UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, DC 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, 2019
OR

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

For the transition period from ____ to ____
Commission File Number: 001-38098

APPIAN CORPORATION
(Exact Name of Registrant as Specified in its Charter)

Delaware	**54-1956084**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. Employer Identification No.)**
7950 Jones Branch Drive **Tysons, VA**	**20190**
(Address of principal executive offices)	**(Zip Code)**

Registrant's telephone number, including area code: (703) 442-8844

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

Title of each class	Trading symbol	Name of each exchange on which registered
Class A Common Stock	APPN	The Nasdaq Stock Market LLC

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

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

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

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

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

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

Large accelerated filer	☒	Accelerated filer	☐
Non-accelerated filer	☐	Smaller reporting company	☐
		Emerging growth company	☐

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

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

As of June 28, 2019, the aggregate market value of the registrant’s voting Class A common stock and Class B common stock held by non-affiliates of the registrant was approximately $832,771,572 and $89,268,922, respectively, based on a closing price of $36.07 per share of the registrant’s Class A common stock as reported on The Nasdaq Global Market on June 28, 2019. For purposes of this computation, all officers, directors and 10% beneficial owners of the registrant are deemed to be affiliates. Such determination should not be deemed to be an admission that such officers, directors or 10% beneficial owners are, in fact, affiliates of the registrant.

As of February 14, 2020, there were 34,562,551 shares of the registrant’s Class A common stock and 32,922,636 shares of the registrant’s Class B common stock, each with a par value of $0.0001 per share, outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's definitive Proxy Statement for its 2020 Annual Meeting of Stockholders to be filed with the Securities and Exchange Commission pursuant to Regulation 14A not later than 120 days after the end of the fiscal year covered by this Annual Report on Form 10-K are incorporated by reference in Part III, Items 10-14 of this Annual Report on Form 10-K.

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PART I

Forward-Looking Statements

This Annual Report on Form 10-K, including the sections entitled "Business," "Risk Factors," and "Management's Discussion and Analysis of Financial Condition and Results of Operations," contains forward-looking statements that involve known and unknown risks, uncertainties and other factors that may cause our actual results, levels of activity, performance or achievements to be materially different from the information expressed or implied by these forward-looking statements. Statements that are not purely historical are forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, or the Securities Act, and Section 21E of the Securities Exchange Act of 1934, as amended, or the Exchange Act. In some cases, you can identify forward-looking statements by the words “anticipate,” “believe,” “continue,” “could,” “estimate,” “expect,” “intend,” “may,” “might,” “objective,” “ongoing,” “plan,” “predict,” “project,” “potential,” “should,” “will,” or “would,” or the negative of these terms, or other comparable terminology intended to identify statements about the future. These forward-looking statements include, but are not limited to, statements concerning the following:

- our market opportunity and the expansion of our core software markets in general;
- the effects of increased competition as well as innovations by new and existing competitors in our market;
- our ability to adapt to technological change and effectively enhance, innovate and scale our platform and professional services;
- our ability to effectively manage or sustain our growth and to achieve profitability;
- potential acquisitions and integration of complementary businesses and technologies;
- our ability to maintain, or strengthen awareness of, our brand;
- perceived or actual problems with the integrity, reliability, quality or compatibility of our platform, including unscheduled downtime or outages;
- future revenue, hiring plans, expenses, capital expenditures, capital requirements and stock performance;
- our ability to attract and retain qualified employees and key personnel and further expand our overall headcount;
- the expected benefits to our clients and potential clients of our product and service offerings;
- the timing of revenue recognition under license and cloud arrangements;
- our expectation that subscriptions revenue as a percentage of total revenue will continue to increase;
- our backlog of license, maintenance, cloud and services agreements and the timing of future cash receipts from committed license and cloud arrangements;
- our expectation that cost of revenue, sales and marketing expenses and general and administrative expenses will continue to increase in absolute dollar values;
- our expectations regarding the impact of recent accounting pronouncements on our consolidated financial statements;
- our ability to stay abreast of new or modified laws and regulations that currently apply or become applicable to our business both in the United States and internationally;
- our ability to maintain, protect and enhance our intellectual property; and
- costs associated with defending intellectual property infringement and other claims.

These statements represent the beliefs and assumptions of our management based on information currently available to us. Such forward-looking statements are subject to risks, uncertainties and other important factors that could cause actual results and the timing of certain events to differ materially from future results expressed or implied by such forward-looking statements. Factors that could cause or contribute to such differences include, but are not limited to, those discussed in the section titled “Risk Factors” included under Part I, Item 1A. Furthermore, such forward-looking statements speak only as of the date of this report. Except as required by law, we undertake no obligation to update any forward-looking statements to reflect events or circumstances that occur after the date of this report.

Item 1. Business.

Overview

Appian provides a low-code automation platform that accelerates the creation of high-impact business applications, enabling our customers to automate the most important aspects of their business. Global organizations use our applications to improve customer experience, achieve operational excellence and simplify global risk management and compliance.

With our platform, organizations can rapidly and easily design, build and implement powerful, enterprise-grade custom applications through our intuitive, visual interface with little or no coding required. Our customers have used applications built on our platform to launch new business lines, automate vital employee workflows, manage complex trading platforms, accelerate drug development and build global procurement systems. With our platform, decision makers can reimagine their products, services, processes and customer interactions by removing much of the complexity and many of the challenges associated with traditional approaches to software development.

Organizations across all industries are digitally transforming—leveraging software to automate and optimize mission critical operations, enhance customer experiences and drive competitive differentiation. Historically, organizations have principally relied on packaged software and custom software solutions to operationalize and automate their businesses. Packaged software often fails to address unusual use cases or to enable differentiation and requires organizations to adapt their individual processes, needs and systems of record to standardized frameworks. While traditional custom software solutions can be differentiated and tailored to meet strategic objectives, development requires a long, iterative and cumbersome process, as well as costly integration, and relies on scarce developer talent.

We enable organizations to differentiate themselves from their competition through software-enabled digital transformation. Our low-code automation platform employs an intuitive, visual interface and pre-built development modules that reduce the time required to build powerful and unique applications. Our platform automates the creation of forms, data flows, records, reports and other software elements that would otherwise need to be manually coded. This functionality greatly reduces the iterative development process, allowing for real-time application optimization and ultimately shortening the time from idea to deployment. Our applications take advantage of a complete stack of automation technologies, including our industry-leading workflow engine, rules engine, native Robotic Process Automation, or RPA, capabilities, leading case management capabilities, and integrated Google-based artificial intelligence, or AI. Our customers can leverage these capabilities to apply the right automation approach for each specific use case.

Further, our patented Self-Assembling Interface Layer, or SAIL, technology ensures that applications developed on our platform can be immediately and natively deployed across a full range of mobile and desktop devices with no additional customization, including desktop web browsers, tablets and mobile phones. Updates to applications developed with SAIL disseminate automatically across device types to ensure that all users benefit from the most up-to-date functionality. At the same time, we unify enterprise data in a single searchable environment, providing organizations with a comprehensive view of customer, product, organizational asset and other critical information. Rich reporting dashboards capture detailed performance metrics, providing valuable business intelligence and analytics that enable business process optimization. Our platform can be deployed in the cloud or on-premises, with organizations able to access the same functionality and data sources in all cases.

Our go-to-market strategy consists of both direct sales and, to a lesser extent, sales through strategic partners. We sell our software almost exclusively through subscriptions and intend to grow our revenue both by adding new customers and increasing the number of users at existing customers that use applications developed on our platform. As of December 31, 2019, we had 533 customers in a wide variety of industries, of which 427 customers were commercial and 106 customers were government or non-commercial entities. Our customers include financial services, life sciences, government, telecommunications, media, energy, manufacturing and transportation organizations. As of December 31, 2019, 24% of our commercial customers were Global 2000 organizations and included 48 Fortune 500 companies.

Many of our customers begin by building a single application and grow to build dozens of applications on our platform, which implicitly reduces the per-user cost of each application. Generally, the development of new applications results in the expansion of our user base within an organization and a corresponding increase in revenue to us because we charge subscription fees on a per-user basis for the significant majority of our customer contracts. Every additional application that an organization creates on our platform increases the value of our platform for that organization because it further integrates people, process and data across the organization and facilitates knowledge sharing. At the same time, our industry-leading professional services organization enables our customers to more easily build and deploy applications on our platform to achieve their digital transformation goals.

