair value of the net tangible and intangible assets acquired and liabilities assumed to goodwill. If the fair value of the assets acquired exceeds our purchase price, the excess is recognized as a gain.

Significant management judgments and assumptions are required in determining the fair value of acquired assets and liabilities, particularly acquired intangible assets. The valuation of purchased intangible assets is based upon estimates of the future performance and cash flows from the acquired business. Each asset is measured at fair value from the perspective of a market participant.

If different assumptions are used, it could materially impact the purchase price allocation and adversely affect our results of operations, financial condition and cash flows.

Intangible assets, goodwill and long-lived assets

When we acquire a business, a portion of the purchase consideration is typically allocated to acquired technology and other identifiable intangible assets, such as customer relationships. The excess of the purchase consideration over the net of the acquisition-date fair value of identifiable assets acquired and liabilities assumed is recorded as goodwill. We estimate fair value primarily utilizing the market approach, which calculates fair value based on the market values of comparable companies or comparable transactions. The amounts allocated to acquired technology and other intangible assets represent our estimates of their fair values at the acquisition date. We amortize our intangible assets that have finite lives using either the straight-line method or, if reliably determinable, the pattern in which the economic benefit of the asset is expected to be consumed utilizing expected undiscounted future cash flows. Amortization is recorded over the estimated useful lives ranging from two to eight years.

We review our intangible assets subject to amortization to determine if any adverse conditions exist or a change in circumstances has occurred that would indicate impairment or a change in the remaining useful life. If the carrying value of an asset exceeds its undiscounted cash flows, we will write down the carrying value of the intangible asset to its fair value in the period identified. In assessing recoverability, we must make assumptions regarding estimated future cash flows and discount rates. If these estimates or related assumptions change in the future, we may be required to record impairment charges. If the estimate of an intangible asset's remaining useful life is changed, we will amortize the remaining carrying value of the intangible asset prospectively over the revised remaining useful life.

We assess goodwill for impairment as of November 30 of each fiscal year, or more frequently if events or changes in circumstances indicate that the fair value of our reporting unit has been reduced below its carrying value. When conducting our annual goodwill impairment assessment, we use a three step process. The first step is to perform an optional qualitative evaluation as to whether it is more likely than not that the fair value of our reporting unit is less than its carrying value, using an assessment of relevant events and circumstances. In performing this assessment, we

are required to make assumptions and judgments including but not limited to an evaluation of macroeconomic conditions as they relate to our business, industry and market trends, as well as the overall future financial performance of our reporting unit and future opportunities in the markets in which it operates. If we determine that it is not more likely than not that the fair value of our reporting unit is less than its carrying value, we are not required to perform any additional tests in assessing goodwill for impairment. However, if we conclude otherwise or elect not to perform the qualitative assessment, we perform a second step for our reporting unit, consisting of a quantitative assessment of goodwill impairment. This quantitative assessment requires us to estimate the fair value of our reporting unit and compare the estimated fair value to its respective carrying value (including goodwill) as of the date of the impairment test. The third step, employed for our reporting unit if it fails the second step, is used to measure the amount of any potential impairment and compares the implied fair value of our reporting unit with the carrying amount of goodwill.

Table of Contents

Recent accounting pronouncements

See Note 2 - Summary of Significant Accounting Policies to the Consolidated Financial Statements included in this report, regarding the impact of certain recent accounting pronouncements on our Consolidated Financial Statements. Item 7A. Quantitative and qualitative disclosures about market risk

Foreign Currency Exchange Risk

Our contracts are predominately denominated in U.S. dollars; however, we have contracts denominated in foreign currencies and therefore a portion of our revenue is subject to foreign currency risks. The primary market risk we face is from foreign currency exchange rate fluctuations. Our cash flows are subject to fluctuations due to changes in foreign currency exchange rates. The effect of an immediate 10% adverse change in exchange rates on foreign denominated receivables as of December 31, 2017, would have resulted in a \$0.2 million loss. We are also exposed to foreign currency risk due to our French subsidiary, PROS France. A hypothetical 10% adverse change in the value of the U.S. dollar in relation to the Euro, which is our single most significant foreign currency exposure, would have changed revenue for the year ended December 31, 2017 by approximately \$0.9 million. In addition, as of December 31, 2017, we had operating subsidiaries in Australia, Ireland, Canada, Bulgaria, United Arab Emirates, the United Kingdom and Germany. Due to the relative low volume of payments made by us through these foreign subsidiaries, we do not believe we have significant exposure to foreign currency exchange risks, however, fluctuations in currency exchange rates could harm our results of operations in the future.

We currently do not use derivative financial instruments to mitigate foreign currency exchange risks. We continue to review this issue and may consider hedging certain foreign exchange risks through the use of currency futures or options in future years.

Exposure to Interest Rates

Our exposure to market risk for changes in interest rates relates to the variable interest rate on borrowings under our Revolver. As of December 31, 2017, we had no borrowings under the Revolver.

Our investment portfolio mainly consists of short-term interest-bearing obligations, including government and investment grade debt securities and money market funds. These securities are classified as available-for-sale and, consequently, are recorded in the unaudited condensed consolidated balance sheets at fair value with unrealized gains or losses reported as a separate component of accumulated other comprehensive income (loss), net of tax. Our investment strategy is focused on the preservation of capital and supporting our working capital requirements. We do not enter into investments for trading or speculative purposes. We believe that we do not have any material exposure to changes in the fair value as a result of changes in interest rates due to the short term nature of our cash equivalents.

As of December 31, 2017, we had an outstanding principal amount of \$143.8 million and \$106.3 million, respectively, of 2019 Notes and 2047 Notes, which are fixed rate instruments. Therefore, our results of operations are not subject to fluctuations in interest rates. The fair value of the Notes may change when the market price of our stock fluctuates.

Item 8. Financial statements and supplementary data

The consolidated financial statements required to be filed are indexed on page F-1 and are incorporated herein by reference. See Item 15(a)(1) and (2).

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

As of the end of the period covered by this report, we carried out an evaluation, under the supervision and with the participation of our management, including our Chief Executive Officer and Chief Financial Officer, of the effectiveness of our disclosure controls and procedures as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act. Based on that evaluation as of the period covered by this Annual Report on Form 10-K, our Chief Executive Officer and Chief Financial Officer have concluded that our disclosure controls and procedures were effective to ensure that information we are required to disclose in reports that we file or submit under the Exchange Act (i) is recorded, processed, summarized and reported within the time periods

Table of Contents

specified in SEC rules and forms, and (ii) is accumulated and communicated to our management, including our Chief Executive Officer and our Chief Financial Officer, as appropriate to allow timely decisions regarding required disclosure.

Changes in Internal Control over Financial Reporting

In August 2017, we acquired Vayant. For purposes of determining the effectiveness of our internal controls over financial reporting, management has excluded Vayant from its evaluation of these matters. Vayant represented approximately 0.6% of our consolidated total assets as of December 31, 2017 and approximately 2.0% of our consolidated revenues for the year-ended December 31, 2017.

Other than the change described above, there have been no changes in our internal control over financial reporting that occurred during the most recent fiscal quarter that materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Management's Report on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act). Internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with GAAP. Our internal control over financial reporting is a framework that includes policies and procedures that: (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of our assets; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with GAAP, and that our receipts and expenditures are being made only in accordance with authorizations of our management and directors; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of our assets that could have a material effect on the financial statements.

In August 2017, we acquired Vayant. For purposes of determining the effectiveness of our internal controls over financial reporting, management has excluded Vayant from its evaluation of these matters. Vayant represented approximately 0.6% of our consolidated total assets as of December 31, 2017 and approximately 2.0% of our consolidated revenues for the year-ended December 31, 2017.

Our management, with the participation of our Chief Executive Officer and Chief Financial Officer, has assessed the effectiveness of our internal control over financial reporting as of December 31, 2017, based on the criteria in Internal Control — Integrated Framework (2013) issued by COSO. Based on this evaluation, management concluded that our internal control over financial reporting was effective as of December 31, 2017 based upon the COSO criteria. The effectiveness of our internal control over financial reporting as of December 31, 2017 has been audited by PricewaterhouseCoopers LLP, an independent registered public accounting firm, as stated in their report, which is included herein.

Item 9B. Other information

None.

Table of Contents

Part III

Item 10. Directors, executive officers and corporate governance

The information required by this item is incorporated by reference from our proxy statement in connection with our 2018 Annual Meeting of Stockholders, which proxy statement will be filed with the SEC not later than 120 days after the close of our fiscal year ended December 31, 2017.

Item 11. Executive compensation

The information required by this item is incorporated by reference from our proxy statement in connection with our 2018 Annual Meeting of Stockholders, which proxy statement will be filed with the SEC not later than 120 days after the close of our fiscal year ended December 31, 2017.

Item 12. Security ownership of certain beneficial owners and management and related stockholder matters

The information required by this item is incorporated by reference from our proxy statement in connection with our 2018 Annual Meeting of Stockholders, which proxy statement will be filed with the SEC not later than 120 days after the close of our fiscal year ended December 31, 2017.

Item 13. Certain relationships, related transactions and director independence

The information required by this item is incorporated by reference from our proxy statement in connection with our 2018 Annual Meeting of Stockholders, which proxy statement will be filed with the SEC not later than 120 days after the close of our fiscal year ended December 31, 2017.

Item 14. Principal accountant fees and services

The information required by this item is incorporated by reference from our proxy statement in connection with our 2018 Annual Meeting of Stockholders, which proxy statement will be filed with the SEC not later than 120 days after the close of our fiscal year ended December 31, 2017.

Table of Contents

Part IV

Item 15. Exhibits and financial statements schedules

(a)(1) Financial Statements

Reference is made to the Index to Financial Statements in the section entitled "Financial Statements and Supplementary Data" in Part II, Item 8 of this Annual Report on Form 10-K.

(a)(2) Financial Statement Schedules

Reference is made to Schedule II, Valuation and Qualifying Accounts, as indexed on page F-34.

Schedules not listed above have been omitted because they are not applicable or are not required or the information required to be set forth therein is included in the Consolidated Financial Statements or Notes thereto.

(a)(3) Exhibits

Exhibits are as set forth in the section entitled "Exhibit Index" which follows the section entitled "Signatures" in this Annual Report on Form 10-K. Exhibits which are incorporated herein by reference can be inspected and copied at the public reference rooms maintained by the SEC in Washington, D.C., New York, New York, and Chicago, Illinois, and are also available to the public from commercial document retrieval services and at the website maintained by the SEC at <http://www.sec.gov>.

Table of Contents

PROS Holdings, Inc.

Index to the Consolidated Financial Statements

| | Page |
|--|-------------|
| <u>Report of independent registered public accounting firm</u> | <u>F-2</u> |
| <u>Consolidated balance sheets at December 31, 2017 and 2016</u> | <u>F-4</u> |
| <u>Consolidated statements of comprehensive income (loss) for the years ended December 31, 2017, 2016 and 2015</u> | <u>F-5</u> |
| <u>Consolidated statements of cash flows for the years ended December 31, 2017, 2016 and 2015</u> | <u>F-6</u> |
| <u>Consolidated statements of stockholders' equity for the years ended December 31, 2017, 2016 and 2015</u> | <u>F-8</u> |
| <u>Notes to the consolidated financial statements</u> | <u>F-9</u> |
| <u>Schedule II – valuation and qualifying accounts for the years ended December 31, 2017, 2016 and 2015</u> | <u>F-37</u> |

F-1

Table of Contents

Report of Independent Registered Public Accounting Firm

To the Board of Directors and Stockholders of PROS Holdings, Inc.:

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of PROS Holdings, Inc. and its subsidiaries as of December 31, 2017 and 2016, and the related consolidated statements of comprehensive income (loss), cash flows, and stockholders' equity for each of the three years in the period ended December 31, 2017, including the related notes and financial statement schedule for the years listed in the accompanying index (collectively referred to as the "consolidated financial statements"). We also have audited the Company's internal control over financial reporting as of December 31, 2017, 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 December 31, 2017 and 2016, and the results of their operations and their cash flows for each of the three years in the period ended December 31, 2017 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 December 31, 2017, based on criteria established in Internal Control - Integrated Framework (2013) issued by the COSO.

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

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

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

As described in Management's Report on Internal Control over Financial Reporting, management has excluded Vayant from its assessment of internal control over financial reporting as of December 31, 2017 because it was acquired by the Company in a purchase business combination during 2017. We have also excluded Vayant from our audit of internal control over financial reporting. Vayant 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 0.6% and 2.0%, respectively, of the related consolidated financial statement amounts as of and for the year ended December 31, 2017.

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

F-2

Table of Contents

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.

/s/ PricewaterhouseCoopers LLP

San Jose, California
February 15, 2018

We have served as the Company's auditor since 2002.

F-3

Table of Contents

PROS Holdings, Inc.

Consolidated Balance Sheets

(In thousands, except share and per share amounts)

| | December 31, | |
|--|--------------|------------|
| | 2017 | 2016 |
| Assets: | | |
| Current assets: | | |
| Cash and cash equivalents | \$160,505 | \$118,039 |
| Short-term investments | — | 15,996 |
| Accounts and unbilled receivables, net of allowance of \$760 and \$760, respectively | 32,484 | 33,285 |
| Prepaid and other current assets | 9,067 | 6,337 |
| Total current assets | 202,056 | 173,657 |
| Property and equipment, net | 14,007 | 15,238 |
| Intangibles, net | 26,929 | 12,650 |
| Goodwill | 38,458 | 20,096 |
| Other long-term assets | 7,233 | 6,013 |
| Total assets | \$288,683 | \$227,654 |
| Liabilities and Stockholders' Equity: | | |
| Current liabilities: | | |
| Accounts payable and other liabilities | \$2,976 | \$2,744 |
| Accrued liabilities | 6,733 | 7,279 |
| Accrued payroll and other employee benefits | 16,712 | 18,349 |
| Deferred revenue | 75,604 | 68,349 |
| Total current liabilities | 102,025 | 96,721 |
| Long-term deferred revenue | 19,591 | 11,389 |
| Convertible debt, net | 213,203 | 122,299 |
| Other long-term liabilities | 843 | 639 |
| Total liabilities | 335,662 | 231,048 |
| Commitments and contingencies (Note 14) | | |
| Stockholders' equity: | | |
| Preferred stock, \$0.001 par value, 5,000,000 shares authorized none issued | — | — |
| Common stock, \$0.001 par value, 75,000,000 shares authorized; 36,356,760 and 35,001,236 shares issued, respectively; 31,939,175 and 30,583,651 shares outstanding, respectively | 36 | 35 |
| Additional paid-in capital | 207,924 | 175,678 |
| Treasury stock, 4,417,585 common shares, at cost | (13,938) | (13,938) |
| Accumulated deficit | (238,185) | (160,259) |
| Accumulated other comprehensive loss | (2,816) | (4,910) |
| Total stockholders' equity | (46,979) | (3,394) |
| Total liabilities and stockholders' equity | \$288,683 | \$227,654 |

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

Table of Contents

PROS Holdings, Inc.