We have experienced strong revenue growth, with revenue of $260.4 million, $226.7 million and $176.7 million in 2019, 2018 and 2017, respectively. Our subscriptions revenue was $151.3 million, $126.0 million and $91.5 million in 2019, 2018 and 2017, respectively, and includes sales of our SaaS subscriptions, on-premises term license subscriptions and maintenance support. Our cloud subscription revenue was $95.0 million, $67.4 million and $40.2 million in 2019, 2018 and 2017, respectively, representing year-over-year growth rates of 41% from 2018 to 2019 and 68% from 2017 to 2018. Our professional services revenue was $109.1 million, $100.7 million and $85.2 million in 2019, 2018 and 2017, respectively. Over time, as the need for professional services associated with user deployments decreases and the number of end users increases, we expect subscriptions revenue as a percentage of total revenue will continue to increase.

We have invested in developing our platform, expanding our sales and marketing and research and development capabilities, and providing general and administrative resources to support our growth. We intend to continue to invest in our business to take advantage of our market opportunity. As a result, we incurred net losses of $50.7 million, $49.5 million and $31.0 million in 2019, 2018 and 2017, respectively. We also used cash in operations of $8.9 million, $31.3 million and $9.1 million in 2019, 2018 and 2017, respectively.

Industry & Market Data

Information contained in this Annual Report on Form 10-K concerning our industry and the market in which we operate, including our general expectations and market position, market opportunity and market size is based on information from various sources, including independent industry publications by Forrester Research Inc., or Forrester, Gartner, Inc., or Gartner, Prescient & Strategic Intelligence and S&P Global Market Intelligence. In presenting this information, we have also made assumptions based on such data and other similar sources, and based on our knowledge of, and our experience to date in, the markets for our services. This information involves a number of assumptions and limitations, and you are cautioned not to give undue weight to such estimates. Although we have not independently verified the accuracy or completeness of any third-party information, we believe the market position, market opportunity and market size information included in this Annual Report on Form 10-K is reliable. The industry in which we operate is subject to a high degree of uncertainty and risk due to a variety of factors, including those described in the “Risk Factors” section. These and other factors could cause results to differ materially from those expressed in the estimates made by the independent parties and by us.

The Gartner report described in this Annual Report on Form 10-K represents data, research opinion or viewpoints published, as part of a syndicated subscription service, by Gartner and are not representations of fact. The Gartner report speaks as of its original publication date, and not as of the date of this Annual Report on Form 10-K, and the opinions expressed in the Gartner report are subject to change without notice. Gartner does not endorse any vendor, product or service depicted in its research publications, and does not advise technology users to select only those vendors with the highest ratings or other designation. Gartner research publications consist of the opinions of Gartner’s research organization and should not be construed as statements of fact. Gartner disclaims all warranties, expressed or implied, with respect to this research, including any warranties of merchantability or fitness for a particular purpose.

The S&P Global Market Intelligence data described herein represents proprietary data gathered by S&P Global Market Intelligence and is not a representation of fact. The S&P Global Market Intelligence data is as of June 11, 2019 (and not as of the date of this Annual Report on Form 10-K) and is subject to change without notice.

Benefits of Our Platform

We enable organizations to differentiate themselves from their competition through software-enabled digital transformation. With our platform, organizations can rapidly and easily design, build and implement powerful, enterprise-grade custom applications through our intuitive, visual interface, with little or no coding required. Our patented SAIL technology ensures that applications developed on our platform can be immediately and natively deployed across a full range of mobile and desktop devices with no additional customization, including desktop web browsers, tablets and mobile phones. We also enable organizations to easily modify and enhance applications and automatically disseminate these updates across device types to ensure that all users benefit from the most up-to-date functionality.

Key benefits of our platform include:

- ***Powerful applications to solve critical and complex challenges***. At the core of our platform is an advanced engine that enables the modeling, modification and management of complex processes and business rules. Our heritage as a business process management, or BPM, company provides us with this differentiated understanding of complex processes, and we have incorporated that expertise into our platform to enable the development of powerful applications. Organizations have used our platform to launch new business lines, build large procurement systems, manage retail store layouts, conduct predictive maintenance on field equipment and manage trading platforms, among a range of other use cases.

- ***Rapid and simple innovation through our powerful platform.*** Our platform employs a low-code, intuitive, visual interface and pre-built development modules that reduce the time required to build powerful and unique applications. Our platform automates the creation of forms, data flows, records, reports and other software elements that would otherwise need to be manually coded or configured. This functionality greatly reduces the iterative development process, allowing for real-time application optimization and ultimately shortening the time from idea to deployment. In turn, organizations can better leverage scarce and costly developer talent to accomplish more digital transformation objectives.
- ***Build once, deploy everywhere.*** Our patented SAIL technology allows developers to build an application once and use it everywhere with the consistency of experience and optimal performance levels that users expect. Applications developed on our platform can be immediately and natively deployed across a full range of mobile and desktop devices with no additional customization, including desktop web browsers, tablets and mobile phones.
- ***Delivering measurable results using automation.*** Our low-code automation applies the power of RPA, AI, workflow and enterprise integration to quickly deliver a meaningful business impact. Our RPA automates the routine tasks across legacy and modern systems, increasing efficiency and providing even more value to the customer. AI boosts business outcomes by making the applications smarter. Our platform allows companies to design, execute, manage and optimize processes (i.e. workflows).
- ***Seamless integration with existing systems and data.*** In contrast to typical enterprise software, our platform does not require that data reside within it in order to enable robust data analysis and cross-department and cross-application insight. Our platform seamlessly integrates with many of the most popular enterprise software applications and data repositories and can be used within many legacy environments. For example, organizations frequently use our platform to extend the life and enhance the functionality of legacy systems of record, such as those used for enterprise resource planning, human capital management and customer relationship management, by building new applications that enhance the functionality of those systems and by leveraging the data within those systems to further optimize and automate operations.
- ***Deployment flexibility to serve customer needs.*** Our platform can be installed in any cloud or on-premises, with organizations able to access the same functionality and data sources in all cases. Our flexible deployment model also preserves a seamless path to future cloud deployments for organizations initially choosing on-premises for their most sensitive workloads.
- ***Industry-leading security.*** Our platform is designed to meet the highest demands of our U.S. federal government and large enterprise customers. Therefore, it holds some of the highest security certifications available. Our platform was one of the first software companies to achieve Federal Risk and Authorization Management Program (FedRAMP) compliance. Additionally, government agencies can deploy our platform into a fully managed environment at the Impact Level IV security levels with a comprehensive SLA. Our platform is also certified under the Payment Card Industry Data Security (PCI DSS) and under HITRUST as meeting all requirements under the HITRUST Common Security Framework (CSF). Our controls are documented in our SOC 2 Type 2 report, in which an independent audit firm provides a detailed review of Appian Cloud’s security, availability, and confidentiality controls. Also, our platform is ISO 27001 certified and possesses both a SOC 1 Type 2 report and a SOC 3 report.

Our approach to digital transformation goes beyond simply enabling organizations to build custom applications fast. We empower decision makers to reimagine their products, services, processes and customer interactions with software by removing much of the complexity and many of the challenges associated with traditional approaches to software development. Because we make application development easy, organizations can build specific and competitively differentiated functionality into applications to deliver enhanced user experiences and streamlined business operations.

Our Growth Strategy

Key elements of our growth strategy include:

- ***Expand our customer base.*** As of December 31, 2019, we had 533 customers in a wide variety of industries, including financial services, life sciences, government, telecommunications, media, energy, manufacturing and transportation. We believe that the market for our software automation platform is still in its early stages and that we have a significant opportunity to add additional large enterprise and government customers.
- ***Grow through our differentiated land and expand model.*** Many of our customers begin by building a single application and grow to build dozens of applications on our platform, which implicitly reduces the per-user cost of

each application. Generally, the development of new applications results in the expansion of our user base within an organization and a corresponding increase in revenue to us because we usually charge subscription fees on a per-user basis. Every additional application that an organization creates on our platform increases the value of our platform for that organization because it further integrates people, process and data across the organization and facilitates knowledge sharing. Applications built on our platform may be used only on our platform while customers have active subscriptions, creating substantial switching costs for customers to move to a different software platform.