Consolidated Statements of Comprehensive Income (Loss)

(In thousands, except per share data)

| | For the Year Ended | | |
|---|--------------------|-----------|-----------|
| | December 31, | | |
| | 2017 | 2016 | 2015 |
| Revenue: | | | |
| Subscription | \$60,539 | \$38,158 | \$28,989 |
| Maintenance and support | 69,408 | 68,565 | 63,666 |
| Total subscription, maintenance and support | 129,947 | 106,723 | 92,655 |
| License | 5,562 | 11,814 | 32,716 |
| Services | 33,307 | 34,739 | 42,875 |
| Total revenue | 168,816 | 153,276 | 168,246 |
| Cost of revenue: | | | |
| Subscription | 27,858 | 17,379 | 12,786 |
| Maintenance and support | 11,693 | 13,681 | 12,173 |
| Total cost of subscription, maintenance and support | 39,551 | 31,060 | 24,959 |
| License | 282 | 246 | 304 |
| Services | 28,733 | 32,047 | 36,147 |
| Total cost of revenue | 68,566 | 63,353 | 61,410 |
| Gross profit | 100,250 | 89,923 | 106,836 |
| Operating expenses: | | | |
| Selling and marketing | 68,116 | 63,980 | 74,146 |
| General and administrative | 40,336 | 38,537 | 38,517 |
| Research and development | 56,021 | 52,804 | 46,780 |
| Acquisition-related | 720 | — | — |
| Impairment of internal-use software | — | — | 2,890 |
| Loss from operations | (64,943) | (65,398) | (55,497) |
| Convertible debt interest and amortization | (13,218) | (9,319) | (8,914) |
| Other income (expense), net | 384 | (38) | (661) |
| Loss before income tax provision | (77,777) | (74,755) | (65,072) |
| Income tax provision | 149 | 470 | 739 |
| Net loss | (77,926) | (75,225) | (65,811) |
| Net loss per share: | | | |
| Basic and diluted | (2.46) | (2.47) | (2.23) |
| Weighted average number of shares: | | | |
| Basic and diluted | 31,627 | 30,395 | 29,578 |
| Other comprehensive (loss) income, net of tax: | | | |
| Foreign currency translation adjustment | 2,107 | (594) | (2,076) |
| Unrealized gain on short-term investments | (13) | 6 | 3 |
| Other comprehensive loss, net of tax | 2,094 | (588) | (2,073) |
| Comprehensive (loss) income | (75,832) | (75,813) | (67,884) |

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

Table of Contents

PROS Holdings, Inc.
 Consolidated Statements of Cash Flows
 (In thousands)

| | Year Ended December 31, | | |
|---|-------------------------|-------------|-------------|
| | 2017 | 2016 | 2015 |
| Operating activities: | | | |
| Net loss | \$(77,926) | \$(75,225) | \$(65,811) |
| Adjustments to reconcile net loss to net cash provided by operating activities: | | | |
| Depreciation and amortization | 10,531 | 9,507 | 10,395 |
| Amortization of debt discount and issuance costs | 9,264 | 6,439 | 6,039 |
| Share-based compensation | 22,796 | 20,466 | 27,864 |
| Deferred income tax, net | (520) | 40 | 165 |
| Provision for doubtful accounts | — | 174 | (282) |
| Loss on disposal of assets | 59 | 19 | 167 |
| Impairment of internal-use software | — | — | 2,890 |
| Changes in operating assets and liabilities: | | | |
| Accounts and unbilled receivables | 2,022 | 5,671 | 32,274 |
| Prepaid expenses and other assets | (3,715) | (915) | 229 |
| Accounts payable and other liabilities | 700 | (2,905) | (4,049) |
| Accrued liabilities | (1,055) | 2,801 | 800 |
| Accrued payroll and other employee benefits | (2,344) | 5,195 | (2,048) |
| Deferred revenue | 14,875 | 14,388 | 6,899 |
| Net cash (used in) provided by operating activities | (25,313) | (14,345) | 15,532 |
| Investing activities: | | | |
| Purchase of property and equipment | (1,286) | (7,241) | (6,794) |
| Purchase of equity securities | — | (2,000) | — |
| Acquisition of Vayant, net of cash acquired | (34,130) | — | — |
| Capitalized internal-use software development costs | (2,797) | (1,048) | (233) |
| Purchase of intangible asset | (125) | (1,625) | — |
| Change in restricted cash | — | — | 100 |
| Purchases in short-term investment | — | (154,990) | (57,697) |
| Proceeds from maturities of short-term investments | 15,992 | 141,500 | 55,200 |
| Net cash used in investing activities | (22,346) | (25,404) | (9,424) |
| Financing activities: | | | |
| Exercise of stock options | 6,331 | 889 | 706 |
| Proceeds from employee stock plans | 1,535 | 1,090 | 839 |
| Tax withholding related to net share settlement of stock awards | (7,375) | (5,467) | (5,124) |
| Payment of contingent consideration for PROS France | — | — | (1,304) |
| Payments of notes payable | (209) | (196) | (263) |
| Proceeds from issuance of convertible debt, net | 93,500 | — | — |
| Debt issuance costs related to convertible debt | (2,978) | — | — |
| Debt issuance costs related to revolver | (150) | — | (408) |
| Net cash provided by (used in) financing activities | 90,654 | (3,684) | (5,554) |
| Effect of foreign currency rates on cash | (529) | (298) | 197 |
| Net increase (decrease) in cash and cash equivalents | 42,466 | (43,731) | 751 |
| Cash and cash equivalents: | | | |
| Beginning of period | 118,039 | 161,770 | 161,019 |
| End of period | \$160,505 | \$118,039 | \$161,770 |

Table of Contents

PROS Holdings, Inc.
Consolidated Statements of Cash Flows
(In thousands)

Supplemental disclosure of cash flow information:

Cash (paid) refund during period for:

| | | | |
|----------|-----------|-----------|-----------|
| Taxes | \$(271) | \$968 | \$(3) |
| Interest | \$(4,013) | \$(3,182) | \$(2,932) |

Noncash investing activities:

| | | | |
|---|------|-------|---------|
| Purchase of property and equipment accrued but not paid | \$38 | \$378 | \$2,722 |
|---|------|-------|---------|

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

F-7

Table of Contents

PROS Holdings, Inc.
 Consolidated Statements of Stockholders' Equity
 (In thousands, except share data)

| | Common Stock | | Additional | Treasury Stock | | Accumulated | Accumulated | Total |
|---|--------------|--------|--------------------|----------------|------------|-----------------------------------|--------------------------------|-------------------------|
| | Shares | Amount | Paid-In Capital | Shares | Amount | (Deficit) Retained Earnings | other comprehensive loss | Stockholders' Equity |
| Balance at December 31, 2014 | 29,060,225 | \$ 34 | \$ 134,375 | 4,417,585 | \$(13,938) | \$(19,223) | \$(2,249) | \$ 98,999 |
| Exercise of stock options | 220,031 | — | 706 | — | — | — | — | 706 |
| Restricted and market stock net settlement | 421,115 | — | (5,124) | — | — | — | — | (5,124) |
| Proceeds from employee stock plans | 37,605 | — | 839 | — | — | — | — | 839 |
| Noncash share-based compensation | — | — | 27,878 | — | — | — | — | 27,878 |
| Other comprehensive loss | — | — | — | — | — | — | (2,073) | (2,073) |
| Net loss | — | — | — | — | — | (65,811) | — | (65,811) |
| Balance at December 31, 2015 | 29,738,976 | \$ 34 | \$ 158,674 | 4,417,585 | \$(13,938) | \$(85,034) | \$(4,322) | \$ 55,414 |
| Exercise of stock options | 96,870 | — | 889 | — | — | — | — | 889 |
| Restricted and market stock net settlement | 682,112 | 1 | (5,467) | — | — | — | — | (5,466) |
| Proceeds from employee stock plans | 65,693 | — | 1,090 | — | — | — | — | 1,090 |
| Noncash share-based compensation | — | — | 20,492 | — | — | — | — | 20,492 |
| Other comprehensive loss | — | — | — | — | — | — | (588) | (588) |
| Net loss | — | — | — | — | — | (75,225) | — | (75,225) |
| Balance at December 31, 2016 | 30,583,651 | \$ 35 | \$ 175,678 | 4,417,585 | \$(13,938) | \$(160,259) | \$(4,910) | \$(3,394) |
| Exercise of stock options | 651,607 | 1 | 6,330 | — | — | — | — | 6,331 |
| Restricted and market stock net settlement | 611,708 | — | (7,375) | — | — | — | — | (7,375) |
| Proceeds from employee stock plans | 92,209 | — | 1,535 | — | — | — | — | 1,535 |
| Equity component of the convertible notes issuance, net | — | — | 8,846 | — | — | — | — | 8,846 |
| Noncash share-based compensation | — | — | 22,910 | — | — | — | — | 22,910 |
| Other comprehensive loss | — | — | — | — | — | — | 2,094 | 2,094 |
| Net loss | — | — | — | — | — | (77,926) | — | (77,926) |
| Balance at December 31, 2017 | 31,939,175 | \$ 36 | \$ 207,924 | 4,417,585 | \$(13,938) | \$(238,185) | \$(2,816) | \$(46,979) |

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

F-8

Table of Contents

PROS Holdings, Inc.

Notes to Consolidated Financial Statements

1. Organization and Nature of Operations

PROS Holdings, Inc., a Delaware corporation, through its operating subsidiaries (collectively, the "Company"), provides cloud-based solutions to power the shift to modern commerce by helping companies create personalized and frictionless buying experiences for their customers. Fueled by artificial intelligence, machine learning and proven science, PROS solutions make it possible for companies to price, configure and sell their products and services in an omnichannel environment with speed, precision and consistency. PROS customers benefit from decades of data science expertise infused into its purpose-built industry solutions. The Company provides its solutions to enterprises across the manufacturing, distribution and services industries, including automotive and industrial, business-to-business ("B2B") services, cargo, chemicals and energy, consumer goods, insurance, food and beverage, healthcare, high tech, and travel. The Company also provides professional services to implement its software applications. In addition, the Company provides product maintenance and support to its customers through which they receive unspecified upgrades, maintenance releases and bug fixes during the term of the support period on a when-and-if-available basis.

2. Summary of Significant Accounting Policies

Principles of consolidation and basis of presentation

The Consolidated Financial Statements include the accounts of the Company, and its wholly-owned subsidiaries. All significant intercompany transactions and balances have been eliminated in consolidation. The Consolidated Financial Statements of the Company have been prepared in accordance with generally accepted accounting principles in the United States ("GAAP").

Dollar amounts

The dollar amounts presented in the tabular data within these footnote disclosures are stated in thousands of dollars, except per share amounts, or as noted within the context of each footnote disclosure.

Use of estimates

The Company's management makes estimates and assumptions in the preparation of its audited Consolidated Financial Statements in conformity with GAAP. These estimates and assumptions may affect the reported amounts of assets and liabilities, the disclosure of contingent assets and liabilities at the date of the audited Consolidated Financial Statements and the reported amounts of revenue and expense during the reporting periods. Actual results could differ from those estimates. The complexity of the estimation process and issues related to the assumptions, risks and uncertainties inherent in the application of the percentage-of-completion method of revenue recognition affects the amount of revenue, expenses, unbilled receivables and deferred revenue. Numerous internal and external factors can affect estimates. Estimates are also used for, but not limited to, receivables, allowance for doubtful accounts, useful lives of assets, depreciation and amortization, the fair value of assets acquired and liabilities assumed for business combinations, income taxes and deferred tax asset valuation, valuation of stock options, other current liabilities and accrued liabilities.

Cash and cash equivalents

The Company considers all highly liquid investments with an original maturity of three months or less at the time of purchase, or the ability to be settled in cash within a period of three months, to be cash equivalents, except for commercial paper which is classified as short-term investments. The Company has a cash management program that provides for the investment of excess cash balances, primarily in short-term money market instruments.

Short-term investments

The Company's investments are available-for-sale commercial paper and certificate of deposit that are recorded at fair value in the consolidated balance sheets. The Company classifies all commercial paper regardless of original maturity at purchase date as investments. Unrealized gains and losses on available-for-sale securities are recorded, net of tax, as a component of accumulated other comprehensive income (loss), unless impairment is considered to be other-than-temporary. Other-than-temporary unrealized losses on available-for-sale securities are generally recorded in gain (loss) on investments, net, in the consolidated statements of comprehensive income (loss) unless certain criteria are met. The primary factors considered when determining if a charge must be recorded because a decline in the fair value of an investment is other-than-temporary include whether: (i) the fair value of the investment is significantly below the Company's cost basis; (ii) the financial condition of the issuer of the security has deteriorated; (iii) if a debt security, it is probable that the Company will be unable to collect all amounts

F-9

Table of Contents

due according to the contractual terms of the security; (iv) the decline in fair value has existed for an extended period of time; (v) if a debt security, such security has been downgraded by a rating agency; and (vi) the Company has the intent and ability to retain the investment for a period of time sufficient to allow for any anticipated recovery in fair value. Investments with remaining maturities of twelve months or less are classified as short-term investments since they are readily convertible to cash to fund short-term operations. Investments with remaining maturities of more than twelve months are classified as long-term investments. The Company had no investments as of December 31, 2017. All of the Company's investments had contractual maturities of less than twelve months as of December 31, 2016.

Cost method investment

Investments in equity securities of privately held companies without readily determinable fair value, where the Company does not exercise significant influence over the investee, are recorded using the cost method of accounting, carrying the investment at historical cost. If there are no identified events or changes in circumstances that might have an adverse effect on the cost method investments, the Company does not estimate the investments' fair value. For all investments, if a decline in the fair value of an investment below the carrying value is determined to be other-than-temporary, such investment is written down to its estimated fair value with a charge to current earnings.

At December 31, 2017 and December 31, 2016, the Company held \$2.0 million of equity securities in a privately held company. This investment is accounted for under the cost method and the Company measures it at fair value on a nonrecurring basis when it is deemed to be other-than-temporarily impaired. The Company estimates fair value of its cost method investment considering available information such as pricing in recent rounds of financing, current cash positions, earnings and cash flow forecasts, recent operational performance and any other readily available market data, which represents level 3 in the fair value hierarchy. As of December 31, 2017, the Company determined there were no other-than-temporary impairments on its cost method investment.

Financial instruments

The carrying amount of the Company's financial instruments, which include cash equivalents, short-term investments, receivables and accounts payable, and cost method investment approximates their fair values at December 31, 2017 and 2016. For additional information on the Company's fair value measurements, see Note 8 to the Consolidated Financial Statements.

Allowance for doubtful accounts

The Company maintains an allowance for doubtful accounts which reflects the Company's best estimate of potentially uncollectible receivables. The Company regularly reviews the receivables allowances by considering such factors as historical experience, credit-worthiness, the age of the receivable balances and current economic conditions that may affect a customer's ability to pay and the Company specifically reserves for those deemed uncollectible.

Prepaid expenses and other assets

Prepaid expenses and other assets consist primarily of prepaid third-party cloud infrastructure costs and license fees, deferred project costs and prepaid income taxes.

Property and equipment, net

Property and equipment are recorded at cost, less accumulated depreciation. Maintenance, repairs and minor replacements are charged to expense as incurred. Significant renewals and betterments are capitalized. Depreciation on property and equipment, with the exception of leasehold improvements, is recorded using the straight-line method over the estimated useful lives of the assets. Depreciation on leasehold improvements is recorded using the shorter of the lease term or useful life. When property is retired or disposed of, the cost and related accumulated depreciation are removed from the accounts and any resulting gains or losses are reflected in the Consolidated Statements of Comprehensive Income in the period of disposal.

Internal-use software

Costs incurred to develop internal-use software during the application development stage are capitalized, stated at cost, and depreciated using the straight-line method over the estimated useful lives of the assets. Application development stage costs generally include salaries and personnel costs and third-party contractor expenses associated with internal-use software development, configuration and coding. Capitalization of such costs begins when the preliminary project stage is complete and ceases at the point in which the project is substantially complete and is ready for its intended purpose. Capitalized internal-use software is included in property and equipment, net in the Consolidated Balance Sheets.

Deferred commissions

F-10

Table of Contents

Sales commissions earned by the Company's sales force are considered to be direct sales commissions when they are associated specifically with a non-cancellable subscription contract. Direct sales commissions are deferred when earned and amortized over the same period that revenues are recognized for the related non-cancellable subscription contract.

Impairment of long-lived assets

Long-lived assets are reviewed for impairment whenever an event or change in circumstances indicates that the carrying amount of an asset or group of assets may not be recoverable. The impairment review includes comparison of future cash flows expected to be generated by the asset or group of assets with the associated assets' carrying value. If the carrying value of the asset or group of assets exceeds its expected future cash flows (undiscounted and without interest charges), an impairment loss is recognized to the extent that the carrying amount of the asset exceeds its fair value. The Company recorded no impairment charges in the year ended December 31, 2017 and 2016. During the year ended December 31, 2015, the Company recorded a full impairment of \$2.9 million related to capitalized internal-use software associated with the expected future cash flows.

Intangible assets and goodwill

Intangible assets that have finite lives are amortized over their useful lives and are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. During this review, the Company reevaluates the significant assumptions used in determining the original cost and estimated lives of long-lived assets. Although the assumptions may vary from asset to asset, they generally include operating results, changes in the use of the asset, cash flows and other indicators of value. Management then determines whether the remaining useful life continues to be appropriate or whether there has been an impairment of long-lived assets based primarily upon whether expected future undiscounted cash flows are sufficient to support the assets' recovery. If impairment exists, the Company would adjust the carrying value of the asset to fair value, generally determined by a discounted cash flow analysis.