- ***Grow revenue from key industry verticals.*** While our platform is industry-agnostic, we have made, and plan to continue to make, investments to enhance the expertise of our sales and marketing organization within our key industry verticals of financial services, life sciences and U.S. federal government. In 2019, we generated over 68% of our subscriptions revenue from customers in these verticals. We believe that focusing on the digital transformation needs of organizations within these industry verticals can help drive adoption of our platform.
- ***Continue to innovate and enhance our platform***. We have made, and will continue to make, investments in research and development to strengthen our platform and expand the number of features available to our customers. We typically offer multiple upgrades each year that allow our customers to benefit from ongoing innovation. As we continue to increase the functionality of our platform and further reduce the amount of developer skill required to build robust applications on our platform, we believe that we have the potential to expand the use of our platform.
- ***Offer industry solutions to accelerate customer usage***. Our platform enables our customers to build applications quickly. To give our customers an even faster start, we offer pre-built solutions. Every Appian solution is built on our platform so they are fully standardized, upgradeable, and compatible. Our solutions are proactively collaborative with each other and not built in silos. They have common data definitions, shared reports, and built in calls that talk to each other. For these reasons, which are facilitated by our long-standing focus on the platform, our solutions approach is different from, and we believe superior, to what is currently available. We currently offer financial services onboarding and customer contact center solutions.
- ***Expand our international footprint.*** Our platform is designed to be natively multi-lingual to facilitate collaboration and address challenges in multi-national organizations. In 2019, approximately 32% of our total revenue was generated from customers outside of the United States. As of December 31, 2019, we operated in 12 countries and believe that we have a significant opportunity to continue to grow our international footprint. We are investing in new geographies, including through investment in direct and indirect sales channels, professional services and customer support and implementation partners.
- ***Grow our partner base.*** We have several strategic partnerships including with KPMG, PwC and Deloitte. These partners work with organizations that are undergoing digital transformation projects and, when these partners recognize an opportunity for our platform, they often introduce us to potential customers. We intend to further grow our base of partners to provide broader customer coverage and solution delivery capabilities.

Our Opportunity

We believe that we have a significant market opportunity in helping organizations accelerate their digital transformation by leveraging our low-code automation platform.

- ***Current core software markets.*** We believe that our platform addresses several key core software markets, as follows:
    - ***Low-code.*** According to the Low-Code Development Platform Market Research Report published by Prescient & Strategic Intelligence in August 2019, the market for low-code development platforms was valued at $5.6 billion in 2018 and is expected to grow at a 45% compound annual growth rate to $52.3 billion in 2024. We were recognized as a "Leader" based on our completeness of vision and ability to execute in the Gartner Magic Quadrant for Enterprise Low-Code Application Platforms (Published on August, 8 2019; Authored by: Paul Vincent, Kimihiko Iijima, et al.).
    - ***RPA.*** According to Forrester, the market for RPA automation totaled $3.9 billion in 2018 and is expected to grow at a 25% compound annual growth rate to $12.0 billion in 2023.
    - ***Application PaaS.*** Application platform as a service, or application PaaS, is a cloud service that provides the necessary infrastructure to enable the development, deployment and hosting of software applications. We believe that we are well positioned to capture a portion of the application PaaS market. According to Gartner, the global application PaaS market was valued at $26.4 billion in 2018 and is expected to grow at a 21% compound annual growth rate to $69.3 billion in 2023.[1]

- ***BPM.*** BPM applications are designed to support the optimization of business processes, including process identification, improvement implementation and monitoring and analysis. We were included as a "Leader" based on our ability to execute and the completeness of our vision in the Gartner Magic Quadrant for Intelligent Business Process Management Suites (Published on 30 January 2019; Authored by Rob Dunie, Derek Miers, et al.) in 2019.
- ***Case management.*** Case management applications are designed to support complex processes that require a combination of human workflows and collaboration, electronic workflows, data management and processing of files and cases. We were included as a "Leader" based on the strength of our current offering, our strategy and our market presence in The Forrester Wave™: Cloud-Based Dynamic Case Management in 2018.

Taken together, these current core software markets were expected to represent a combined $35.9 billion market opportunity currently and a combined $133.6 billion market opportunity in the near term.

- ***Traditional custom enterprise software market.*** In addition to our current core software markets, we believe that our platform better addresses certain needs of enterprise companies that have historically used manually-developed custom software. The global enterprise application software market is expected to reach $230 billion in 2020, according to Gartner.[2]
- ***Our internal estimate.*** Based on approximately 150,000 global companies and government institutions in 2018 in relevant industries and revenue-based size segments, and our industry- and size-specific average annual recurring revenue for customers as of December 31, 2018, we internally estimate our market opportunity to have been approximately $34 billion in 2018. We determined relevant global companies and government institutions by industry and size by referencing certain independent industry data from S&P Global Market Intelligence. We calculated industry-and size-specific average annual recurring revenue as of December 31, 2018 by adding the aggregate annual recurring revenue from all existing customers within each industry and size segment and dividing the total by the number of our existing customers in each industry and size segment.

[1]*Gartner, Forecast: Public Cloud Services, Worldwide, 2017-2023, 4Q19 Update, Colleen Graham, Neha Gupta, et al., 19 January 2020.*

[2]*Gartner, Forecast: Enterprise Application Software, Worldwide, 2017-2023, 4Q19 Update, Neha Gupta, Chris Pang, et al., 24 December 2019.*

Our Platform

With our platform, organizations can rapidly and easily design, build and implement powerful, enterprise-grade custom applications through our intuitive, visual interface, with little or no coding required. We also enable organizations to easily modify and enhance applications and automatically disseminate these updates across device types to ensure that all users benefit from the most up-to-date functionality. Through the speed and power of our platform, organizations can make their digital transformations happen more effectively and efficiently than could be achieved through building an application with standard programming languages.

We believe that the key elements of our technology infrastructure are as follows:

Full-Stack Automation Capabilities

Our heritage as a BPM company provides us with a differentiated understanding and ability to automate complex processes, and we have incorporated that expertise into our platform to enable the development of powerful business software. Appian applications can leverage a complete stack of automation technologies, applying the right automation approach for each specific use case:

- ***Business Process Management.*** At the core of our platform is an advanced engine that enables the modeling, modification and management of complex processes. This engine enables orchestration of any business workflow, and can distribute work to Appian's other automation capabilities, which include decision rules, RPA and AI.
- ***Decision Rules.*** Appian includes a declarative environment for defining and executing business logic or rules. These rules can be highly complex and can be applied within the Appian platform to many use cases, ranging from automated decision making to user experience personalization.
- ***Robotic Process Automation.*** Appian will include native software robots which will be used to execute simple repetitive tasks, reducing the human burden of that work. These robots will facilitate integration with legacy systems that do not offer modern application program interfaces, or APIs.
- ***Artificial Intelligence***. Appian includes a range of AI features, based on Google's AI services. These features include sentiment analysis, translation and document and image analysis. Appian also allows our customers to integrate with their preferred AI provider using our zero-code connectors.
- ***Case Management.*** Appian case management enables automation of many of the most common patterns of collaborative human work - including service management, incident management and investigations.

In the aggregate, these core capabilities enable Appian to automate and govern end-to-end processes. Appian complements these automation technologies with related features like process reporting, analytics and management, which make it simple for organizations to quickly improve and upgrade their automations as business needs change.

Web-Based Development Environment

The Appian design interface is a model-driven, web-based development environment for application creation, testing, deployment and performance optimization. Appian design is a shared repository of all Appian components—interfaces, process models, APIs, new component builders and user collaboration modules—and administration utilities for managing people, processes and data.

The Appian design repository incorporates best practices and years of lessons learned from digital transformation initiatives. Common development operations tasks require just a few clicks and can be automated for hands-off deployment. Dramatic improvements in developer productivity can be achieved through user-friendly capabilities such as fast impact analysis of all changes; auto-updating applications and components when data types change; and live views of interfaces under development.