Goodwill represents the excess of the purchase consideration over the net of the acquisition-date fair value of identifiable assets acquired, including identifiable intangible assets, and liabilities assumed in connection with business combinations. Goodwill is not amortized, but is assessed for impairment as of November 30 of each fiscal year, or more frequently if events or changes in circumstances indicate that the fair value of the Company's sole reporting unit has been reduced below its carrying value. When conducting the annual goodwill impairment assessment, a three step process is used. The first step is to perform an optional qualitative evaluation as to whether it is more likely than not that the fair value of the Company's sole reporting unit is less than its carrying value, using an assessment of relevant events and circumstances. In performing this assessment, the Company is required to make assumptions and judgments including but not limited to an evaluation of macroeconomic conditions as they relate to the business, industry and market trends, as well as the overall future financial performance of the reporting unit and future opportunities in the markets in which it operates. If it is determined that it is not more likely than not that the fair value of the reporting unit is less than its carrying value, no additional tests are required to be performed in assessing goodwill for impairment. However, if the Company concludes otherwise or elects not to perform the qualitative assessment, the Company performs a second step, consisting of a quantitative assessment of goodwill impairment. This quantitative assessment requires us to estimate the fair value of the reporting unit and compare the estimated fair value to its respective carrying value (including goodwill) as of the date of the impairment test. The third step, employed for the reporting unit failing the second step, is used to measure the amount of any potential impairment and compares the implied fair value of the reporting unit with the carrying amount of goodwill. Based on the results of the qualitative review of goodwill performed as of November 30, 2017, the Company did not identify any indicators of impairment. As such, the second and third steps described above were not necessary.

Research and development

Research and development costs for software sold to customers are expensed as incurred. These costs include salaries and personnel costs, including employee benefits, third-party contractor expenses, software development tools, an allocation of facilities and depreciation expenses and other expenses in developing new solutions and upgrading and enhancing existing solutions.

Software development costs

Capitalization of software development costs for software to be sold, leased, or otherwise marketed begins upon the establishment of technological feasibility, which is generally the completion of a working prototype that has been certified as having no critical bugs and is a release candidate. Amortization begins once the software is ready for its intended use, generally based on the pattern in which the economic benefits will be consumed. To date, software development costs incurred between completion of a working prototype and general availability of the related product have not been material.

Treasury stock

The Company is authorized to make treasury stock purchases in the open market pursuant to the share repurchase program, which was approved by its Board of Directors on August 28, 2008. The Company accounts for the purchase of treasury stock

Table of Contents

under the cost method. For additional information on the Company's stock repurchase program, see Note 9 to the Consolidated Financial Statements. There were no treasury stock repurchases for the years ended December 31, 2017, 2016 and 2015.

Revenue recognition

The Company derives its revenues primarily from subscription services fees, professional services, the perpetual licensing of its software products and the associated software maintenance and support services.

The Company commences revenue recognition when all of the following criteria are met:

- there is persuasive evidence of an arrangement;
- the service has been or is being provided to the customer;
- collection of the fee is reasonably assured; and
- the amount of fees to be paid by the customer is fixed and determinable.

Subscription services revenue

Subscription services revenue is generally recognized ratably over the contractual term of the arrangement beginning on the date that the Company's service is made available to the customer, assuming all other revenue recognition criteria have been met. The Company's subscription contracts do not provide customers with the right to take possession of the software supporting the applications and, as a result, are accounted for as service contracts. Any revenue related to up-front activation or set-up fees are deferred and recognized ratably over the estimated period that the customer benefits from the related services. Direct and incremental costs related to up-front activation or set-up activities are capitalized until the date the Company's service is made available and then expensed ratably over the estimated period that the customer benefits from the related services.

For the Company's subscription services that include professional services, the Company determines whether the professional services have stand-alone value. Professional services deemed to have stand-alone value are accounted for separately from subscription services and the subscription services revenue recognition commences on the date that the Company's subscription services are made available to the customer. If determined that the professional services do not have stand-alone value, the transaction is treated as a single element and the subscription services and professional services revenue is deferred until the customer commences use of the subscription services, and the subscription services revenue is recognized over the remaining term of the arrangement.

Maintenance and support revenue

Maintenance and support revenue includes post-implementation customer support and the right to unspecified software updates and enhancements on a when-and-if-available basis. The Company recognizes revenue from maintenance arrangements ratably over the period in which the services are provided. There are limited instances where the Company recognizes maintenance and support revenue at the latter of when the services are provided and when payment is received based on the Company's belief that collectability is not reasonably assured.

License revenue

The Company derives the majority of its license revenue from the sale of perpetual licenses. For software license arrangements that do not require significant modification or customization of the underlying software, the Company recognizes software licenses revenues upon software delivery, assuming all other revenue recognition criteria have been met.

The Company evaluates the nature and scope of professional services for each arrangement, and if it determines that the professional services revenue should not be accounted for separately from license revenue, the license revenue is recognized together with the professional services revenue using the percentage-of-completion method or completed

contract method. The completed contract method is also used for contracts where there is a risk over final acceptance by the customer or for contracts that are short-term in nature.

The percentage-of-completion method is measured by the percentage of man-days incurred during the reporting period as compared to the estimated total man-days necessary for each contract for implementation of the software solutions. The Company believes that for each such project, man-days expended in proportion to total estimated man-days at completion represents the most reliable and meaningful measure for determining a project's progress toward completion. Under the Company's fixed-fee arrangements, should a loss be anticipated on a contract, the full amount of the loss is recorded when the loss is determinable.

F-12

Table of Contents

The Company also licenses software solutions under term license agreements that typically include maintenance during the license term. When maintenance is included for the entire term of the term license, there is no renewal rate and the Company has not established vendor specific objective evidence ("VSOE") of fair value for the maintenance on term licenses. For term license agreements, revenue and the associated costs are deferred until the delivery of the solution and recognized ratably over the remaining license term.

Professional services revenue

Professional services revenues are generally recognized as the services are rendered for time and material contracts, or on a proportional performance basis for fixed price contracts. The majority of the Company's professional services contracts are on a time and materials basis. Training revenues are recognized as the services are rendered.

For the Company's subscription services that include professional services, the Company determines whether the professional services have stand-alone value. Professional services deemed to have stand-alone value are accounted for separately from subscription services and typically recognized as the services are performed. If determined that the professional services do not have stand-alone value, the transaction is treated as a single element, the professional services revenue is deferred until the customer commences use of the subscription services, and the professional services revenue is recognized over the remaining term of the arrangement.

For software license arrangements that include professional services, the Company determines whether the professional services are considered essential to the functionality of the software using factors such as: the nature of its software products; whether they are ready for use by the customer upon receipt; the nature of professional services; the availability of services from other vendors; whether the timing of payments for license revenue coincides with performance of services; and whether milestones or acceptance criteria exist that affect the realizability of the software license fee. For professional services considered essential to the functionality of the software, the license revenue is recognized together with the professional services revenue using the percentage-of-completion method or completed contract method. The completed contract method is also used for contracts where there is a risk over final acceptance by the customer or for contracts that are short-term in nature.

Multiple element arrangements

For arrangements with multiple deliverables, the Company evaluates whether the individual deliverables qualify as separate units of accounting. In order to treat deliverables in a multiple deliverable arrangement as separate units of accounting, the deliverables must have stand-alone value upon delivery. If the deliverables have stand-alone value upon delivery, the Company accounts for each deliverable separately and revenue is recognized for the respective deliverables as they are delivered.

When multiple deliverables included in an arrangement are separable into different units of accounting, the arrangement consideration is allocated to the identified separate units of accounting based on their relative selling price. Multiple deliverable arrangement accounting guidance provides a hierarchy when determining the relative selling price for each unit of accounting. VSOE of selling price, based on the price at which the item is regularly sold by the vendor on a stand-alone basis, should be used if it exists. If VSOE of selling price is not available, third-party evidence ("TPE") of selling price is used to establish the selling price if it exists. If neither VSOE nor TPE exist for a deliverable, arrangements with multiple deliverables can be separated into discrete units of accounting based on the Company's best estimate of selling price ("BESP"). The objective of BESP is to determine the price at which the Company would transact a sale if the product or service were sold on a stand-alone basis. The amount of arrangement fee allocated is limited by contingent revenues, if any. For transactions that only include software and software-related elements, the Company continues to account for such arrangements under the software revenue recognition standards which require it to establish VSOE of fair value to allocate arrangement consideration to multiple deliverables.

For multiple-element arrangements that contain software and nonsoftware elements such as its subscription services, the Company allocates revenue between the software and software related elements as a group and any nonsoftware elements based on a relative fair value allocation. The Company determines fair value for each deliverable using the selling price hierarchy described above and utilizing VSOE of fair value if it exists.

The Company applies the residual method to recognize revenue for the delivered elements in stand-alone software transactions. Under the residual method, the amount of revenue allocated to delivered elements equals the total arrangement consideration, less the aggregate fair value of any undelivered elements, typically maintenance, provided that VSOE of fair value exists for all undelivered elements. VSOE of fair value is based on the price charged when the element is sold separately or, in the case of maintenance, substantive renewal rates for maintenance.

F-13

Table of Contents

Revenue that has been recognized, but for which the Company has not invoiced the customer, is recorded as unbilled receivables. Invoices that have been issued before revenue has been recognized are recorded as deferred revenue in the accompanying consolidated balance sheets.

Foreign currency

The Company has contracts denominated in foreign currencies and therefore a portion of the Company's revenue is subject to foreign currency risks. Gains and losses from foreign currency transactions, such as those resulting from the settlement of receivables, are classified in other expense, net included in the accompanying Consolidated Statements of Comprehensive Income (Loss).

The functional currency of PROS France SAS ("PROS France") is the Euro. The financial statements of this subsidiary are translated into U.S. dollars using period-end rates of exchange for assets and liabilities, historical rates of exchange for equity, and average rates of exchange for the period for revenue and expenses. Translation gains (losses) are recorded in accumulated other comprehensive income (loss) as a component of stockholders' equity.

Noncash share-based compensation

The Company has three noncash share-based compensation plans, the 1999 Equity Incentive Plan ("1999 Stock Plan"), the 2007 Equity Incentive Plan ("2007 Stock Plan") and the 2017 Equity Incentive Plan ("2017 Stock Plan"), which authorize the discretionary granting of various types of stock awards to key employees, officers, directors and consultants. The 1999 Stock Plan was terminated in March 2007 for purposes of granting any future equity awards. The 2007 Stock Plan was adopted in March 2007 and expired in March 2017 for purposes of granting any future equity awards. The 2017 Stock Plan was adopted in May 2017. The Company may provide noncash share-based compensation through the grant of: (i) restricted stock awards; (ii) restricted stock unit awards - time, performance and market-based ("RSUs"); (iii) stock options; (iv) stock appreciation rights ("SARs"); (v) phantom stock; and (vi) performance awards, such as market stock units ("MSUs"). Also in February 2014, the Company granted inducement awards in an aggregate amount of up to 308,250 shares in accordance with NYSE Rule 303A.08. These inducement awards were in the form of RSUs and MSUs granted to the Company's former Chief Operating Officer and RSUs granted to certain new employees in connection with the acquisitions of PROS France and SignalDemand Inc.

To date, the Company has granted stock options, stock appreciation rights, restricted stock units, time-based, performance-based and market-based, and market stock units. The Company issues common stock from its pool of authorized stock upon exercise of stock options, settlement of stock appreciation rights and market stock units or upon vesting of restricted stock units.

The following table presents the number of awards outstanding for each award type as of December 31, 2017 and 2016 (in thousands):

| Award type | Year Ended December 31, | |
|---------------------------------------|-------------------------|-------|
| | 2017 | 2016 |
| Stock options | 135 | 734 |
| Restricted stock units (time-based) | 2,133 | 2,237 |
| Restricted stock units (market-based) | 345 | 460 |
| Stock appreciation rights | 356 | 515 |
| Market stock units | 387 | 342 |

Stock options. The Company did not grant stock options during 2017 and 2016. The fair value of each stock option was estimated on the date of grant using the Black-Scholes option pricing model.

Restricted stock units. The fair value of the RSUs (time-based and performance-based) is based on the closing price of the Company's stock on the date of grant and is amortized over the vesting period. RSUs include (i) time-based awards, (ii) performance-based awards in which the number of shares that vest are based upon satisfying certain conditions from binding customer agreements for the provision of configure, price, and quote ("CPQ") solutions, and (iii) market-based awards in which the number of shares that vest are based upon attainment of target average per share closing price over a requisite trading period. Market-based RSUs vest if the average trailing closing price of the

Company's Common Stock meets certain minimum performance hurdles for at least 105 calendar days prior to September 9, 2020, with 25% vesting at \$27, an additional 25% vesting at \$33, and the remaining 50% vesting at \$41. The Company estimates the fair value and the derived service period of the market-based RSUs on the date of grant using a Monte Carlo simulation model. The model requires the use of a number of assumptions including the expected volatility of the Company's stock, its risk-free interest rate and expected dividends. The Company's expected volatility at the date of grant is based on the historical volatility of the Company over the performance period.

F-14

Table of Contents

Stock appreciation rights. SARs will be settled in stock at the time of exercise and vest over four years from the date of grant. The Company used the Black-Scholes option pricing model to estimate the fair value of its SARs. The determination of the fair value of SARs utilizing the Black-Scholes model is affected by the Company's stock price and a number of assumptions, including expected volatility, expected life, deliver risk-free interest rate and expected dividends. The Company estimates the expected volatility of common stock at the date of grant based on a combination of its historical volatility and the average volatility of comparable companies. The expected life of the SARs noncash share-based payment awards is a historical weighted average of the expected lives of similar securities of comparable public companies. The risk-free interest rate assumption is based on observed interest rates appropriate for the terms of the Company's awards. The dividend yield assumption is based on the Company's expectation of paying no dividends.

Market stock units. MSUs are performance-based awards that vest based upon the Company's relative shareholder return. The actual number of MSUs that will be eligible to vest is based on the total shareholder return of the Company relative to the total shareholder return of the Russell 2000 Index ("Index") over a three year period ending December 31, 2016, December 31, 2017, March 2, 2018, February 28, 2019, February 28, 2020 and October 9, 2020 ("Performance Period"), respectively. The MSUs vest on January 1, 2017, January 1, 2018, March 3, 2018, March 1, 2019, March 1, 2020, and October 9, 2020, respectively. The maximum number of shares issuable upon vesting is 200% of the MSUs initially granted based on the average price of the Company's common stock relative to the Index during the Performance Period. The Company estimates the fair value of MSUs on the date of grant using a Monte Carlo simulation model. The determination of fair value of the MSUs is affected by the Company's stock price and a number of assumptions including the expected volatility of the Company's stock and the Index, its risk-free interest rate and expected dividends. The Company's expected volatility at the date of grant was based on the historical volatilities of the Company and the Index over the Performance Period.

As the Company issues stock options and SARs, it evaluates the assumptions used to value its stock option awards and SARs. If factors change and the Company employs different assumptions, noncash share-based compensation expense may differ significantly from what has been recorded in the past. If there are any modifications or cancellations of the underlying unvested securities, the Company may be required to accelerate, increase or cancel any remaining unearned noncash share-based compensation expense. Future noncash share-based compensation expense and unearned noncash share-based compensation will increase to the extent that the Company grants additional equity awards to employees.

At December 31, 2017, there were an estimated \$31.4 million of total unrecognized compensation costs related to noncash share-based compensation arrangements. These costs will be recognized over a weighted average period of 2.3 years. For further discussion of the Company's noncash share-based compensation plans, see Note 10 to the Consolidated Financial Statements.

Product warranties

For software-as-a-service application subscriptions, the Company generally issues a product warranty for the subscription term, depending on the contract. For on-premise software licenses, the Company generally issues a product warranty for 90 days following the first use of the software in a production environment, depending on the contract. In the Company's experience, warranty costs have been insignificant.

Income taxes

The Company uses the asset and liability method to account for income taxes, including recognition of deferred tax assets and liabilities for the anticipated future tax consequences attributable to differences between financial statement amounts and their respective tax basis. The Company reviews its deferred tax assets for recovery. A valuation allowance is established when the Company believes that it is more-likely than not that some portion of its deferred tax assets will not be realized. Changes in the valuation allowance from period to period are included in the Company's tax provision in the period of change.

The Company accounts for uncertain income tax positions recognized in an enterprise's financial statements in accordance with the income tax topic of the ASC issued by the FASB. This interpretation requires companies to use a prescribed model for assessing the financial recognition and measurement of all tax positions taken or expected to be taken in its tax returns. This guidance provides clarification on recognition, classification, interest and penalties, accounting in interim periods, disclosures and transition. The Company recognized accrued interest and penalties related to income taxes as a component of income tax expense. For additional information regarding the Company's income taxes, see Note 11 to the Consolidated Financial Statements.

Segment reporting

The Company reports as one operating segment with the Chief Executive Officer ("CEO") acting as the Company's chief operating decision maker. The Company's CEO reviews financial information presented on a consolidated basis for purposes of allocating resources and evaluating financial performance. The Company has a single reporting unit, and there are no segment managers who are held accountable for operations, operating results or components below the consolidated unit level.

F-15

Table of Contents

Earnings per share

The Company computes basic earnings (loss) per share by dividing net income (loss) attributable to common stockholders by the weighted average number of common shares outstanding. Diluted earnings (loss) per share is computed by dividing net income (loss) attributable to common stockholders by the weighted average number of common shares and dilutive potential common shares then outstanding. Diluted earnings per share reflect the assumed conversion of all dilutive securities, using the treasury stock method. Dilutive potential common shares consist of shares issuable upon the exercise of stock options, shares of unvested restricted stock units, and settlement of stock appreciation rights. When the Company incurs a net loss, the effect of the Company's outstanding stock options, stock appreciation rights, restricted stock units and market stock units are not included in the calculation of diluted earnings (loss) per share as the effect would be anti-dilutive. Accordingly, basic and diluted net loss per share are identical.

Recently adopted accounting pronouncements

In March 2016, the FASB issued ASU 2016-09, "Compensation – Stock Compensation (Topic 718): Improvements to Employee Share-Based Payment Accounting" which is intended to simplify several aspects of the accounting for share-based payment transactions including the income tax consequences, classification of awards as either equity or liabilities, and classification on the statement of cash flows. This standard is effective for interim and annual reporting periods beginning after December 15, 2016. The Company adopted this standard on January 1, 2017. Upon adoption, the Company recognized the previously unrecognized excess tax benefits using the modified retrospective transition method, which resulted in a cumulative-effect adjustment of \$4.2 million to accumulated deficit. The previously unrecognized excess tax effects were recorded as a deferred tax asset, which was fully offset by a valuation allowance and as such the cumulative adjustment had no net impact on the Company's financial statements. As required by ASU 2016-09, excess tax benefits recognized on stock-based compensation expense are reflected in the condensed consolidated statements of operations as a component of the provision for income taxes on a prospective basis. In addition, ASU 2016-09 allows companies to account for forfeitures as they occur or estimate expected forfeitures over the course of a vesting period; the Company has elected to continue to estimate forfeitures expected to occur to determine the amount of compensation cost to be recognized each period.

Recent accounting pronouncements

In May 2014, the FASB issued Accounting Standards Update No. 2014-09, "Revenue from Contracts with Customers (Topic 606)" ("ASU 2014-09"), which amended the existing FASB Accounting Standards Codification, replaces existing revenue recognition guidance with a comprehensive revenue measurement and recognition standard and expanded disclosure requirements. The standard also provides guidance on the recognition of costs related to obtaining customer contracts. ASU 2014-09, as amended, will be effective in the first quarter of 2018, including interim periods within that reporting period. The Company has evaluated the transition methods and elected to use the modified retrospective method and will adopt this standard beginning January 1, 2018, by recognizing the cumulative effect of initially applying the new standard as an adjustment to the opening balance of accumulated deficit.

The Company believes that the new standard will impact the following policies and disclosures:

- removal of the current limitation on contingent revenue will result in revenue being recognized earlier for certain contracts;
- allocation of subscription and professional services revenue;
- required disclosures including remaining revenue from remaining performance obligations and when the Company expects to recognize revenue; and
- accounting for deferred costs of obtaining a contract with a customer that qualify for deferral and the amortization period.

In the fourth quarter of fiscal 2017, the Company finalized its assessment of the new standard, including completing its contract reviews and its evaluation of the incremental costs of obtaining a contract and related disclosures. The most significant impact relates to its accounting for arrangements that include term-based software licenses bundled with maintenance and support, the deferral of incremental costs of obtaining a contract with a customer, including the period of amortization of such costs, and additional disclosures. Under Topic 605, the revenue attributable to term-based software licenses is recognized ratably over the term of the arrangement, as VSOE does not exist for the undelivered maintenance and support element as it is not sold separately. The requirement to have VSOE for undelivered elements to enable the separation of revenue for the delivered software licenses is eliminated under the new standard. Accordingly, under the new standard, the Company will be required to recognize as revenue a portion of the arrangement fee upon delivery of the software license. The Company expects the adjustment to the opening balance sheet of the accumulated deficit for all revenue related items to be a decrease of approximately \$2.5 million.

F-16

Table of Contents

The costs to obtain a contract accounting under the new standard is significantly different than the Company's current capitalization policy, as it will require the Company to capitalize additional costs and amortize them over a longer period of time. Under Topic 605, the Company deferred only direct and incremental commission costs to obtain a revenue contract and amortized those costs on a straight-line basis over the term of the related contract. Under the new standard, the concept of what must be capitalized is significantly broader since a direct relationship with a revenue contract is not required. Accordingly, the new standard will result in additional types of costs being capitalized. Additionally, all amounts capitalized will be amortized over the expected period of customer benefit, which is longer than the Company's current policy of amortizing the deferred amounts over the term of the related contract, which are typically 24 to 60 months. The Company expects the adjustment to the opening balance sheet of the accumulated deficit for costs to obtain a contract to be a decrease of approximately \$7.0 million.

The Company does not expect the adoption of ASU 2014-09 to have any impact on its cash flows from operating activities.

In February 2016, the FASB issued ASU 2016-02, "Leases (Topic 842)" which requires the lessee to recognize most leases on the balance sheet thereby resulting in the recognition of lease assets and liabilities for those leases currently classified as operating leases. Lessor accounting remains largely unchanged from current guidance, however, ASU 2016-02 provides improvements that are intended to align lessor accounting with the lessee model and with updated revenue recognition guidance. This standard is effective for interim and annual reporting periods beginning after December 15, 2018. The Company is currently assessing the impact of ASU 2016-02 on its condensed consolidated financial statements.

In August 2016, the FASB issued ASU 2016-15, "Statement of Cash Flows (Topic 230): Classification of Certain Cash Receipts and Cash Payments" which is intended to reduce the diversity in practice on classification of certain transactions in the statement of cash flows. This standard is effective for interim and annual reporting periods beginning after December 15, 2017; early adoption is permitted. The Company is currently assessing the impact of ASU 2016-15 on its condensed consolidated financial statements.

In January 2017, the FASB issued ASU 2017-04, "Intangibles - Goodwill and Other (Topic 350): Simplifying the Test for Goodwill Impairment", which eliminates step two from the goodwill impairment test. Under the amendments in this standard, an entity should recognize an impairment charge for the amount by which the carrying amount of a reporting unit exceeds its fair value; however, the loss recognized should not exceed the total amount of goodwill allocated to that reporting unit. The standard is effective for interim and annual reporting periods beginning after December 15, 2019; earlier adoption is permitted for goodwill impairment tests performed on testing dates after January 1, 2017. The Company is currently assessing the impact of ASU 2017-04 on its condensed consolidated financial statements.

With the exception of the new standards discussed above, there have been no other recent accounting pronouncements or changes in accounting pronouncements during the year ended December 31, 2017, that are of significance or potential significance to the Company.

3. Business Combination

On August 3, 2017, the Company acquired 100% of the issued and outstanding stock of Vayant Travel Technologies, Inc. ("Vayant"), a privately held company based in Sofia, Bulgaria, for total cash consideration, net of cash acquired, of approximately \$34.1 million. Vayant is a cloud software company that provides advanced shopping, merchandising and inspirational travel solutions. The acquisition of Vayant strengthens the Company's modern commerce solutions for the travel industry and positions it to deliver greater value to its travel customers through an end-to-end offer optimization solution designed to help travel companies deliver personalized offers and expanded choices that drive loyalty and growth.

Since the acquisition date, the Company has included \$3.3 million of revenue and \$1.8 million of net loss related to Vayant in its consolidated income statement. During the year ended December 31, 2017, the Company incurred acquisition-related costs of \$0.7 million consisting primarily of advisory, legal fees, and retention of key employees. All of the assets acquired and the liabilities assumed in the transaction have been recognized at their acquisition date fair values at August 3, 2017.

The preliminary allocation of the total purchase price for Vayant is as follows (in thousands):

F-17

Table of Contents

| | | | |
|--|--------|--------|---|
| Cash | \$ | 1,822 | |
| Other current assets | | 1,235 | |
| Noncurrent assets | | 86 | |
| Intangibles | | 18,600 | |
| Goodwill | | 17,052 | |
| Accounts payable and accrued liabilities | (1,668 | |) |
| Deferred revenue | (600 | |) |
| Deferred tax liability | (526 | |) |
| Noncurrent liabilities | (49 | |) |
| Net assets acquired | \$ | 35,952 | |

The following are the identifiable intangible assets acquired (in thousands) and their respective useful lives:

| | Amount | Useful Life |
|------------------------|----------|-------------|
| | (years) | |
| Developed technology | \$11,600 | 7 |
| Customer relationships | 7,000 | 5 |
| Total | \$18,600 | |

In performing the preliminary purchase price allocation, the Company considered, among other factors, its anticipated future use of the acquired assets, analysis of historical financial performance, and estimates of future cash flows from Vayant's products and services. The allocation resulted in acquired intangible assets of \$18.6 million. The acquired intangible assets consisted of developed technology and customer relationships and were valued using the income approach in which the after-tax cash flows are discounted to present value. The cash flows are based on estimates used to price the transaction, and the discount rates applied were benchmarked with reference to the implied rate of return from the transaction model as well as the weighted average cost of capital. Additionally, the Company assumed certain liabilities in the acquisition, including deferred revenue to which a fair value of \$0.6 million was ascribed using a cost-plus profit approach.

The Company has made a preliminary determination that \$0.5 million of net deferred tax liabilities were assumed on the acquisition date. The deferred tax liability is comprised of the value of intangible assets partially offset by a deferred tax asset related to net operating losses.

The excess of the purchase price over the estimated amounts of net assets as of the effective date of the acquisition was allocated to goodwill. The factors contributing to the recognition of the amount of goodwill are based on several strategic and synergistic benefits that are expected to be realized from the Vayant acquisition. These benefits include the expectation that the combined company's complementary products will strengthen the Company's modern commerce solutions for the travel industry.

The Company believes the combined company will benefit from a broader global presence and, with the Company's direct sales force and larger channel coverage, significant cross-selling opportunities. None of the goodwill is expected to be currently deductible for tax purposes. In accordance with applicable accounting standards, goodwill will not be amortized but instead will be tested for impairment at least annually, or more frequently if certain indicators are present. In the event that the management of the combined company determines that the value of

goodwill has become impaired, the combined company will incur a charge for the amount of the impairment during the fiscal quarter in which the impairment occurs.

Pro Forma Financial Information

The unaudited financial information in the table below summarizes the combined results of operations of the Company and Vayant, on a pro forma basis, as though the Company had acquired Vayant on January 1, 2016. The pro forma information for all periods presented also includes the effect of business combination accounting resulting from the acquisition, including amortization charges from acquired intangible assets.

F-18

Table of Contents

| (in thousands, except earnings per share) | Year Ended | |
|---|--------------|-----------|
| | December 31, | |
| | 2017 | 2016 |
| Total revenue | \$173,866 | \$160,696 |
| Net loss | (81,476) | (81,652) |
| Earnings per share - basic and diluted | \$(2.58) | \$(2.69) |

4. Goodwill and Intangible Assets

The change in the carrying amount of goodwill for the years ended December 31, 2017 and 2016, was as follows (in thousands):

| | |
|--|----------|
| Balance as of December 31, 2015 | \$20,445 |
| Foreign currency translation adjustments | (349) |
| Balance as of December 31, 2016 | 20,096 |
| Goodwill acquired | 17,052 |
| Foreign currency translation adjustments | 1,310 |
| Balance as of December 31, 2017 | \$38,458 |

The goodwill balance related to PROS France is denominated in Euro and the goodwill balance related to Vayant is denominated in the U.S. dollar.

Intangible assets consisted of the following as of December 31, (in thousands):

| | Weighted average useful life (years) | December 31, 2017 | | |
|---------------------------|--------------------------------------|-----------------------|---------------------------|---------------------|
| | | Gross Carrying Amount | Accumulated Amortization* | Net Carrying Amount |
| Developed technology | 7 | \$26,023 | \$ 9,560 | \$ 16,463 |
| Maintenance relationships | 8 | 3,565 | 2,207 | 1,358 |
| Customer relationships | 6 | 11,840 | 4,482 | 7,358 |
| Acquired technology | 3 | 1,750 | — | 1,750 |
| Total | | \$43,178 | \$ 16,249 | \$ 26,929 |

*Cumulative foreign currency translation adjustments, reflecting movement in the currencies of the underlying entities, increased total intangible assets by approximately \$0.7 million as of December 31, 2017.

| | Weighted average useful life (years) | December 31, 2016 | | |
|---------------------------|--------------------------------------|-----------------------|---------------------------|---------------------|
| | | Gross Carrying Amount | Accumulated Amortization* | Net Carrying Amount |
| Developed technology | 7 | \$13,223 | \$ 5,671 | \$ 7,552 |
| Maintenance relationships | 8 | 3,346 | 1,755 | 1,591 |
| Customer relationships | 7 | 4,736 | 2,854 | 1,882 |
| Acquired technology | 4 | 1,625 | — | 1,625 |
| Total | | \$22,930 | \$ 10,280 | \$ 12,650 |

*Cumulative foreign currency translation adjustments, reflecting movement in the currencies of the underlying entities, decreased total intangible assets by approximately \$0.2 million as of December 31, 2016.

Customer relationships are amortized over a period ranging from five to eight years.

In the third quarter of 2015, the Company determined that the original strategy for the trade name of 'Cameleon Software SA' had changed which caused a change in estimate related to the useful life of the asset and the amortization related to this intangible asset was accelerated and fully recognized at that time.

F-19

Table of Contents

In December 2016, the Company purchased a technology-based intangible asset in connection with the equity securities investment made during the same period. The Company estimates that the intangible will be amortized approximately over a 3 year period. During the second half of 2017, the Company purchased an additional technology-based intangible asset which is expected to be amortized over a 3 year period.

Intangible asset amortization expense for the years ended December 31, 2017, 2016 and 2015 was \$5.2 million, \$3.0 million and \$4.8 million, respectively. As of December 31, 2017, the expected future amortization expense for the acquired intangible assets for each of the five succeeding years and thereafter was as follows (in thousands):

| Year Ending December 31, | Amount |
|----------------------------|----------|
| 2018 | \$7,790 |
| 2019 | 6,408 |
| 2020 | 5,735 |
| 2021 | 3,030 |
| 2022 | 1,921 |
| 2023 and thereafter | 2,045 |
| Total amortization expense | \$26,929 |

5. Accounts receivable and contracts in progress

Accounts receivable at December 31, 2017 and 2016, consists of the following (in thousands):

| | December 31, | |
|---------------------------------------|--------------|----------|
| | 2017 | 2016 |
| Accounts receivable | \$30,689 | \$31,722 |
| Unbilled receivables | 2,555 | 2,323 |
| Total receivables | 33,244 | 34,045 |
| Less: Allowance for doubtful accounts | (760) | (760) |
| Accounts receivable, net | \$32,484 | \$33,285 |

The bad debt expense reflected in general and administrative expenses in the accompanying Consolidated Statements of Comprehensive Income for the years ended December 31, 2017, 2016 and 2015, totaled approximately zero, \$0.2 million and \$(0.3) million, respectively.

Activity related to contracts in progress at December 31, 2017 and 2016, is summarized as follows (in thousands):

| | December 31, | |
|---|--------------|-------------|
| | 2017 | 2016 |
| Costs and estimated earnings recognized to date | \$612,565 | \$470,239 |
| Progress billings to date | (705,205) | (547,654) |
| Total | \$(92,640) | \$(77,415) |

The foregoing table reflects the aggregate invoiced amount of all contracts in progress and maintenance as of the respective dates, including amounts that have already been collected.

These amounts are included in the accompanying Consolidated Balance Sheets at December 31, 2017 and 2016, as follows (in thousands):

| | December 31, | |
|----------------------|--------------|-------------|
| | 2017 | 2016 |
| Unbilled receivables | \$2,555 | \$2,323 |
| Deferred revenue | (95,195) | (79,738) |
| Total | \$(92,640) | \$(77,415) |

Table of Contents

At December 31, 2017 and 2016, the Company had approximately \$22.3 million and \$25.1 million, respectively, in deferred maintenance and support revenue, and \$57.9 million and \$36.6 million, respectively, in deferred subscription revenue both of which are reflected above within deferred revenue and progress billing.