Appian design guides developers through the necessary steps to create the foundation elements of reusable interfaces, records and business processes, while providing all the power that developers need to design, build and implement enterprise systems at scale. Organizations have used our platform to launch new business lines, build large procurement systems, manage retail store layouts, conduct predictive maintenance on field equipment and manage trading platforms, among a range of other use cases.

Our Patented SAIL Technology

SAIL is our patented technology that allows developers to create dynamic and responsive web and native-mobile user interfaces through a "build once, deploy everywhere" architecture. SAIL interfaces only need to be created once and SAIL automatically assembles customer applications for optimal viewing on each device type, including desktop web browsers, tablets and mobile phones, and each device operating system, including iOS and different permutations of Android. SAIL leverages native functionality inherent across a myriad of devices and operating systems to ensure the consistency of experience and optimal performance levels that users expect. Updates to applications developed with SAIL are automatically disseminated across device types to ensure that all users benefit from the most up-to-date functionality. This approach enables enterprise mobility without the extensive time and resources that other development approaches require.

We believe that SAIL provides a significant advantage over other platforms that both require extensive customization for various devices at the time of the creation of the new applications and on an on-going basis as mobile device manufacturers continue to update their software and capabilities.

Unified Data

Appian Records is an advanced data management technology that allows end users to discover and unite enterprise data into a single searchable environment, providing a comprehensive view of an organization's data. In contrast to typical enterprise software, our platform does not require that data reside within it in order to enable robust data analysis and cross-department and cross-application insight. Using standard database software and service connection frameworks, including APIs, our platform seamlessly integrates with many of the most popular enterprise software applications and data repositories and can be used within many legacy environments. Users simply need to assign a name to a given topic and then decide which existing data sources within the enterprise they want to capture. In addition to the benefits of having an immediate snapshot of all centralized data relating to the customer, product, employee or service request. Records also allows organizations to analyze the end-to-end journeys of any given person, entity or asset. Once the connections are established, users may navigate, analyze, collaborate and take action on data from our intuitive dashboards and interactive reports.

Unified End User Interfaces

Our end user interfaces enable users to discover data, collaborate with other end users and participate in process actions. The end user experience begins with a news feed that allows end users to monitor key events from processes, systems and other end users, providing a unified view of all applications and activity in one place. End users can collaborate with others, obtain status updates, send direct and secure messages and create social tasks for other end users. Our activity stream is designed to be intuitive for end users familiar with popular consumer social interfaces, allowing them to instantly track important events and occurrences and collaborate with little to no training. We also enforce company security policies, so end users can confidently collaborate without fear of compromising regulatory compliance. Our end user interfaces solve the problem of information silos, allowing organizations to respond to constituent feedback in real time by uniting the right team with the right information.

At the same time, our platform provides transparency, visibility and control across all of our applications through a dynamic and powerfully flexible tasking environment. We provide detailed tracking of all human process tasks on our platform, including when tasks have been assigned, addressed and completed by any user. Business Activity Monitoring reports display real-time enterprise performance, bottleneck detection and process optimization while scaling to millions of tasks.

Technology

We designed our platform to support large global enterprises and government organizations at scale, in the cloud or on-premises. We designed, deploy and manage our platform with the goal of it being a "joy to use" for both developers and users of applications.

Our customers build powerful and unique applications using our proprietary and patented SAIL technology, which we also use ourselves to develop features of our platform. We also employ cutting-edge React technology for building web and mobile user interfaces. We use third-party proprietary database and database language technology licensed from Kx Systems, Inc., or Kx, to power the high-performance in-memory database of our platform. Under our agreement with Kx, we are permitted to distribute Kx's software as a component part of our software platform as well as to host Kx's software on behalf of our customers through our cloud offering. Our agreement requires Kx to provide maintenance directly to us on the software we license as long as it provides maintenance to any other customers. We pay a variable license fee based on the number of applications built by our customers, subject to an overall cap on payment. We have paid Kx the overall license fee cap in each of the last five years. We may maintain the contract as long as we pay maintenance fees. Kx may terminate the agreement if we materially breach the agreement, become insolvent, make an assignment for the benefit of creditors, or if a bankruptcy proceeding is initiated against us. Unless we fail to pay amounts due under the contract or violate certain of Kx's intellectual property rights, Kx may not terminate the agreement until either it has successfully litigated a breach action or six months, whichever is earlier.

Our cloud offering is hosted by Amazon Web Services, or AWS, and is available in 49 availability zones in 14 countries. Our software is also able to run in the Microsoft Azure cloud and the Google Cloud Platform. Our enablement of the Microsoft Azure cloud and the Google Cloud Platform is consistent with our principle of platform neutrality.

We have also implemented a wide set of technical, physical and personnel-based security controls designed to protect against the compromise of confidential data that belongs to both our customers and us.

Professional Services

Since inception, we have invested in our professional services organization to help ensure that customers are able to deploy and adopt our platform. We believe our investment in professional services, as well as efforts by partners to build their practices around Appian, will drive increased adoption of our platform.

When we first acquire a new customer, our professional services experts or our deployment partners' professional services experts start the implementation process. Delivery specialists facilitate deployment of our platform and training personnel provide comprehensive support throughout the implementation process. Customers have access to our Appian Academy, which caters to a diverse range of skill sets and roles within organizations and trains developers on our platform. We also provide instructor-led courses at our Tysons, Virginia headquarters and certain of our other offices, as well as virtual classrooms for self-paced learning and on-site training at our customers' offices.

Once our customers have deployed and implemented our platform, our Appian Architects review our customers' programs and applications to find potential issues and provide recommendations on best practices. Our professional services team also assists customers by building applications on our platform for them.

Over time, we expect professional services revenue as a percentage of total revenue to decline as we increasingly rely on strategic partners to help our customers deploy our software.

Customer Support

Our customer support personnel are trained engineers and designers who can work with customers on the front lines to address support issues. We provide email and phone support, with teams in the United States, the United Kingdom and Australia. Developers can also find answers to their questions on the Appian Community, a community site that provides online customer support; real-time collaboration and networking; a growing knowledge base of answers for common questions; and live product webinars and training. The Appian Community also includes documentation, methodologies and reusable components for our platform. We have consistently been able to achieve at least a 98% customer satisfaction rating for our customer support organization, based on our surveys.

Our Customers

Our customers operate in a variety of industries, including financial services, government, education, technology, media and telecom, consumer, life sciences and industrials. As of December 31, 2019, we had 533 customers in a wide variety of industries, of which 427 customers were commercial and 106 customers were government or non-commercial entities. Our customers include financial services, life sciences, government, telecommunications, media, energy, manufacturing and transportation organizations. Generally, our sales force targets its efforts to organizations with over 2,000 employees and $2 billion in annual revenue. Our number of customers paying us in excess of $1 million of annual recurring revenue has grown from 38 at the end of 2018 to 48 at the end of 2019. As of December 31, 2019, 24% of our commercial customers were Global 2000 organizations and included 48 Fortune 500 companies. No single end-customer accounted for more than 10% of our total revenue in 2019, 2018 or 2017.

Culture and Employees

We believe that fostering our distinct culture of innovation is an important contributor to our success as a company. When we started Appian, we used to debate about everything. It was second nature since half the founding team had been competitive debaters in college. Debate proved to be a great way to reach the best decisions. Bad ideas couldn't survive; good ideas got better. We encourage everyone to speak up, but we also delegate every decision to a single person. So, we can disagree, and we still reach firm resolutions.

Our culture was purposefully created by our four founders, who are still heavily involved in operating the business, including recruiting, interviewing and educating new employees at Appian. Our founders, led by Matt Calkins, our Chief Executive Officer, have intentionally grown our business organically, focusing on developing a single solution—the Appian platform. We do so by employing a unified development team located in a single office in the Washington, D.C. metropolitan area to maximize the cohesion and simplicity of our platform and our company. When a client buys Appian software, they get a piece of Appian culture along with it.