6. Earnings per share

The following table sets forth the computation of basic and diluted earnings per share:

| | For the Year Ended December 31, | | |
|--|------------------------------------|------------|------------|
| | 2017 | 2016 | 2015 |
| Numerator: | | | |
| Net loss | \$(77,926) | \$(75,225) | \$(65,811) |
| Denominator: | | | |
| Weighted average shares (basic) | 31,627 | 30,395 | 29,578 |
| Dilutive effect of stock options, restricted stock units and stock appreciation rights | — | — | — |
| Weighted average shares (diluted) | 31,627 | 30,395 | 29,578 |
| Basic earnings per share | \$(2.46) | \$(2.47) | \$(2.23) |
| Diluted earnings per share | \$(2.46) | \$(2.47) | \$(2.23) |

Dilutive potential common shares consist of shares issuable upon the exercise of stock options, settlement of SARs, and the vesting of RSUs and MSUs. Potential common shares determined to be antidilutive and excluded from diluted weighted average shares outstanding were approximately 2.0 million, 1.8 million and 2.2 million for the years ended December 31, 2017, 2016 and 2015, respectively.

Since the Company has the intention and ability to settle the principal amount of its Notes (see Note 12) in cash, the treasury stock method is expected to be used for calculating any potential dilutive effect of the conversion spread on diluted net income per share, if applicable. The conversion spread will have a dilutive impact on diluted net income per share of common stock when the average market price of common stock for a given period exceeds the conversion price of \$33.79 and \$48.63 per share, for the 2019 Notes and 2047 Notes, respectively.

7. Property and equipment, net

Property and equipment, net as of December 31, 2017 and 2016 consists of the following:

| | Estimated useful life | December 31, | |
|---|---|--------------|-----------|
| | | 2017 | 2016 |
| Furniture and fixtures | 5-10 years | \$2,958 | \$2,934 |
| Computers and equipment | 3-5 years | 18,950 | 20,321 |
| Software | 3-6 years | 5,430 | 5,907 |
| Capitalized internal-use software development costs | 3 years | 4,102 | 1,078 |
| Leasehold improvements | Shorter of lease term or useful life | 5,650 | 5,601 |
| Construction in progress | | 19 | 98 |
| Property and equipment, gross | | 37,109 | 35,939 |
| Less: Accumulated depreciation and amortization | | (23,102) | (20,701) |
| Property and equipment, net | | \$14,007 | \$15,238 |

Depreciation and amortization was approximately \$5.4 million, \$6.4 million and \$5.5 million for the years ended December 31, 2017, 2016 and 2015, respectively. During the years ended December 31, 2017, 2016 and 2015, the Company disposed of approximately \$1.8 million, \$2.3 million and \$4.4 million, respectively, of fully depreciated assets. During the years ended December 31, 2017 and 2016, the Company recognized immaterial amounts of loss on disposal of certain non-fully depreciated assets, respectively. During the year ended December 31, 2015, the Company recognized \$0.2 million of loss on disposal of assets. As of December 31, 2017 and 2016, the Company had approximately \$11.1 million and \$9.3 million, respectively, of fully depreciated assets in use.

Table of Contents

During the years ended December 31, 2017 and 2016, the Company capitalized internal-use software development costs of approximately \$3.0 million and \$1.1 million, respectively, related to its subscription solutions. As of December 31, 2017 and 2016, \$1.0 million and zero, respectively, capitalized internal-use software development costs were subject to amortization and \$0.1 million and zero capitalized internal-use software development costs was included in accumulated depreciation and amortization for the years ended December 31, 2017 and 2016.

No impairment was recorded for the years ended December 31, 2017 and 2016. During the year ended December 31, 2015, the Company recorded \$2.9 million of impairment charges related to internally developed software. The impairment was triggered by a change in product strategy which resulted in a reduction in projected cash flows.

8. Fair value measurements

The Company adopted fair value measurements guidance for financial and nonfinancial assets and liabilities. The guidance defines fair value, establishes a framework for measuring fair value in GAAP and expands disclosures about fair value measurements.

The guidance defines fair value as the price that would be received to sell an asset, or paid to transfer a liability, in an orderly transaction between market participants. The guidance establishes a fair value hierarchy for valuation inputs that gives the highest priority to quoted prices in active markets for identical assets or liabilities and the lowest priority to unobservable inputs. The fair value hierarchy is as follows:

Level 1: Unadjusted quoted prices in active markets that are accessible at the measurement date for identical, unrestricted assets or liabilities;

Level 2: Quoted prices for similar assets or liabilities in markets that are not active or inputs which are observable, either directly or indirectly, for substantially the full term of the asset or liability; and

Level 3: Prices or valuation techniques that require inputs that are both significant to the fair value measurement and unobservable (i.e., supported by little or no market activity).

A portion of the Company's existing cash and cash equivalents are invested in short-term interest bearing obligations with original maturities less than 90 days, principally various types of money market funds. In addition, the Company had short-term investments consisting of commercial papers and certificate of deposit. The Company does not enter into investments for trading or speculative purposes.

At December 31, 2017 and 2016, the Company had approximately \$131.4 million and \$106.3 million invested in treasury money market funds. The fair value of the treasury money market funds is determined based on quoted market prices, which represents level 1 in the fair value hierarchy as defined by Accounting Standard Codification ("ASC") 820, "Fair Value Measurement and Disclosure."

The Company's short-term investments that are measured at fair value are comprised of zero and \$10.0 million invested in available-for-sale commercial paper as of December 31, 2017 and 2016, respectively, and zero and \$6.0 million invested in certificate of deposit at December 31, 2017 and 2016, respectively. The fair value of these accounts is determined based on quoted market prices for similar assets in active markets, which represents level 2 in the fair value hierarchy. The Company's diversified money market funds, treasury money market funds and short-term investments have a fair value that is not materially different from its carrying amount. The Company recorded an immaterial amount of unrealized gain related to the short-term investments for the years ended December 31, 2017 and 2016. Reclassification adjustments for realized gain (loss) on available-for-sale securities in net income were immaterial for the years ended December 31, 2017 and 2016.

The fair value of the Company's Notes is classified in the level 2 hierarchy. See Note 12 for further detail regarding the Notes.

In December 2016, the Company purchased \$2.0 million equity securities in a privately held company. This investment is accounted for under the cost method and the Company measures it at fair value on a nonrecurring basis when it is deemed to be other-than-temporarily impaired. The Company estimates fair value of its cost method investment considering available information such as pricing in recent rounds of financing, current cash positions, earnings and cash flow forecasts, recent operational performance and any other readily available market data, which represents level 3 in the fair value hierarchy. An impairment charge to current earnings is recorded when the cost of the investment exceeds its fair value and this condition is determined to

F-22

Table of Contents

be other-than-temporary. As of December 31, 2017, the Company determined there were no other-than-temporary impairments on its cost method investment.

9. Stockholders' equity

Stock repurchase

On August 25, 2008, the Company's Board of Directors approved a stock repurchase program that authorized the Company to purchase up to \$15.0 million of the Company's outstanding shares of common stock. Under the board-approved repurchase program, share purchases may be made from time to time in the open market or through privately negotiated transactions depending on market conditions, share price, trading volume and other factors, and such purchases, if any, will be made in accordance with applicable insider trading and other securities laws and regulations. These repurchases may be commenced or suspended at any time or from time to time without prior notice.

The Company did not repurchase any shares under this plan for the years ended December 31, 2017 and 2016. The remaining amount available to purchase common stock under this plan was \$10.0 million as of December 31, 2017.

10. Noncash share-based compensation

Employee noncash share-based compensation plans

The Company has three noncash share-based compensation plans; the 1999 Stock Plan, the 2007 Stock Plan and the 2017 Stock Plan. These plans authorize the discretionary granting of various types of stock awards to key employees, officers, directors and consultants. The discretionary issuance of stock awards generally contains vesting provisions ranging from one to four years.

1999 Stock Plan. Under the 1999 Stock Plan, the Company is authorized to grant options to purchase shares of common stock to its employees, directors and consultants at the Company's discretion. The Company's 1999 Stock Plan was terminated in March 2007 for purposes of granting any future equity awards. There were no issued and outstanding stock options to purchase shares of the Company's common stock under the 1999 Stock Plan as of December 31, 2017. All outstanding options were exercised in 2016 and there were no outstanding options remaining as of December 31, 2017.

2007 Stock Plan. The Company's 2007 Stock Plan was adopted in March 2007 and expired in March 2017 for purposes of granting future equity awards. The 2007 Stock Plan had an evergreen provision that allowed for an annual increase equal to the lesser of (i) 3.5% of the Company's outstanding shares, (ii) 900,000 shares, or (iii) any lesser amount determined by the Compensation Committee of the Board of Directors. The Company was authorized to provide these incentives through the grant of: (i) restricted stock awards; (ii) restricted stock unit awards; (iii) stock options; (iv) stock appreciation rights; (v) phantom stock; and (vi) performance awards, such as market stock units. As of December 31, 2017, the Company had outstanding equity awards to acquire 3,244,069 shares of its common stock held by the Company's employees, directors and consultants under the 2007 Stock Plan (assuming MSU performance at 100% of the MSUs initially granted), and inclusive of 134,600 stock options, 2,405,734 RSUs, 356,435 SARs and 347,300 MSUs. As of December 31, 2017, there were no restricted stock awards or phantom stock issued under the 2007 Stock Plan.

In February 2014, the Company granted inducement awards in an aggregate amount of up to 308,250 shares in accordance with NYSE Rule 303A.08. These inducement awards were in the form of RSUs and MSUs granted to the Company's former Chief Operating Officer and RSUs granted to certain new employees in connection with the acquisitions of PROS France and SignalDemand, Inc. As of December 31, 2017, the Company had no outstanding equity inducement awards.

2017 Stock Plan. The Company's 2017 Stock Plan was adopted in May 2017. The purpose of the 2017 Stock Plan is to promote the Company's long-term growth and profitability by making available incentives that will help the Company

attract, retain and reward employees whose contributions are essential to its success. Under the 2017 Stock Plan, the Company's employees, officers, directors and other individuals providing services to the Company or any of its affiliates are eligible to receive awards. The 2017 Stock Plan reserved an aggregate amount of 2,500,000 shares for issuance. The Company may provide these incentives through the grant of: (i) restricted stock awards; (ii) restricted stock unit awards; (iii) stock options; (iv) stock appreciation rights; (v) phantom stock; and (vi) performance awards., such as market stock units.

As of December 31, 2017, the Company had outstanding equity awards to acquire 111,961 shares of its common stock held by the Company's employees, directors and consultants under the 2017 Stock Plan (assuming MSU performance at 100% of the MSUs initially granted), and inclusive of 72,292 RSUs and 39,669 MSUs. As of December 31, 2017, 2,348,370 shares remain

F-23

Table of Contents

available for grant under the 2017 Stock Plan. As of December 31, 2017, there were no options, SARs, restricted stock awards or phantom stock issued under the 2017 Stock Plan.

Noncash share-based compensation expense for all noncash share-based payment awards granted is determined based on the grant-date fair value of the award. The Company recognizes compensation expense, net of estimated forfeitures, which represents noncash share-based awards expected to vest on a straight-line basis over the requisite service period of the award, which is generally the vesting term. Noncash share-based awards typically vest over four years. Stock options are generally granted for a ten-year term. The Company estimates forfeiture rates based on its historical experience for grant years where the majority of the vesting terms have been satisfied. Changes in estimated forfeiture rates are recognized through a cumulative catch-up adjustment in the period of change and thus impact the amount of noncash share-based compensation expense to be recognized in future periods.

Noncash share-based compensation expense is allocated to expense categories on the Consolidated Statements of Comprehensive Income. The following table summarizes noncash share-based compensation expense, net of amounts capitalized, for the years ended December 31, 2017, 2016 and 2015 (in thousands).

| | For the Year Ended | | |
|--|--------------------|----------|----------|
| | December 31, | | |
| | 2017 | 2016 | 2015 |
| Share-based compensation: | | | |
| Cost of revenue | \$1,971 | \$2,267 | \$3,719 |
| Operating expenses: | | | |
| Selling and marketing | 4,348 | 3,824 | 8,536 |
| General and administrative | 11,163 | 9,040 | 10,293 |
| Research and development | 5,314 | 5,335 | 5,316 |
| Total included in operating expenses | 20,825 | 18,199 | 24,145 |
| Total share-based compensation expense | \$22,796 | \$20,466 | \$27,864 |

At December 31, 2017, there was an estimated \$31.4 million of total unrecognized compensation costs related to noncash share-based compensation arrangements. These costs will be recognized over a weighted average period of 2.3 years.

Stock options

The following table summarizes the Company's stock option activity for the year ended December 31, 2017 (number of shares and intrinsic value in thousands):

| | Number of shares under option | Weighted average exercise price | Weighted average remaining contractual term (year) | Aggregate intrinsic value (1) |
|---|--|--|--|-------------------------------------|
| Outstanding, December 31, 2016 | 734 | \$ 12.38 | | |
| Granted | — | — | | |
| Exercised | (592) | 12.41 | | |
| Forfeited | — | — | | |
| Expired | (7) | 7.43 | | |
| Outstanding, December 31, 2017 | 135 | \$ 12.52 | 0.33 | \$ 1,875 |
| Vested and exercisable at December 31, 2017 | 135 | \$ 12.52 | 0.33 | \$ 1,875 |

(1) The aggregate intrinsic value was calculated based on the positive difference between the estimated fair value of the Company's common stock on December 31, 2017 of \$26.45 and the grant date fair value.

For the years ended December 31, 2017 and 2016, respectively, the Company did not grant any stock options. The total intrinsic value of stock options exercised for the years ended December 31, 2017, 2016 and 2015 was \$7.2

million, \$1.0 million and \$1.6 million, respectively.

F-24

Table of Contents

RSUs (time-based)

The Company has granted RSUs under the 2017 Stock Plan, the 2007 Stock Plan and as part of the February 2014 inducement awards grant. Time-based RSUs granted to employees, directors and consultants vest in equal annual installments over a one to four year period from the grant date.

The following table summarizes the Company's unvested time-based RSUs as of December 31, 2017, and changes during the year then ended (number of shares and intrinsic value in thousands):

| | Number of shares | Weighted average grant date fair value | Weighted average remaining contractual term (year) | Aggregate intrinsic value (1) |
|---------------------------------------|------------------|--|--|-------------------------------|
| Unvested at December 31, 2016 | 2,237 | \$ 18.05 | | |
| Granted | 964 | 21.63 | | |
| Vested | (813) | 19.75 | | |
| Forfeited | (255) | 19.07 | | |
| Unvested at December 31, 2017 | 2,133 | \$ 18.90 | 2.15 | \$ 56,419 |
| Expected to vest at December 31, 2017 | 2,073 | \$ 18.92 | 2.14 | \$ 54,836 |

(1) The aggregate intrinsic value was calculated based on the fair value of the Company's common stock on December 31, 2017 of \$26.45.

The weighted average grant-date fair value of the time and performance-based RSUs granted during the years ended December 31, 2017, 2016 and 2015 was \$21.63, \$11.69 and \$25.29, respectively.

RSUs (market-based)

During 2016, under the 2007 Stock Plan, the Company granted 460,000 RSUs with a market-based vesting condition to certain executive employees. These market-based RSUs will vest if the average trailing closing price of the Company's Common Stock meets certain minimum performance hurdles for at least 105 calendar days prior to September 9, 2020, with 25% vesting at \$27, an additional 25% vesting at \$33, and the remaining 50% vesting at \$41.

The following table summarizes the Company's unvested market-based RSUs as of December 31, 2017, and changes during the year then ended (number of shares and intrinsic value in thousands):

| | Number of shares | Weighted average grant date fair value | Weighted average remaining contractual term (year) | Aggregate intrinsic value (1) |
|---------------------------------------|------------------|--|--|-------------------------------|
| Unvested at December 31, 2016 | 460 | \$ 11.92 | | |
| Granted | — | — | | |
| Vested | (115) | 15.09 | | |
| Forfeited | — | — | | |
| Unvested at December 31, 2017 | 345 | \$ 10.86 | 2.69 | \$ 9,125 |
| Expected to vest at December 31, 2017 | 331 | \$ 10.86 | 2.69 | \$ 8,753 |

(1) The aggregate intrinsic value was calculated based on the fair value of the Company's common stock on December 31, 2017 of \$26.45.

The Company estimates the fair value and the derived service period of the market-based RSUs on the date of grant using a Monte Carlo simulation model. The model requires the use of a number of assumptions including the expected

volatility of the Company's stock, its risk-free interest rate and expected dividends. The Company's expected volatility at the date of grant was based on the historical volatility of the Company over the performance period.

The assumptions used to value the market-based RSUs granted in 2016 were as follows:

F-25

Table of Contents

| | |
|-------------------------|-------------------|
| | December 31, 2016 |
| Volatility | 44.98% |
| Risk-free interest rate | 1.08% |
| Dividend yield | — |

The fair value of the market-based RSUs is expensed over the derived service period for each separate vesting tranche. The derived service period for the vesting tranches of the market-based RSUs ranges between 1.01 and 1.98 years. SARs

The Company has granted SARs under the 2007 Stock Plan. The SARs will be settled in stock at the time of exercise and vest four years from the date of grant subject to the recipient's continued employment with the Company. The number of shares issued upon the exercise of the SARs is calculated as the difference between the share price of the Company's stock on the date of exercise and the date of grant multiplied by the number of SARs divided by the share price on the exercise date.

The following table summarizes the Company's SARs activity for the year ended December 31, 2017 (number of shares and intrinsic value in thousands):

| | Stock appreciation rights | Weighted average exercise price | Weighted average remaining contractual term (year) | Aggregate intrinsic value (1) |
|--|---------------------------------|--|--|-------------------------------------|
| Outstanding, December 31, 2016 | 515 | \$ 10.86 | | |
| Granted | — | — | | |
| Exercised | (159 |) 10.61 | | |
| Forfeited | — | — | | |
| Expired | — | — | | |
| Outstanding, December 31, 2017 | 356 | \$ 10.97 | 2.88 | \$ 5,518 |
| Exercisable at December 31, 2017 | 356 | \$ 10.97 | 2.88 | \$ 5,518 |
| Vested and expected to vest at December 31, 2017 | 356 | \$ 10.97 | 2.88 | \$ 5,518 |

(1) The aggregate intrinsic value was calculated based on the positive difference between the estimated fair value of the Company's common stock on December 31, 2017 of \$26.45 and the exercise price of the underlying SARs. The Company did not grant SARs in 2017, 2016 and 2015.

MSUs

In 2017, 2016 and 2015, the Company granted MSUs to certain executives employees under the 2007 and 2017 Stock Plans. The MSUs are performance-based awards that vest based upon the Company's relative shareholder return. The actual number of MSUs that will be eligible to vest is based on the total shareholder return of the Company relative to the total shareholder return of the Index over the three year Performance Period. The MSUs vest on January 1, 2017, January 1, 2018, March 3, 2018, March 1, 2019, March 1, 2020 and October 9, 2020, respectively. The MSUs maximum number of shares issuable upon vesting is 200% of the MSUs initially granted.

The following table summarizes the Company's MSUs activity for the year ended December 31, 2017 (number of shares and intrinsic value in thousands):

Table of Contents

| | Number of unvested awards | Weighted average grant date fair value | Weighted average remaining contractual term (year) | Aggregate intrinsic value (1) |
|-------------------------------|---------------------------------|---|--|-------------------------------------|
| Unvested at December 31, 2016 | 342 | \$ 29.06 | | |
| Granted | 150 | 28.13 | | |
| Exercised | (105) | 48.32 | | |
| Forfeited | — | — | | |
| Expired | — | — | | |
| Unvested at December 31, 2017 | 387 | \$ 23.48 | 1.37 | \$ 10,235 |

(1) The aggregate intrinsic value was calculated based on the positive difference between the estimated fair value of the Company's common stock on December 31, 2017 of \$26.45 and the grant date fair value of the underlying MSUs.

The Company estimates the fair value of MSUs on the date of grant using a Monte Carlo simulation model. The determination of fair value of the MSUs is affected by the Company's stock price and a number of assumptions including the expected volatilities of the Company's stock and the Index, its risk-free interest rate and expected dividends. The Company's expected volatility at the date of grant was based on the historical volatilities of the Company and the Index over the Performance Period. The Company did not estimate a forfeiture rate for the MSUs due to the limited size, the vesting period and nature of the grantee population and the lack of history of granting this type of award.

Significant assumptions used in the Monte Carlo simulation model for MSUs granted during the years ended December 31, 2017, 2016 and 2015 are as follows:

| | For the Year Ended December 31, | | |
|-------------------------------|------------------------------------|--------|--------|
| | 2017 | 2016 | 2015 |
| Volatility | 45.38% | 44.06% | 42.06% |
| Risk-free interest rate | 1.56% | 1.04% | 0.89% |
| Expected option life in years | 3.07 | 2.93 | 2.95 |
| Dividend yield | — | — | — |

The assumptions related to fiscal years 2017 and 2015 are presented on weighted average basis for the various awards granted throughout the period.

Employee stock purchase plan

In June 2013, the Board of Directors authorized an Employee Stock Purchase Plan ("ESPP") which provides for eligible employees to purchase shares on an after-tax basis in an amount between 1% and 10% of their annual pay: (i) on June 30 of each year at a 5% discount of the fair market value of the Company's common stock on January 1 or June 30, whichever is lower, and (ii) on December 31 of each year at a 5% discount of the fair market value of the Company's common stock on July 1 or December 31, whichever is lower. An employee may not purchase more than \$5,000 in either of the six-month measurement periods described above or more than \$10,000 annually. In November 2015, the Board of Directors amended the ESPP plan to increase the discount to 15% of the fair market value of the Company's common stock effective January 1, 2016. The amendment did not change the accounting treatment of the ESPP plan. During the year ended December 31, 2017, the Company issued 92,209 shares under the ESPP. As of December 31, 2017, 291,101 shares remain authorized and available for issuance under the ESPP. As of December 31, 2017, the Company held approximately \$0.8 million on behalf of employees for future purchases under the ESPP and this amount was recorded in accrued liabilities in the Company's Consolidated Balance Sheet.

Table of Contents

11. Income taxes

The income tax provision (benefit) consisted of the following for the years ended December 31, 2017, 2016 and 2015 (in thousands):

| | Year Ended December 31, | | |
|----------------------|----------------------------|-------|--------|
| | 2017 | 2016 | 2015 |
| Current: | | | |
| Federal | \$— | \$19 | \$(51) |
| State and Foreign | 669 | 402 | 621 |
| | 669 | 421 | 570 |
| Deferred: | | | |
| Federal | (488) | 51 | 159 |
| State | (32) | (2) | 10 |
| Income tax provision | \$149 | \$470 | \$739 |

The differences between the effective tax rates reflected in the total provision for income taxes and the U.S. federal statutory rate of 34% for the years ended December 31, 2017, 2016 and 2015, respectively, were as follows (in thousands):

| | Year Ended December 31, | | |
|--|-------------------------|------------|------------|
| | 2017 | 2016 | 2015 |
| Provision at the U.S. federal statutory rate | \$(26,443) | \$(25,338) | \$(22,124) |
| Increase (decrease) resulting from: | | | |
| State income taxes, net of federal taxes | 18 | 3 | 74 |
| Nondeductible expenses | 373 | 457 | 1,195 |
| Acquisition-related expense | 245 | (4) | (4) |
| Statutory to GAAP income adjustment | (77) | (274) | 119 |
| Foreign Tax Expense | — | 2 | 350 |
| Noncash share-based compensation | (3,405) | 604 | 2,201 |
| Incremental benefits for tax credits | (1,711) | (1,663) | (1,947) |
| Change in tax rate/income subject to lower tax rates and other | 2,625 | 49 | (15) |
| Change related to US tax reform | 31,359 | — | — |
| Change in valuation allowance | (2,835) | 26,634 | 20,890 |
| Income tax provision | \$149 | \$470 | \$739 |

The Company's effective tax rate was a provision of 0%, 1% and 1% for the years ended December 31, 2017, 2016 and 2015, respectively. During the year ended December 31, 2017, the Company's effective tax rate was impacted primarily by a valuation allowance, foreign taxes and other nondeductible expenses, partially offset by the R&E credit and the tax law changes under the Tax Cuts and Jobs Act.

On December 22, 2017, the Tax Cuts and Jobs Act was signed into law by the President of the United States and included a broad range of tax reform proposals affecting businesses, including corporate tax rates, business deductions, and international tax provisions. The Tax Cuts and Jobs Act reduced the United States corporate income tax rate to 21% effective January 1, 2018. The Company has remeasured the deferred tax assets as of December 31, 2017 to reflect the tax rate reduction and this resulted in a deferred tax expense of \$31.4 million. The tax expense is offset by a release of valuation allowance of \$31.4 million resulting in no expense for the year ended December 31, 2017.

The Tax Cuts and Jobs Act imposes a repatriation tax on any accumulated offshore earnings and profit. As of December 31, 2017, the Company has reviewed the offshore earnings and profits and has no additional earnings to repatriate and has provided for no tax. The Company continues to review the changes surrounding the deductibility of

business expenses and stock compensation for executives as more guidance is issued.

Although PROS has included what it believes to be a reasonable estimate of the impact of the income tax effects of the Act on the Company's consolidated financial statements as of December 31, 2017, it should be considered provisional. As the

F-28

Table of Contents

Company finalizes certain tax positions and reviews additional guidance available on tax reform, it will be able to conclude whether any further adjustments to current and deferred tax, current tax payable and receivable, and deferred income tax balances are required to the net deferred tax assets as well as to a liability related to the one-time repatriation tax. Any adjustments to these provisional amounts will be reported as a component of income tax expense in the reporting period in which the adjustments are determined, which will occur no later than the fourth quarter of 2018.

The tax effects of temporary differences and other tax attributes that give rise to significant portions of the deferred tax assets and liabilities as of December 31, 2017 and 2016 are as follows (in thousands):

| | Year Ended | |
|---|--------------|-----------|
| | December 31, | |
| | 2017 | 2016 |
| Noncurrent deferred taxes: | | |
| Property and equipment | \$(847) | \$(2,114) |
| Noncash share based compensation | 6,373 | 8,053 |
| State deferred | — | 242 |
| Capitalized software | (1,397) | (1,591) |
| Amortization | (5,096) | (2,187) |
| R&E tax credit carryforwards | 9,340 | 6,852 |
| Deferred revenue | 2,996 | 2,673 |
| Federal Net Operating Losses ("NOLs") | 46,907 | 40,671 |
| State NOLs | 1,050 | 1,517 |
| State Credits | 1,613 | 1,348 |
| Foreign NOLs | 9,057 | 10,663 |
| Foreign tax credit carryforward | 2,521 | 1,795 |
| Other | 1,425 | 1,317 |
| Total noncurrent deferred tax assets | 73,942 | 68,831 |
| Less: valuation allowance | (74,153) | (69,049) |
| Total noncurrent deferred tax liability | (211) | (218) |
| Total net deferred tax liability | \$(211) | \$(218) |

The net deferred tax liability is classified as other noncurrent liabilities in the accompanying Consolidated Balance Sheets.

The Company has federal and state net operating loss carryforwards related to past acquisitions and current year losses. Internal Revenue Code Section 382 ("Section 382") places certain limitations on the annual amount of U.S. net operating loss carryforwards that can be utilized when a change of ownership occurs. The Company believes the past acquisitions were changes in ownership pursuant to Section 382, subjecting federal acquired net operating losses to limitations. According to French law the net operating loss carryforwards are not subject to ownership change limitations.

The federal and foreign net operating loss and R&E tax credit carryforward amount available to be used in future periods, taking into account the 382 annual limitation and current year losses, is approximately \$260.1 million and \$11.0 million, respectively. The Company's net operating losses will begin to expire in 2024, R&E credits will begin to expire in 2031, and foreign tax credits will begin to expire in 2022. Also included in net operating losses are \$36.2 million of French carryforwards which have no expiration.

As of December 31, 2014, the Company determined it was more likely than not that it would be unable to fully utilize the majority of its U.S. and state deferred tax assets. As a result, the Company had recorded a valuation allowance against those assets to the extent that they cannot be realized through net operating loss carrybacks to prior years. This valuation allowance is evaluated periodically and will be reversed partially or in whole if business results and the economic environment have sufficiently improved to support realization of some or all of the Company's deferred tax assets. In performing the analysis throughout 2017, the Company determined that there was no sufficient positive evidence to outweigh the current and historic negative evidence to determine that it was more likely than not that the

deferred assets would not be realized. Therefore, the Company continues to have a valuation allowance against net deferred tax assets as of December 31, 2017 and 2016.

Undistributed earnings of the Company's foreign subsidiaries are considered permanently reinvested and, accordingly, no provision for U.S. federal or state income taxes has been provided thereon. The cumulative amount of undistributed earnings of the Company's non-U.S. subsidiaries was immaterial for the years ended December 31, 2017 and 2016. The determination of

F-29

Table of Contents

the related deferred tax liability, which requires complex analysis of international tax situations related to repatriation, is not practical at this time. The Company is presently investing in international operations located in Europe, North America, and Australia. The Company is funding the working capital needs of its foreign operations through its U.S. operations. In the future, the Company plans to utilize its foreign undistributed earnings, as well as continued funding from its U.S. operations, to support its continued foreign investment.

For the years ended December 31, 2017, 2016 and 2015, the Company had \$0.2 million, \$0.2 million and \$0.2 million, respectively, of net unrecognized tax benefits which, if recognized, would impact the Company's effective tax rate. The Company recorded immaterial amounts for interest and penalties as of December 31, 2017, 2016 and 2015, respectively. The Company believes that it is reasonably possible that there will be no change in the unrecognized tax benefits within the next twelve months.

The Company is not aware of any significant income tax examinations in progress at this time. The Company files tax returns in the United States and various state and foreign jurisdictions. The Company is subject to U.S. federal income tax examination for the calendar tax years 2016, 2015 and 2014 and state and foreign income tax examination for various years depending on the statutes of limitation of those jurisdictions.

The following table sets forth the changes to the Company's unrecognized tax benefit for the year ended December 31, 2017, 2016 and 2015 (in thousands):

| | Year Ended | | |
|--|--------------|-------|--------|
| | December 31, | | |
| | 2017 | 2016 | 2015 |
| Beginning balance | \$192 | \$192 | \$395 |
| Changes based on tax positions related to prior year | — | — | 21 |
| Changes due to settlement | (9) | — | (224) |
| Ending balance | \$183 | \$192 | \$192 |

The table above has been updated to reflect gross tax liability, exclusive of interest and penalties and other offsetting amounts.

12. Convertible Senior Notes

The Company issued \$143.8 million principal amount of convertible senior notes in December 2014 (the "2019 Notes") and \$106.3 million principal amount of convertible senior notes in June 2017 (the "2047 Notes" and collectively with the 2019 Notes, the "Notes"). The interest rates for the Notes are fixed at 2.0% per annum. Interest is payable semi-annually in arrears on June 1 and December 1 of each year, commencing on June 1, 2015 for the 2019 Notes, and on December 1, 2017 for the 2047 Notes. The 2019 Notes mature on December 1, 2019, unless redeemed or converted in accordance with their terms prior to such date. The 2047 Notes mature on June 1, 2047, unless repurchased, redeemed or converted in accordance with their terms prior to such date.

Each \$1,000 of principal of the 2019 Notes will initially be convertible into 29.5972 shares of the Company's common stock, which is equivalent to an initial conversion price of approximately \$33.79 per share. Each \$1,000 of principal amount at maturity of the 2047 Notes had an issue price of \$880, and will initially be convertible into 20.5624 shares of the Company's common stock, which is equivalent to an initial conversion price of approximately \$48.63 per share. The initial conversion price for each of the Notes is subject to adjustment upon the occurrence of certain specified events. An amount equal to the difference between the issue price and the principal amount at maturity will accrete to the 2047 Notes in accordance with the schedule set forth in the 2047 Notes. The issue price plus such accreted amount of the 2047 Notes is referred to herein as the "accreted principal amount." On June 1, 2022, the accreted principal amount will accrete to 100% of the principal amount at maturity.

The Notes are each general unsecured obligations and rank senior in right of payment to all of the Company's indebtedness that is expressly subordinated in right of payment to the Notes, rank equally in right of payment with all of the Company's existing and future liabilities that are not so subordinated, are effectively junior to any of the

Company's secured indebtedness to the extent of the value of the assets securing such indebtedness and are structurally subordinated to all indebtedness and other liabilities (including trade payables but excluding intercompany obligations owed to the Company or its subsidiaries).