As of December 31, 2019, we had 1,018 full-time employees in the United States and 257 full-time employees internationally. During 2019, we had a voluntary attrition rate of 10% among all employees of our company. We believe that this low voluntary attrition rate is a testament to our company culture. None of our U.S. employees are covered by collective bargaining agreements. We believe our employee relations are good and we have not experienced any work stoppages.

Our Competition

Our main competitors fall into three categories: (1) providers of low-code development platforms, such as salesforce.com, ServiceNow, Outsystems, Mendix and Bizagi; (2) providers of business process management and case management software, such as Oracle, Pegasystems, SAP, Microsoft and K2; and (3) providers of custom software and customer software solutions that address, or are developed to address, some of the use cases that can be addressed by applications developed on our platform.

As our market grows, we expect that it will attract more highly specialized vendors as well as larger vendors that may continue to acquire or bundle their products more effectively. The principal competitive factors in our market include:

- platform features, reliability, performance and effectiveness;
- ease of use and speed;
- platform extensibility and ability to integrate with other technology infrastructures;
- deployment flexibility;
- robustness of professional services and customer support;
- price and total cost of ownership;
- strength of platform security and adherence to industry standards and certifications;
- strength of sales and marketing efforts; and
- brand awareness and reputation.

We believe we generally compete favorably with our competitors with respect to the features, security and performance of our platform, the ease of integration of our applications and the relatively low total cost of ownership of our applications. However, many of our competitors have substantially greater financial, technical and other resources, greater name recognition, larger sales and marketing budgets, broader distribution, more diversified product lines and larger and more mature intellectual property portfolios.

Backlog

Backlog represents non-cancellable future amounts to be recognized under software as a service, or SaaS, and term license subscription agreements. Our backlog is equivalent to our remaining performance obligations. As of December 31, 2019 and 2018, we had backlog of approximately $176 million and $230 million, respectively. Approximately 41% of our backlog as of December 31, 2019 is not expected to be recognized in 2020. The decrease in backlog is due to the primarily upfront revenue recognition of our on-premises term license subscriptions under ASU 2014-09, *Revenue from Contracts with Customers (Topic 606)*, or ASC 606, and the reduced contract lengths of our on-premises term license subscriptions.

We expect that the amount of backlog relative to the total value of our contracts will change from quarter to quarter and year to year for several reasons, including the specific timing and duration of SaaS and term license subscription agreements with large customers, the specific timing of customer renewals, changes in customer financial circumstances and foreign currency fluctuations.

We often sign multiple-year SaaS subscription agreements. Backlog may vary based on changes in the average non-cancellable term of SaaS and term license subscription agreements. The change in backlog that results from changes in the average non-cancellable term of SaaS and term license subscription agreements may not be an indicator of the likelihood of renewal or expected future revenue. Accordingly, we believe that fluctuations in backlog may not be a reliable indicator of future revenue, and we do not utilize backlog as a key management metric internally.

Seasonality

We have historically experienced seasonality in terms of when we enter into agreements with customers. We typically enter into a significantly higher percentage of agreements with new customers, as well as renewal agreements with existing customers, in the fourth quarter. The increase in customer agreements for the fourth quarter is attributable to large enterprise account buying patterns typical in the software industry. Furthermore, we usually enter into a significant portion of agreements with customers during the last month, and often the last two weeks, of each quarter. However, we recognize the majority of our subscriptions revenue ratably over the terms of our subscriptions agreements, which are generally one to three years in length. As a result, a substantial portion of the subscriptions revenue that we report in each period will be derived from the recognition of deferred revenue relating to agreements entered into during previous periods. Consequently, a decline in new sales or renewals in any one period may not be immediately reflected in our revenue results for that period. This decline, however, will negatively affect our revenue in future periods. Accordingly, the effect of significant downturns in sales and market acceptance of our platform and potential changes in our rate of renewals may not be fully reflected in our results of operations until future periods.

While we will continue to recognize the majority of our subscriptions revenue ratably over the terms of our subscription agreements, as a result of the adoption of ASC 606, we may experience greater variability and reduced comparability of our quarterly revenue and results with respect to the timing and nature of our term license subscription agreements due to the upfront revenue recognition.

Sales and Marketing

Sales

Our sales organization is responsible for account acquisition and overall market development, which includes managing relationships with our customers. While our platform is industry-agnostic, we have recently made, and plan to continue to make, investments to enhance the expertise of our sales organization within our core industry verticals of financial services, life sciences and government. We also expect to continue to grow our sales headcount in all of our principal markets and expand our presence into countries where we currently do not have a direct sales presence.

Marketing

Our marketing efforts focus on building our brand reputation and increasing market awareness of our platform. Marketing activities include sponsorship of, and attendance at, trade shows and conferences; our annual Appian World event; social media, advertising and other digital programs; management of our corporate web site and partner portal; press outreach; and customer relations.

Intellectual Property

Our success depends in part upon our ability to protect our core technology and intellectual property. We rely on patents, trademarks, copyrights and trade secret laws, confidentiality procedures, and employee disclosure and invention assignment agreements to protect our intellectual property rights.

As of December 31, 2019, we had five granted patents and three patents pending related to our platform and its technology. None of our issued patents expire before 2034. We cannot assure you that any of our patent applications will result in the issuance of a patent or that the examination process will not require us to narrow our claims. Any patents that may issue may be contested, circumvented, found unenforceable or invalidated, and we may not be able to prevent third parties from infringing them. We also license software from third parties for integration into our products, including open source software and other software available on commercially reasonable terms. We control access to and use of our proprietary software and other confidential information through the use of internal and external controls, including contractual protections with employees, contractors, end-customers and partners, and our software is protected by U.S. and international copyright and trade secret laws.

Facilities

We have offices in six U.S. cities and ten cities outside the United States. Our headquarters are located in Tysons, Virginia. We believe that our facilities are adequate to meet our ongoing needs, including substantial rights to expand within the property. If we require additional space, we believe that we will be able to obtain additional facilities on commercially reasonable terms.

Corporate Information

Appian Corporation was incorporated in Delaware in August 1999. Our Class A common stock is listed on The Nasdaq Global Market under the symbol "APPN".

Our current principal executive offices are located at 7950 Jones Branch Drive, Tysons, Virginia 22102 and our telephone number is (703) 442-8844.

“Appian”, the Appian logo, and other trademarks or service marks of Appian Corporation appearing in this Annual Report on Form 10-K are the property of Appian Corporation. This Annual Report on Form 10-K contains additional trade names, trademarks and service marks of others, which are the property of their respective owners. Solely for convenience, trademarks and trade names referred to in this Annual Report on Form 10-K without the ® or TM symbols.

Available Information

Our website address is *www.appian.com*. Our Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and amendments to reports filed pursuant to Sections 13(a) and 15(d) of the Exchange Act are made available free of charge on or through our website at *investors.appian.com* as soon as reasonably practicable after such reports are filed with, or furnished to, the United States Securities and Exchange Commission, or SEC. The information contained on, or that can be accessed through, our website is not incorporated by reference into this Annual Report on Form 10-K or in any other report or document we file with the SEC, and any references to our website are intended to be inactive textual references only.

Item 1A. Risk Factors.

Our operations and financial results are subject to various risks and uncertainties including those described below. You should consider carefully the risks and uncertainties described below, in addition to other information contained in this Annual Report on Form 10-K, including our consolidated financial statements and related notes. The risks and uncertainties described below are not the only ones we face. Additional risks and uncertainties that we are unaware of, or that we currently believe are not material, may also become important factors that adversely affect our business. If any of the following risks or others not specified below materialize, our business, financial condition and results of operations could be materially and adversely affected and the trading price of our Class A common stock could decline.

Risks Related to Our Business and Industry

Our recent growth may not be indicative of our future growth and, if we continue to grow, we may not be able to manage our growth effectively.