On or after September 1, 2019 to the close of business on the second scheduled trading day immediately preceding the maturity date, holders may convert all or any portion of their 2019 Notes regardless of the contingent conversion conditions described herein. Upon conversion, the Company will pay or deliver cash, shares of its common stock or a combination of cash and shares of its common stock, at its election, as described in the indenture governing the 2019 Notes.

F-30

Table of Contents

On or before June 1, 2021, and subject to the satisfaction of certain conditions, the Company is entitled to elect to redeem all or any portion of the 2047 Notes at a redemption price equal to 100% of the accreted principal amount of the 2047 Notes, plus accrued and unpaid interest to, but excluding, the redemption date, if the daily volume weighted average price of the Company's common stock is greater than or equal to 130% of the conversion price for at least 20 trading days during any 30 consecutive trading day period. After June 1, 2021, the Company will be entitled to elect to redeem all or any portion of the 2047 Notes (without regard to the price of the Company's common stock) at a redemption price equal to the then current accreted principal amount of the 2047 Notes, plus accrued and unpaid interest to, but excluding, the redemption date.

Holders may convert their 2019 Notes at their option at any time prior to the close of business on the business day immediately preceding September 1, 2019 only under the following circumstances:

during any calendar quarter commencing after the calendar quarter ending on March 31, 2015, if the last reported sale price of the common stock for at least 20 trading days (whether or not consecutive) during a period of 30 consecutive trading days ending on the last trading day of the immediately preceding calendar quarter is greater than or equal to 130% of the conversion price on each applicable trading day;

during the five consecutive business day period immediately following any five consecutive trading day period in which the trading price per \$1,000 principal amount of 2019 Notes for each trading day of the measurement period was less than 98% of the product of the last reported sale price of the Company's common stock and the conversion rate on each such trading day; or

upon the occurrence of specified corporate events.

Holders may convert their 2047 Notes at their option on any day prior to the close of business on the business day immediately preceding March 1, 2047 under the following circumstances:

during any calendar quarter commencing after the calendar quarter ending September 30, 2017, if the last reported sale price of the Company's common stock for 20 or more trading days (whether or not consecutive) in a period of 30 consecutive trading days ending on the last trading day of the immediately preceding calendar quarter exceeds 130% of the applicable conversion price in effect on each such trading day;

during the five consecutive business day period immediately following any five consecutive trading day period (the "Measurement Period") in which the trading price per 2047 Note for each day of that Measurement Period was less than 98% of the product of the last reported sale price of the Company's common stock and the conversion rate on each such day; or

upon the occurrence of specified corporate events.

The 2047 Notes will also be convertible, regardless of the foregoing circumstances, at any time from, and including, March 1, 2047 until the close of business on the second scheduled trading day immediately preceding the applicable maturity date. Each holder of the 2047 Notes has the right to require the Company to repurchase for cash all or any portion of such holder's 2047 Notes on June 1, 2022 at a price per \$1,000 principal amount of the 2047 Notes equal to the accreted principal amount at maturity plus accrued and unpaid interest to, but excluding, the repurchase date.

If a fundamental change (as defined in the relevant indenture governing the applicable series of Notes) occurs prior to the maturity date, holders of each of the 2019 Notes and 2047 Notes may require the Company to repurchase all or a portion of their notes for cash at a repurchase price equal to 100% of the principal amount at maturity of the Notes, plus any accrued and unpaid interest to, but excluding, the repurchase date. If such a fundamental change occurs prior to June 1, 2022, holders of the 2047 Notes may also require the Company to repurchase all or a portion of their notes for cash at a repurchase price equal to the then current accreted principal amount of the Notes, plus any accrued and unpaid interest to, but excluding, the repurchase date. In addition, if specific corporate events occur prior to the

applicable maturity date, the Company will be required to increase the conversion rate for holders who elect to convert their notes in certain circumstances. Holders who convert their 2047 Notes in connection with a Make-Whole Fundamental Change (as defined in the indenture governing the 2047 Notes) or in connection with a redemption of such 2047 Notes on or prior to June 1, 2021 will, under certain circumstances, be entitled to a make-whole premium in the form of an increase in the conversion rate determined by reference to a make-whole table set forth in such indenture.

As of December 31, 2017, the 2019 Notes and the 2047 Notes are not yet convertible.

F-31

Table of Contents

In accordance with accounting guidance on embedded conversion features, the Company valued and bifurcated the conversion options associated with each of the 2019 Notes and 2047 Notes from the respective host debt instrument, which is referred to as debt discount and recorded the conversion option of each of the Notes in stockholders' equity. The equity component for each Note is not remeasured as long as such Note continues to meet the conditions for equity classification.

In accounting for the transaction costs for each of the notes issuance, the Company allocated the costs incurred to the liability and equity components in proportion to the allocation of the proceeds from issuance to the liability and equity components. Issuance costs attributable to the liability component, totaling \$4.3 million for the 2019 Notes and \$2.7 million for the 2047 Notes, are being amortized to expense over the expected life of each notes using the effective interest method. Issuance costs attributable to the equity component related to the conversion option, totaling \$1.2 million for the 2019 Notes and \$0.3 million for the 2047 Notes, were netted with the equity component in stockholders' equity.

The Notes consist of the following (in thousands):

| | December 31, 2017 | December 31, 2016 |
|--|----------------------|----------------------|
| Liability component: | | |
| Principal | \$250,000 | \$143,750 |
| Less: debt discount, net of amortization | (36,797) | (21,451) |
| Net carrying amount | \$213,203 | \$122,299 |
| Equity component ⁽¹⁾ | \$37,560 | \$28,714 |

(1) Recorded within additional paid-in capital in the consolidated balance sheet. As of December 31, 2017, it included \$28.7 million and \$8.8 million related to the 2019 Notes and the 2047 Notes, respectively, net of \$1.2 million and \$0.3 million issuance cost in equity, respectively.

The following table sets forth total interest expense recognized related to the Notes (in thousands):

| | Year Ended December 31, 2017 | Year Ended December 31, 2016 |
|-------------------------------------|---------------------------------------|---------------------------------------|
| 2.0% coupon | \$ 3,991 | \$ 2,880 |
| Amortization of debt issuance costs | 1,127 | 831 |
| Amortization of debt discount | 8,100 | 5,608 |
| Total | \$ 13,218 | \$ 9,319 |

As of December 31, 2017 and December 31, 2016, the fair value of the principal amount of the Notes was \$246.6 million and \$141.1 million, respectively. The estimated fair value was determined based on inputs that are observable in the market or that could be derived from, or corroborated with, observable market data, including the Company's stock price and interest rates, which represents level 2 in the fair value hierarchy.

As of December 31, 2017, the remaining life of the 2019 Notes and the 2047 Notes is approximately 23 months and 53 months, respectively.

Note Hedge and Warrant Transactions

Concurrently with the offering of the 2019 Notes, the Company entered into separate convertible note hedge (the "Note Hedge") and warrant (the "Warrant") transactions. Taken together, the purchase of the Note Hedge and the sale of the Warrant are intended to offset any actual dilution from the conversion of the 2019 Notes and to effectively increase the overall conversion price of the 2019 Notes from \$33.79 to \$45.48 per share. The total cost of the Note

Hedge transaction was \$29.4 million. The Company received \$17.1 million in cash proceeds from the sale of the Warrant.

Pursuant to the Warrants, if the average market value per share of the Company's common stock for the reporting period, as measured under the Warrant, exceeds the strike price of the Warrant, the Warrant will have a dilutive effect on the Company's earnings per share. Holders of the 2019 Notes and Note Hedge will not have any rights with respect to the Warrant, as the Note Hedge is not part of the 2019 Notes or the Warrant. The Warrant is not part of the 2019 Notes or Note Hedge. Both the Note Hedge and Warrant have been accounted for as part of additional paid-in capital.

F-32

Table of Contents

13. Credit Facility

In January 2017, the Company, through its wholly owned subsidiary PROS, Inc., entered into an amendment to extend its \$50 million secured Credit Agreement (the "Revolver") with the lenders party thereto and Wells Fargo Bank, National Association as agent for the lenders party thereto.

The Revolver is for a five year term expiring in July 2022, with interest paid at the end of the applicable one month, three month or six month interest period at a rate per annum equal to LIBOR plus an applicable margin of 1.5% to 2.25% or the Federal Funds Rate plus an applicable margin of 1.5% to 2.25%. Borrowings under the Revolver are collateralized by a first priority interest in and lien on all of the Company's material assets.

The Revolver contains affirmative and negative covenants, including covenants which restrict the ability of the Company to, among other things, create liens, incur additional indebtedness and engage in certain other transactions, in each case subject to certain exclusions. In addition, the Revolver contains certain financial covenants which become effective in the event the Company's liquidity falls below \$50 million or upon the occurrence of an event of default.

As of December 31, 2017, the Company was in compliance with all financial covenants in the Revolver.

As of December 31, 2017 and 2016, \$0.2 million and less than \$0.1 million, respectively, of unamortized debt issuance costs related to the Revolver is included in prepaid and other current assets and other long-term assets in the consolidated balance sheets, respectively. For the years ended December 31, 2017 and 2016, the Company recorded an immaterial amount of amortization of debt issuance cost which is included in Other Expense, net in the Consolidated Statements of Comprehensive Income (Loss).

As of December 31, 2017, the Company had no outstanding borrowings under the Revolver.

14. Commitments and contingencies

Litigation

In the ordinary course of the Company's business, the Company regularly becomes involved in contract and other negotiations and, in more limited circumstances, becomes involved in legal proceedings, claims and litigation. The outcomes of these matters are inherently unpredictable. The Company is not currently involved in any outstanding litigation that it believes, individually or in the aggregate, will have a material adverse effect on its business, financial condition, results of operations or cash flows.

Purchase commitments

In the ordinary course of business, the Company enters in various purchase commitments for goods and services.

In June 2017, the Company entered in a noncancellable agreement with a computing infrastructure vendor that expires on June 30, 2020. The purchase commitment as of December 31, 2017 was \$19.7 million for the remaining period under the three-year agreement.

Indemnification

The Company's software agreements generally include certain provisions for indemnifying customers against liabilities if the Company's software solutions infringe a third party's intellectual property rights. To date, the Company has not incurred any losses as a result of such indemnifications and has not accrued any liabilities related to such obligations in the Company's Consolidated Financial Statements.

Lease commitments

The Company leases office space and office equipment under non-cancellable operating leases that expire at various dates. The Company incurred approximately \$3.9 million, \$4.1 million and \$3.5 million of total rent expense for the years ended December 31, 2017, 2016 and 2015, respectively. As of December 31, 2017, the future minimum lease commitments related to lease agreements were as follows:

Table of Contents

| Year Ending December 31, | Amount |
|--------------------------|----------|
| 2018 | \$ 3,674 |
| 2019 | 2,964 |
| 2020 | 1,479 |
| 2021 | 969 |
| 2022 | 683 |
| 2023 and thereafter | 45 |

Total minimum lease payments \$ 9,814

The Company's headquarters are located in Houston, Texas, where it leases approximately 98,000 square feet of office space. In June 2016, the Company entered into a fifth amendment to this corporate office lease (the "Fifth Lease Amendment"). The Fifth Lease Amendment, among other things, provides for a three year extension, until October 31, 2019, unless earlier terminated or extended pursuant to the terms of the lease. The Company also has smaller regional offices, including in London, England; Toulouse, France; San Francisco, California; and Sofia, Bulgaria. The Company leases approximately 3,000 square feet of office space in London, approximately 14,000 square feet of space in Toulouse, approximately 6,600 of space in San Francisco, and approximately 23,000 square feet of space in Sofia.

As a result of the Vayant acquisition in August 2017, the Company assumed an operating lease in Sofia, Bulgaria that expires in early 2018. In August 2017, the Company entered into a new operating lease in Sofia to replace the expiring Sofia lease. The new lease expires in January 2023.

The Company had no capital leases at December 31, 2017 and 2016.

15. Segment and geographic information

Operating segments are the components of an enterprise about which separate financial information is available that is evaluated on a regular basis by the chief operating decision-maker ("CODM") in deciding how to allocate resources to an individual segment and in assessing performance of the segment. The Company's CODM is its CEO, who reviews financial information presented on a consolidated basis for purposes of allocating resources and evaluating financial performance. The Company sells its pricing and revenue management software to customers in multiple industries and geographies, but has no segment managers who are held accountable for operations, operating results or components below the consolidated unit level. The company does not allocate costs at a level that would give segment managers the ability to meaningfully evaluate financial performance below the level presented to the CODM. Therefore, the Company believes that it operates in one segment and has a single reporting unit.

Revenue by geography

The Company presents financial information on a consolidated basis and does not assess the profitability of its geographic regions. Accordingly the Company does not attempt to comprehensively assign or allocate costs to these regions and does not produce reports for, or measure the performance of, its geographic regions based on any asset-based metrics.

International revenue for the years ended December 31, 2017, 2016 and 2015, amounted to approximately \$105.7 million, \$96.5 million and \$104.5 million, respectively, representing 63%, 63% and 62%, respectively, of annual revenue.

Table of Contents

The following geographic information is presented for the years ended December 31, 2017, 2016 and 2015. The Company categorizes geographic revenues based on the location of the customer's headquarters.

| | Year Ended December 31, | | 2016 | | 2015 | |
|--------------------------|-------------------------|---------|-----------|---------|-----------|---------|
| | 2017 | Percent | Revenue | Percent | Revenue | Percent |
| The Americas: | | | | | | |
| United States of America | \$63,097 | 37 % | \$56,774 | 37 % | \$63,754 | 38 % |
| Other | 13,645 | 8 % | 9,335 | 6 % | 10,680 | 6 % |
| Subtotal | 76,742 | 45 % | 66,109 | 43 % | 74,434 | 44 % |
| Europe | 51,273 | 30 % | 44,655 | 29 % | 47,514 | 28 % |
| Asia Pacific | 26,528 | 16 % | 30,457 | 20 % | 30,110 | 18 % |
| The Middle East | 11,437 | 7 % | 10,567 | 7 % | 14,198 | 8 % |
| Africa | 2,836 | 2 % | 1,488 | 1 % | 1,990 | 1 % |
| Total revenue | \$168,816 | 100 % | \$153,276 | 100 % | \$168,246 | 100 % |

16. Concentrations of credit risk

For the years ended December 31, 2017, 2016 and 2015, no customer accounted for 10% or more of revenue. For the year ended December 31, 2017, no customer accounted for 10% or more of accounts receivables, net and unbilled. The Company's cash and cash equivalents and short-term investments on deposit with any one party and at any point in time may exceed federally insured limits. To date, the Company has not incurred any losses in connection with short-term investments.

17. Related-party transactions

The Company currently has employment agreements with its executive officers. The employment agreements provide for twelve to eighteen months of salary upon termination without cause or, in some cases, for good reason and the vesting of certain stock options or other equity awards.

18. Employee retirement savings plan

The Company sponsors a 401(k) savings plan ("401(k) Plan"). The 401(k) Plan is available to substantially all United States employees and is designed to provide eligible employees with an opportunity to make regular contributions to a long-term investment and savings program. Historically, the Company's matching contribution is defined as 50% of the first 6% of employee contributions. The Company may also make discretionary contributions. Matching contributions by the Company in 2017, 2016 and 2015 totaled approximately \$2.0 million, \$1.9 million and \$1.8 million, respectively.