We continue to experience rapid growth in our headcount and operations. In particular, we grew from 570 employees as of December 31, 2015, to 1,275 employees as of December 31, 2019. We have also significantly increased the size of our customer base over the last several years. We anticipate that we will continue to significantly expand our operations and headcount in the near term. Our growth has placed, and any future growth will place, a significant strain on our management, administrative, operational and financial infrastructure. Our success will depend in part on our ability to manage this growth effectively. To manage the expected growth of our operations and personnel, we will need to continue to improve our operational, financial and management controls and our reporting systems and procedures. Failure to effectively manage our growth could result in difficulty or delays in deploying our platform to customers, declines in quality or customer satisfaction, increases in costs, difficulties in introducing new features or other operational difficulties. Any of these difficulties could adversely impact our business performance and results of operations.

Our rapid growth also makes it difficult to evaluate our future prospects. Our ability to forecast our future operating results is subject to a number of uncertainties, including our ability to plan for and model future growth. If our assumptions regarding these uncertainties, which we use to plan our business, are incorrect or change in reaction to changes in our markets, or if we do not address these risks successfully, our operating and financial results could differ materially from our expectations, our business could suffer and the trading price of our stock may decline.

If we are unable to sustain our revenue growth rate, we may not achieve or maintain profitability in the future.

We have experienced revenue growth with revenue of $260.4 million, $226.7 million and $176.7 million in 2019, 2018 and 2017, respectively. Although we have experienced rapid revenue growth historically, we may not continue to grow as rapidly in the future and our revenue growth rates may decline. Any success that we may experience in the future will depend in large part on our ability to, among other things:

- maintain and expand our customer base;
- increase revenue from existing customers through increased or broader use of our platform within their organizations;
- further penetrate the existing industry verticals that we serve and expand into other industry verticals;
- improve the performance and capabilities of our platform through research and development;
- continue to successfully expand our business domestically and internationally; and
- successfully compete with other companies.

If we are unable to maintain consistent revenue or revenue growth, our stock price could be volatile, and it may be difficult to achieve and maintain profitability. You should not rely on our revenue for any prior quarterly or annual periods as any indication of our future revenue or revenue growth.

We may not be able to scale our business quickly enough to meet our customers' growing needs, and if we are not able to grow efficiently, our operating results could be harmed.

As usage of our platform grows and as customers use our platform for more advanced and more frequent projects, we may need to devote additional resources to improving our software architecture, integrating with third-party systems, and maintaining infrastructure performance. In addition, we will need to appropriately scale our internal business as well as grow our partner services systems, including our professional services organization and operations, to serve our growing customer base, particularly as our customer base expands over time. Any failure of or delay in these efforts could cause impaired system performance and reduced customer satisfaction. These issues could reduce the attractiveness of our platform to customers, resulting in decreased sales to new customers, lower renewal rates by existing customers, the issuance of service credits, or requested refunds, which could hurt our revenue growth and our reputation. Even if we are able to upgrade our systems and expand our staff, any such expansion will be expensive and complex, requiring management time and attention. We could also face inefficiencies or operational failures as a result of our efforts to scale our infrastructure. Moreover, there are inherent risks associated with upgrading, improving and expanding our information technology systems. We cannot be sure that the expansion and improvements to our infrastructure and systems will be fully or effectively implemented on a timely basis, if at all. These efforts may reduce revenue and our margins and adversely impact our financial results.

We are dependent on a single product, and the lack of continued market acceptance of our platform could cause our operating results to suffer.

Sales of our software platform account for substantially all of our subscriptions revenue and are the source of substantially all of our professional services revenue. We expect that we will be substantially dependent on our platform to generate revenue for the foreseeable future. As a result, our operating results could suffer due to:

- any decline in demand for our platform;
- the failure of our platform to achieve continued market acceptance;
- the market for low-code solutions not continuing to grow, or growing more slowly than we expect;
- the introduction of products and technologies that serve as a replacement or substitute for, or represent an improvement over, our platform;
- technological innovations or new standards that our platform does not address;
- sensitivity to current or future prices offered by us or competing solutions; and
- our inability to release enhanced versions of our platform on a timely basis.

If the market for our platform grows more slowly than anticipated or if demand for our platform does not grow as quickly as anticipated, whether as a result of competition, pricing sensitivities, product obsolescence, technological change, unfavorable economic conditions, uncertain geopolitical environment, budgetary constraints of our customers or other factors, we may not be able to grow our revenue.

If we are unable to further penetrate our existing industry verticals or expand our customer base, our revenue may not grow and our operating results may be harmed. Moreover, if we fail to comply with government contracting regulations, we could suffer a loss of revenue or incur price adjustments or other penalties.

Currently, a significant majority of our revenue is derived from companies in the financial services, pharmaceuticals, insurance and life sciences industries, and from the U.S. federal government. We are investing substantial resources to expand and train our sales force to enable it to better understand these industry verticals and drive sales to customers in these industry verticals, but there can be no assurance that these investments will be successful. Further, an important part of our strategy is to expand our customer base in a wide variety of industries. We have less experience in some industries and our expansion may require us to grow our expertise in certain areas and add sales and support personnel possessing familiarity with the relevant industries. There may be competitors in these verticals that may be entrenched and difficult to dislodge. As a result of these and other factors, our efforts to expand our customer base may be expensive and may not succeed, and we therefore may be unable to grow our revenue. If we fail to further penetrate our existing industry verticals or expand our customer base, we may be unable to grow our revenue and our operating results may be harmed.

Our sales cycle is long and unpredictable, particularly with respect to large customers, and our sales efforts require considerable time and expense, all of which may cause our operating results to fluctuate.

Our operating results may fluctuate, in part, because of the resource-intensive nature of our sales efforts, the length and variability of the sales cycle of our platform and the difficulty that we face in adjusting our short-term operating expenses. Our operating results depend in part on sales to large customers and promotion of increasing usage by those large customers. The length of our sales cycle, from initial evaluation to delivery of, and payment for, our software, varies substantially from customer to customer. Our sales cycle can extend to more than a year for certain large customers. It is difficult to predict if or when we will make a sale to a potential customer. Prospective customers, especially larger organizations, often undertake a prolonged evaluation process, which typically involves not only our platform, but also those of our competitors and can last from four to nine months or longer. We may spend substantial time, effort and money on our sales and marketing efforts without any assurance that our efforts will result in revenue. In addition, events affecting our customers' businesses may occur during the sales cycle that could affect the size or timing of a purchase, contributing to more unpredictability in our business and operating results. As a result of these factors, we may face greater costs, longer sales cycles and less predictability in the future. In the past, certain individual sales have occurred in periods later than we expected or have not occurred at all. The loss or delay of one or more large transactions in a quarter could impact our operating results for that quarter and any future quarters in which such revenue otherwise would have been recognized. As a result of these factors, it is difficult for us to forecast our revenue accurately in any quarter, and our quarterly results may fluctuate substantially. Further, because a substantial portion of our expenses are relatively fixed in the short-term, our operating results will suffer if revenue falls below our expectations in a particular quarter.

Market adoption of low-code platforms to drive digital transformation is new and unproven and may not grow as we expect, which may harm our business and prospects.

We believe our future success will depend in large part on growth in the demand for low-code platforms to drive software-enabled digital transformation. We have customers in a wide variety of industries, including financial services, life sciences, government, telecommunications, media, energy, manufacturing and transportation. It is difficult to predict customer demand for our platform, renewal rates, the rate at which existing customers expand their subscriptions, the size and growth rate of the market for our platform, the entry of competitive products or the success of existing competitive products. The utilization of low-code software to drive digital transformation is still relatively new. Any expansion in our addressable market depends on a number of factors, including businesses continuing to desire to differentiate themselves through software-enabled digital transformation, increasing their reliance on low-code solutions, changes in the competitive landscape, technological changes, budgetary constraints of our customers and changes in economic conditions. If our platform does not achieve widespread adoption or there is a reduction in demand for low-code solutions caused by a lack of customer acceptance, technological challenges, competing technologies and products, decreases in corporate or IT infrastructure spending, weakening economic conditions, or other factors, it could result in reduced customer purchases, reduced renewal rates and decreased revenue, any of which will adversely affect our business, operating results and financial condition.

We currently face significant competition.

The markets for low-code automation platforms, business process management, case management software and custom software are highly competitive, rapidly evolving and have relatively low barriers to entry. The principal competitive factors in our market include: platform features, reliability, performance and effectiveness; ease of use and speed; platform extensibility and ability to integrate with other technology infrastructures; deployment flexibility; robustness of professional services and customer support; price and total cost of ownership; strength of platform security and adherence to industry standards and certifications; strength of sales and marketing efforts; and brand awareness and reputation. If we fail to compete effectively with respect to any of these competitive factors, we may fail to attract new customers or lose or fail to renew existing customers, which would cause our operating results to suffer.

We primarily compete with low-code automation platforms sold by companies such as salesforce.com, ServiceNow, Outsystems, Mendix and Bizagi. We also compete with companies that provide business process management and case management software, including Oracle, Pegasystems, SAP, Microsoft and K2. Further, because our platform is used by our customers to create custom applications, there are software companies that offer commercial, off-the-shelf applications as well as custom software solutions that compete with us. In addition, large software and internet companies may seek to enter our primary markets.

Some of our actual and potential competitors have advantages over us, such as longer operating histories, more established relationships with current or potential customers and commercial partners, significantly greater financial, technical, marketing or other resources, stronger brand recognition, larger intellectual property portfolios and broader global distribution and presence. Such competitors may make their solutions available at a low cost or no cost basis in order to enhance their overall relationships with current or potential customers. Our competitors may also be able to respond more quickly and effectively than we can to new or changing opportunities, technologies, standards or customer requirements. With the introduction of new technologies and new market entrants, we expect competition to intensify in the future. In addition, some of our larger competitors have substantially broader offerings and can bundle competing products with other software offerings. As a result, customers may choose a bundled offering from our competitors, even if individual products have more limited functionality than our platform. These larger competitors are also often in a better position to withstand any significant reduction in capital spending and will therefore not be as susceptible to economic downturns.

Furthermore, our actual and potential competitors may establish cooperative relationships among themselves or with third parties that may further enhance their resources and offerings in the markets we address. In addition, current or potential competitors may be acquired by third parties with greater available resources. As a result of such relationships and acquisitions, our actual or potential competitors might be able to adapt more quickly to new technologies and customer needs, devote greater resources to the promotion or sale of their products, initiate or withstand substantial price competition, take advantage of other opportunities more readily or develop and expand their offerings more quickly than we do. For all of these reasons, we may not be able to compete successfully against our current or future competitors.

If our security measures are breached or unauthorized access to our platform or customer data is otherwise obtained, our platform may be perceived as not being secure, customers may reduce the use of or stop using our platform and we may incur significant liabilities.

Our platform, which can be deployed in the cloud or on-premises, allows for the storage and transmission of our customers' proprietary or confidential information, which may include trade secrets, personally identifiable information, personal health information and payment card information. Any actual or perceived unauthorized access to, or security breaches affecting, our platform or the information stored on or transmitted by our platform, including through unauthorized and/or malicious activity by one of our employees, could result in the loss of information, litigation, regulatory investigations, penalties, indemnity obligations and other costs, expenses and liability, which could exceed our existing insurance coverage and could result in a substantial financial loss. While we have security measures in place designed to protect customer information and prevent data loss and other security breaches, there can be no assurance that these measures will be effective in protecting against unauthorized access to our platform or our customers' information. Similarly, if cyber incidents, such as phishing attacks, viruses, denial of service attacks, malware installation, server malfunction, software or hardware failures, loss of data or other computer assets, adware, or other similar issues, impair the integrity or availability of our systems by affecting our data, or reducing access to or shutting down one or more of our computing systems or our IT network, we may be subject to negative treatment by our customers, our business partners, the press, and the public at large. Further, because the techniques used to obtain unauthorized access or sabotage systems change frequently and generally are not identified until they are launched against a target, we may be unable to anticipate these techniques or to implement adequate preventative measures. Additionally, we may be subject to attacks on our networks or systems or attempts to gain unauthorized access to our proprietary or confidential information or other data we or our vendors maintain, such as data about our employees. Such attacks and other breaches of security may occur as a result of malicious attacks, human error, social engineering, or other causes. Any actual or perceived breach of our security measures or failure to adequately protect our customers' or our confidential or proprietary information could negatively affect our ability to attract new customers, cause existing customers to elect to not renew their subscriptions to our software or result in reputational damage, any of which could adversely affect our operating results.

Further, security compromises experienced by our customers with respect to data hosted on our platform, even if caused by the customer's own misuse or negligence, may lead to public disclosures, which could harm our reputation, erode customer confidence in the effectiveness of our security measures, negatively impact our ability to attract new customers, or cause existing customers to elect not to renew their subscriptions with us. We may be subjected to indemnity demands, regulatory proceedings, audits, penalties or litigation based on our customers' misuse of our platform with respect to such sensitive information and defending against such litigation and otherwise addressing such matters may be expensive, cause distraction, and may result in us incurring liability, all of which may affect our operating results.

While we maintain general liability insurance coverage and coverage for errors or omissions, we cannot assure you that such coverage will be adequate or otherwise protect us from liabilities or damages with respect to claims alleging compromises of personal data or that such coverage will continue to be available on acceptable terms or at all.

We derive a material portion of our revenue from a limited number of customers, and the loss of one or more of these customers could adversely impact our business, results of operations and financial condition.

Our customer base is concentrated. For example, during the years ended December 31, 2019, 2018 and 2017, revenue from U.S. federal government agencies represented 17%, 16% and 15% of our total revenue, respectively, and the top three U.S. federal government customers generated 7%, 8% and 8% of our total revenue for the years ended December 31, 2019, 2018 and 2017, respectively. Further, nearly 10% of our subscription customers spent more than $1 million on our software in 2019. If we were to lose one or more of our significant customers, our revenue may significantly decline. In addition, revenue from significant customers may vary from period to period depending on the timing of renewing existing agreements or entering into new agreements. The loss of one or more of our significant customers could adversely affect our business, results of operations and financial condition.

In addition, due to our dependence on a limited number of customers, we face a concentration of credit and customer risk. As of December 31, 2019, one customer accounted for 8% of our accounts receivable. In the case of insolvency by one of our significant customers, accounts receivable with respect to that customer might not be collectible, might not be fully collectible, or might be collectible over longer than normal terms, each of which could adversely affect our financial condition.

A portion of our revenue is generated from subscriptions sold to governmental entities and heavily regulated organizations, which are subject to a number of challenges and risks.

A significant portion of our revenue is generated from subscriptions sold to governmental entities, both in the United States and internationally. Additionally, many of our current and prospective customers, such as those in the financial services, pharmaceuticals, insurance and life sciences industries, are highly regulated and may be required to comply with more stringent regulations in connection with subscribing to and implementing our platform. Selling subscriptions to these entities can be highly competitive, expensive and time-consuming, often requiring significant upfront time and expense without any assurance that we will successfully complete a sale. In addition, if our software does not meet the standards of new or existing regulations, we may be in breach of our contracts with our customers, allowing them to terminate their agreements.

Governmental demand and payment for our platform may also be impacted by public sector budgetary cycles and funding authorizations, with funding reductions or delays adversely affecting public sector demand for our platform. Governmental and highly regulated entities, including the General Services Administration, whose schedule accounts for many of our U.S. federal government contracts, impose compliance requirements that are complicated, require preferential pricing or “most favored nation” terms and conditions or are otherwise time-consuming and expensive to satisfy. In the United States, applicable federal contracting regulations change frequently, and the President may issue executive orders requiring federal contractors to adhere to new compliance requirements after a contract is signed. If we undertake to meet special standards or requirements and do not meet them, we could be subject to significant liability from our customers or regulators. Even if we do meet these special standards or requirements, the additional costs associated with providing our platform to government and highly regulated customers could harm our operating results. Moreover, changes in the underlying statutory and regulatory conditions that affect these types of customers could harm our ability to efficiently provide them access to our platform and to grow or maintain our customer base. In addition, engaging in sales activities to foreign governments introduces additional compliance risks specific to the U.S. Foreign Corrupt Practices Act, the U.K. Bribery Act and other similar statutory requirements prohibiting bribery and corruption in the jurisdictions in which we operate.

We have experienced losses in the past, and we may not achieve or sustain profitability in the future.