19. Quarterly results (Unaudited)

The following table presents certain unaudited quarterly financial data for the years ended December 31, 2017 and 2016. This information has been prepared on the same basis as the accompanying Consolidated Financial Statements and all necessary adjustments have been included in the amounts below to state fairly the selected quarterly information when read in conjunction with the accompanying Consolidated Financial Statements and Notes thereto.

| | Quarter Ended | | | |
|---|-------------------|--------------------|---------------|----------------|
| | December 31, 2017 | September 30, 2017 | June 30, 2017 | March 31, 2017 |
| Total revenue | \$46,344 | \$ 41,937 | \$40,406 | \$40,129 |
| Gross profit | \$28,197 | \$ 24,213 | \$24,320 | \$23,520 |
| Loss from operations | \$(12,815) | \$(17,750) | \$(16,710) | \$(17,668) |
| Net loss attributable to PROS Holdings, Inc. | \$(16,980) | \$(21,226) | \$(19,513) | \$(20,207) |
| Net loss attributable to common stockholders per share: | | | | |
| Basic | \$(0.53) | \$(0.67) | \$(0.62) | \$(0.65) |
| Diluted | \$(0.53) | \$(0.67) | \$(0.62) | \$(0.65) |

Table of Contents

| | Quarter Ended | | | |
|---|-------------------|--------------------|---------------|----------------|
| | December 31, 2016 | September 30, 2016 | June 30, 2016 | March 31, 2016 |
| Total revenue | \$39,926 | \$38,384 | \$37,038 | \$37,928 |
| Gross profit | \$23,974 | \$22,742 | \$20,990 | \$22,217 |
| Loss from operations | \$(16,258) | \$(13,116) | \$(18,050) | \$(17,974) |
| Net loss attributable to PROS Holdings, Inc. | \$(18,513) | \$(15,708) | \$(20,527) | \$(20,477) |
| Net loss attributable to common stockholders per share: | | | | |
| Basic | \$(0.61) | \$(0.52) | \$(0.68) | \$(0.68) |
| Diluted | \$(0.61) | \$(0.52) | \$(0.68) | \$(0.68) |

F-36

Table of Contents

Schedule II

Valuation and Qualifying Accounts

| | Balance at beginning of period | Additions charged to costs and expenses | Deductions (1) | Other (2) | Balance at end of period |
|---------------------------------|--------------------------------------|--|-------------------|--------------|--------------------------------|
| Allowance for doubtful accounts | | | | | |
| 2017 | \$ 760 | \$ — | \$ — | \$— | \$ 760 |
| 2016 | \$ 586 | \$ 887 | \$ (713) | \$— | \$ 760 |
| 2015 | \$ 868 | \$ 319 | \$ (601) | \$— | \$ 586 |
| Valuation allowance | | | | | |
| 2017 | \$ 69,049 | \$ 5,872 | \$ — | \$(768) | \$ 74,153 |
| 2016 | \$ 44,321 | \$ 26,634 | \$ — | \$(1,906) | \$ 69,049 |
| 2015 | \$ 24,027 | \$ 20,890 | \$ — | \$(596) | \$ 44,321 |

(1) Deductions column represents the reversal of additions previously charged to costs and expenses and uncollectible accounts written off, net of recoveries.

(2) Other column represents the cumulative translation adjustment impact on the valuation allowance.

F-37

Table of Contents

Item 16. Form 10-K summary

Registrants may voluntarily include a summary of information required by Form 10-K under this Item 16. The Registrant has elected not to include such summary information.

Signatures

Pursuant to the requirements of Section 13 or 15(d) of the Exchange Act, the Registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized, on February 15, 2018.

PROS Holdings, Inc.

By: /s/ Andres Reiner

Andres Reiner

President and Chief Executive Officer

KNOW BY THESE PRESENT, that each person whose signature appears below constitutes and appoints each of Andres Reiner and Stefan Schulz, his attorney-in-fact, with the power of substitution, for him in any and all capacities, to sign any amendments to this report on Form 10-K and to file the same, with exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, hereby ratifying and confirming all that each of the attorney-in-fact, or his substitute or substitutes, may do or cause to be done by virtue hereof. Pursuant to the requirement of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the Registrant and in the capacities and on the dates indicated.

| Signatures | Title | Date |
|--|--|-------------------|
| /s/ Andres Reiner Andres Reiner | President, Chief Executive Officer, and Director (Principal Executive Officer) | February 15, 2018 |
| /s/ Stefan Schulz Stefan Schulz | Executive Vice President and Chief Financial Officer (Principal Accounting Officer) | February 15, 2018 |
| /s/ William Russell William Russell | Chairman of the Board | February 15, 2018 |
| /s/ Ellen Keszler Ellen Keszler | Director | February 15, 2018 |
| /s/ Greg B. Petersen Greg B. Petersen | Director | February 15, 2018 |
| /s/ Leslie J. Rechan Leslie J. Rechan | Director | February 15, 2018 |
| /s/ Timothy V. Williams Timothy V. Williams | Director | February 15, 2018 |
| /s/ Mariette M. Woestemeyer Mariette M. Woestemeyer | Director | February 15, 2018 |
| /s/ Ronald F. Woestemeyer | Director | February 15, 2018 |

Ronald Woestemeyer

F-38

Table of Contents

Exhibit Index

| Exhibit No. | Description | Provided | Incorporated by |
|-------------|---|----------|----------------------------|
| | | Herewith | Form Filing Date Reference |
| 3.1 | <u>Amended and Restated Certificate of Incorporation.</u> | | S-1/A 6/15/2007 |
| 3.2 | <u>Amended and Restated Bylaws.</u> | | 8-K 8/21/2013 |
| 4.1 | <u>Specimen certificate for shares of common stock.</u> | | S-1/A 6/11/2007 |
| 4.2 | <u>Indenture, dated December 10, 2014, between Registrant and Wilmington Trust, National Association, as trustee.</u> | | 8-K 12/10/2014 |
| 4.3 | <u>Global Note, dated December 10, 2014, between Registrant and Wilmington Trust, National Association, as trustee.</u> | | 8-K 12/10/2014 |
| 4.4 | <u>Indenture, dated June 21, 2017, between Registrant and Wilmington Trust, National Association, as trustee.</u> | | 8-K 6/22/2017 |
| 10.1+ | <u>1999 Equity Incentive Plan, as amended to date, and form of stock option agreement.</u> | | S-1 4/4/2007 |
| 10.2+ | <u>2007 Equity Incentive Plan.</u> | | S-1/A 6/11/2007 |
| 10.3+ | <u>Form of Non-Qualified Stock Option Agreement under the 2007 Equity Incentive Plan.</u> | | 10-K 2/22/2013 |
| 10.4+ | <u>Form of Stock Appreciation Rights Agreement under the 2007 Equity Incentive Plan.</u> | | 10-K 2/22/2013 |
| 10.5+ | <u>Form of Restricted Stock Units Agreement under the 2007 Equity Incentive Plan.</u> | | 10-K 2/22/2013 |
| 10.10+ | <u>Form of Market Stock Units Agreement under the 2007 Equity Incentive Plan.</u> | | 10-Q 5/2/2013 |
| 10.11+ | <u>Form of Market Stock Units Agreement under the 2007 Equity Incentive Plan.</u> | | 10-K 2/15/2017 |
| 10.12+ | <u>2017 Equity Incentive Plan.</u> | | 10-Q 8/3/2017 |
| 10.13+ | <u>Form of Notice of Grant of Market Stock Units and Award Agreement under the 2017 Equity Incentive Plan.</u> | | 10-Q 8/3/2017 |
| 10.14+ | <u>Form of Notice of Grant of Stock Option and Award Agreement under the 2017 Equity Incentive Plan.</u> | | 10-Q 8/3/2017 |

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|----------|--|-------|-----------|
| 10.15+ | <u>Form of Notice of Grant of Performance Restricted Stock Units and Award Agreement under the 2017 Equity Incentive Plan.</u> | 10-Q | 8/3/2017 |
| 10.16+ | <u>Form of Notice of Grant of Restricted Stock Units and Award Agreement under the 2017 Equity Incentive Plan.</u> | 10-Q | 8/3/2017 |
| 10.17+ | <u>Form of Notice of Grant of Stock Appreciation Rights and Award Agreement under the 2017 Equity Incentive Plan.</u> | 10-Q | 8/3/2017 |
| 10.18+ | <u>Form of Non-Plan Market Stock Units Agreement.</u> | S-8 | 2/24/2014 |
| 10.19+ | <u>Form of Non-Plan Restricted Stock Units Agreement.</u> | S-8 | 2/24/2014 |
| 10.20+ | <u>Form of Non-Plan Restricted Stock Units Agreement (France).</u> | S-8 | 2/24/2014 |
| 10.21+ | <u>Form of Non-Plan Restricted Stock Units Agreement (Performance France).</u> | S-8 | 2/24/2014 |
| 10.22+ | <u>Form of Performance Restricted Stock Unit Agreement.</u> | 8-K | 9/12/2016 |
| 10.23+ | <u>2013 Employee Stock Purchase Plan.</u> | 8-K | 6/7/2013 |
| 10.24+ | <u>Stock Purchase and Stockholders Agreement, dated June 8, 1998, by and among Registrant (as successor in interest to PROS Strategic Solutions, Inc.) and certain stockholders.</u> | S-1 | 4/4/2007 |
| 10.24.1+ | <u>Amendment to Stock Purchase and Stockholders Agreement, dated March 26, 2007, by and among Registrant and certain stockholders.</u> | S-1 | 4/4/2007 |
| 10.25+ | <u>Registration Rights Agreement, dated June 8, 2007, by and among Registrant, Mariette M. Woestemeyer and Ronald F. Woestemeyer.</u> | S-1/A | 6/11/2007 |
| 10.26 | <u>Office Lease, dated January 31, 2001, by and between PROS, Inc. (as successor in interest to PROS Revenue Management L.P.) and Houston Community College System.</u> | S-1 | 4/7/2007 |
| 10.26.1 | <u>First Amendment to Office Lease, dated March 31, 2006, by and between PROS, Inc. (as successor in interest to PROS Revenue Management L.P.) and Houston Community College System.</u> | S-1 | 4/7/2007 |
| 10.26.2 | <u>Second Amendment to Office Lease, dated March 1, 2007, by and between PROS, Inc. (as successor in interest to PROS Revenue Management L.P.) and Houston Community College System.</u> | 10-K | 2/22/2013 |
| 10.26.3 | <u>Third Amendment to Office Lease, dated July 29, 2011, by and between PROS, Inc. (as successor in interest to PROS Revenue Management L.P.) and Houston Community College System.</u> | 8-K | 8/3/2011 |
| 10.26.4 | <u>Fourth Amendment to Office Lease, dated June 27, 2012, by and between PROS, Inc. (as successor in interest to PROS Revenue Management L.P.) and Houston Community College System.</u> | 10-K | 2/22/2013 |

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| 10.26.5 | <u>Fifth Amendment to Office Lease, dated June 9, 2016, by and between PROS, Inc., and Houston Community College System.</u> | 8-K | 6/14/2016 |
| 10.27+ | <u>Amended and Restated Employment Agreement, dated May 2, 2013, by and between PROS, Inc., Registrant and Andres Reiner.</u> | 10-Q | 5/2/2013 |
| 10.28+ | <u>Offer Letter, dated as of January 15, 2015, by and between PROS, Inc. and Stefan Schulz.</u> | 8-K | 1/20/2015 |
| 10.29+ | <u>Employment Agreement, dated March 3, 2015, by and between PROS, Inc., Registrant, and Stefan B. Schulz.</u> | 8-K | 3/5/2015 |
| 10.30+ | <u>Offer Letter by and between PROS, Inc. and Thomas Dziersk, dated as of October 6, 2017.</u> | 8-K | 10/6/2017 |
| 10.31+ | <u>Employment Agreement by and between PROS, Inc., Registrant and Thomas Dziersk, dated as of October 9, 2017.</u> | 8-K | 10/10/2017 |
| 10.32+ | <u>Form of Indemnity Agreement entered into among Registrant, its affiliates and its directors and officers.</u> | 8-K | 8/21/2013 |
| 10.33+ | <u>Form of Indemnification Agreement to be entered into among Registrant, its affiliates and its directors and officers.</u> | 10-K | 2/15/2017 |
| 10.34 | <u>Tender Offer Agreement, dated October 24, 2013, by and between Registrant and Cameleon Software.</u> | 8-K | 10/24/2013 |
| 10.35 | <u>Agreement and Plan of Merger, dated December 16, 2013, by and among PROS, Inc., Pandora Merger Sub Corporation, SignalDemand, Inc. and Fortis Advisors LLC.</u> | 8-K | 12/16/2013 |
| 10.36 | <u>Agreement and Plan of Merger, dated August 3, 2017, by and among Registrant, Wisdom U.S. Merger Sub Corporation, Vayant Travel Technologies, Inc. and NEVEQ Capital Partners, as agent for Target's securityholders thereunder.</u> | 8-K | 8/3/2017 |
| 10.37 | <u>Credit Agreement, dated July 2, 2012, by and among PROS, Inc., Wells Fargo Bank, National Association, as administrative agent, and the Lenders party thereto.</u> | 8-K | 7/9/2012 |
| 10.37.1 | <u>Third Amendment to Credit Agreement, dated December 3, 2014, by and among PROS, Inc., Wells Fargo Bank, National Association, as administrative agent, and the Lenders party thereto.</u> | 8-K | 12/5/2014 |
| 10.37.2 | <u>Seventh Amendment to Credit Agreement, dated January 27, 2017, by and among PROS, Inc., Wells Fargo Bank, National Association, as administrative agent, and the Lenders party thereto.</u> | 8-K | 2/2/2017 |
| 10.37.3 | <u>Ninth Amendment to Credit Agreement, dated June 15, 2017, by and between PROS, Inc., Wells Fargo Bank, National Association, as administrative agent, and the Lenders party thereto.</u> | 8-K | 6/16/2017 |

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| 10.38 | <u>Purchase Agreement, dated December 4, 2014 by and among Registrant, Goldman, Sachs & Co. and Deutsche Bank Securities Inc., as representatives of the several initial purchasers named therein.</u> | 8-K | 12/10/2014 |
| 10.39 | <u>Base Bond Hedge Confirmation, dated December 4, 2014 by and between Registrant and Goldman, Sachs & Co.</u> | 8-K | 12/10/2014 |
| 10.40 | <u>Base Bond Hedge Confirmation, dated December 4, 2014 by and between Registrant and Deutsche Bank AG, London Branch.</u> | 8-K | 12/10/2014 |
| 10.41 | <u>Additional Bond Hedge Confirmation, dated December 5, 2014 by and between Registrant and Goldman, Sachs & Co.</u> | 8-K | 12/10/2014 |
| 10.42 | <u>Additional Bond Hedge Confirmation, dated December 5, 2014 by and between Registrant and Deutsche Bank AG, London Branch.</u> | 8-K | 12/10/2014 |
| 10.43 | <u>Base Warrant Confirmation, dated December 4, 2014 by and between Registrant and Goldman, Sachs & Co.</u> | 8-K | 12/10/2014 |
| 10.44 | <u>Base Warrant Confirmation, dated December 4, 2014 by and between Registrant and Deutsche Bank AG, London Branch.</u> | 8-K | 12/10/2014 |
| 10.45 | <u>Additional Warrant Confirmation, dated December 5, 2014 by and between Registrant and Goldman, Sachs & Co.</u> | 8-K | 12/10/2014 |
| 10.46 | <u>Additional Warrant Confirmation, dated December 5, 2014 by and between Registrant and Deutsche Bank AG, London Branch.</u> | 8-K | 12/10/2014 |
| 10.47 | <u>Form of Private Placement Purchase Agreement, dated June 15, 2017, between Registrant and each purchaser named therein.</u> | 8-K | 6/21/2017 |
| 21.1 | <u>List of Subsidiaries.</u> | X | |
| 23.1 | <u>Consent of PricewaterhouseCoopers LLP.</u> | X | |
| 24.1* | <u>Power of Attorney.</u> | X | |
| 31.1 | <u>Certification of Chief Executive Officer Pursuant to Exchange Act Rule 13a-14(a)/15d-14(a).</u> | X | |
| 31.2 | <u>Certification of Chief Financial Officer Pursuant to Exchange Act Rule 13a-14(a)/ 15d-14(a).</u> | X | |
| 32.1** | <u>Certifications of Chief Executive Officer and Chief Financial Officer Pursuant to 18 U.S.C. Section 1350.</u> | X | |
| Exhibit No. | Description | | |
| 101.INS | XBRL Instance Document. | | |

101.SCH XBRL Taxonomy Extension Schema Document.

101.CAL XBRL Taxonomy Extension Calculation Linkbase Document.

101.DEF XBRL Taxonomy Extension Definition Linkbase Document.

101.LAB XBRL Taxonomy Extension Label Linkbase Document.

101.PRE XBRL Taxonomy Extension Presentation Linkbase Document.

* Reference is made to page F-38 of this Annual Report on Form 10-K.

This certification shall not be deemed "filed" for purposes of Section 18 of the Securities Act of 1934, or otherwise
**subject to the liability of that Section, nor shall it be deemed to be incorporated by reference into any filing under
the Securities Act of 1933 or the Securities Exchange Act of 1934.

+ Indicates a management contract or compensatory plan or arrangement.