We generated net losses of $50.7 million, $49.5 million and $31.0 million in 2019, 2018 and 2017, respectively. As of December 31, 2019, we had an accumulated deficit of $135.4 million. We will need to generate and sustain increased revenue levels in future periods in order to achieve or sustain profitability in the future. We also expect our costs to increase in future periods, which could negatively affect our future operating results if our revenue does not increase commensurately. For example, we intend to continue to expend significant funds to expand our sales and marketing operations, develop and enhance our platform, meet the increased compliance requirements associated with our operation as a public company, and expand into new markets. Our efforts to grow our business may be more costly than we expect, and we may not be able to increase our revenue enough to offset our higher operating expenses. We may incur significant losses in the future for a number of reasons, including the other risks described in this Annual Report on Form 10-K, and unforeseen expenses, difficulties, complications and delays and other unknown events. If we are unable to achieve and sustain profitability, our stock price may significantly decrease.

Our future quarterly results of operations may fluctuate significantly due to a wide range of factors, which makes our future results difficult to predict.

Our revenue and results of operations have historically varied from period to period, and we expect that they will continue to do so as a result of a number of factors, many of which are outside of our control, including:

- the level of demand for our platform and our professional services;
- the rate of renewal of subscriptions with, and extent of sales of additional subscriptions to, existing customers;
- large customers failing to renew their subscriptions;
- the size, timing and terms of our subscription agreements with existing and new customers, including revenue recognition issues raised by multiple element arrangements;
- variations in the revenue mix of our professional services and growth rates of our cloud subscription and professional services offerings, including the timing of subscriptions and sales offerings that include an on-premises software element for which the revenue allocated to that deliverable is recognized upfront;
- the timing and growth of our business, in particular through our hiring of new employees and international expansion;
- the timing of our adoption of new or revised accounting pronouncements applicable to public companies and the impact on our results of operations;
- the introduction of new products and product enhancements by existing competitors or new entrants into our market, and changes in pricing for solutions offered by us or our competitors;
- network outages, security breaches, technical difficulties or interruptions with our platform;
- changes in the growth rate of the markets in which we compete;
- the mix of subscriptions to our platform and professional services sold during a period;
- customers delaying purchasing decisions in anticipation of new developments or enhancements by us or our competitors or otherwise;
- changes in customers' budgets;
- seasonal variations related to sales and marketing and other activities, such as expenses related to our customers;
- our ability to increase, retain and incentivize the strategic partners that market and sell our platform;
- our ability to control costs, including our operating expenses;
- our ability to hire, train and maintain our direct sales force;
- unforeseen litigation and intellectual property infringement;
- fluctuations in our effective tax rate; and
- general economic and political conditions, both domestically and internationally, as well as economic conditions specifically affecting industries in which our customers operate.

Any one of these or other factors discussed elsewhere in this Annual Report on Form 10-K or the cumulative effect of some of these factors may result in fluctuations in our revenue and operating results, meaning that quarter-to-quarter comparisons of our revenue, results of operations and cash flows may not necessarily be indicative of our future performance and may cause us to miss our guidance and analyst expectations and may cause our stock price to decline.

In addition, we have historically experienced seasonality in terms of when we enter into agreements with customers. We typically enter into a significantly higher percentage of agreements with new customers, as well as renewal agreements with existing customers, in the fourth quarter and, to a lesser extent, the second quarter. The increase in customer agreements for the fourth quarter is attributable to large enterprise account buying patterns typical in the software industry. Furthermore, we usually enter into a significant portion of agreements with customers during the last month, and often the last two weeks, of each quarter. This seasonality is reflected to a much lesser extent, and sometimes is not immediately apparent, in revenue, due to the fact that we recognize cloud subscription revenue over the term of the subscription agreement, which is generally one to three years. We expect that seasonality will continue to affect our operating results in the future and may reduce our ability to predict cash flow and optimize the timing of our operating expenses.

We rely on the performance of highly skilled personnel, including senior management and our engineering, professional services, sales and technology professionals; if we are unable to retain or motivate key personnel or hire, retain and motivate qualified personnel, our business would be harmed.

We believe our success has depended, and continues to depend, on the efforts and talents of our senior management team, particularly Matthew Calkins, our founder and Chief Executive Officer, and our highly skilled team members, including our sales personnel, professional services personnel, cloud engineering and support personnel and software engineers. We do not maintain key man insurance on any of our executive officers or key employees. From time to time, there may be changes in our senior management team resulting from the termination or departure of our executive officers and key employees. Our senior management and key employees are employed on an at-will basis, which means that they could terminate their employment with us at any time. Many of our executive officers and key employees receive equity compensation as a significant portion of their overall compensation package. A substantial decrease in the market price of our Class A common stock would effectively reduce the compensation of such persons and could increase the risk that they depart from our company. The loss of any of our senior management or key employees, particularly Mr. Calkins, could adversely affect our ability to build on the efforts they have undertaken and to execute our business plan, and we may not be able to find adequate replacements. We cannot ensure that we will be able to retain the services of any members of our senior management or other key employees.

Our ability to successfully pursue our growth strategy also depends on our ability to attract, motivate and retain our personnel. Competition for well-qualified employees in all aspects of our business, including sales personnel, professional services personnel, cloud engineering and support personnel and software engineers, is intense. Our recruiting efforts focus on elite universities and our primary recruiting competition are well-known, high-paying firms. Our continued ability to compete effectively depends on our ability to attract new employees and to retain and motivate existing employees. Further, a small portion of our employees are immigrants to the United States or foreign nationals holding visas. If immigration to the United States is further restricted by the federal government, we might lose existing employees who are unable to remain in the United States and our pool of qualified applicants might also be diminished, thereby hampering our recruiting efforts. If we do not succeed in attracting well-qualified employees or retaining and motivating existing employees, our business would be adversely affected.

We may not be able to increase subscriptions revenue as a percentage of total revenue.

Currently, our revenue is divided between subscriptions and professional services revenue. Our strategic focus has been to grow cloud subscriptions revenue faster than professional services revenue because our marginal costs of delivering our cloud subscriptions are lower than the marginal costs of delivering professional services. An increase in the percentage of subscriptions revenue as a percentage of total revenue therefore results in a higher overall gross profit margin. In 2015 and 2016, the proportion of our revenue attributable to subscriptions increased as a proportion of our total revenue, thereby increasing our overall gross profit margin during such period. Although the proportion of our revenue attributable to subscriptions for the year ended December 31, 2017 decreased slightly from such amount for the year ended December 31, 2016, the proportion of our revenue attributable to subscriptions increased as a proportion of our total revenue for each of the years ended December 31, 2018 and December 31, 2019. We intend to continue focusing on growing cloud subscriptions revenue faster than professional services revenue in the future.

There can be no guarantee that we will successfully increase subscriptions revenue as a percentage of total revenue in the future. Our customers may demand more professional services from us, or demand for our cloud subscriptions may grow slower than demand for our professional services. Should we fail to increase subscriptions revenue as a percentage of our total revenue our earnings may suffer and our stock price may decline.

If we do not continue to innovate and provide a platform that is useful to our customers, we may not remain competitive, and our revenue and operating results could suffer.

Our success depends on continued innovation to provide features that make our platform useful for our customers. We must continue to invest significant resources in research and development in order to continually improve the simplicity and power of our platform. We may introduce significant changes to our platform or develop and introduce new and unproven products, including using technologies with which we have little or no prior development or operating experience. If we are unable to continue offering innovative solutions or if new or enhanced solutions fail to engage our customers, we may be unable to attract additional customers or retain our current customers, which may adversely affect our business, operating results and financial condition.

We may need to reduce or change our pricing model to remain competitive.

We generally sell our software on a per-user basis and, to a lesser degree, non-user based single application licenses. We have changed and expect that we will continue to need to change our pricing model from time to time. As competitors introduce new products that compete with ours or reduce their prices, we may be unable to attract new customers or retain existing customers based on our historical pricing. We also must determine the appropriate price to enable us to compete effectively internationally. Moreover, mid- to large-size enterprises may demand substantial price discounts as part of the negotiation of sales contracts. As a result, we may be required or choose to reduce our prices or change our pricing model, which could adversely affect our business, operating results and financial condition.

If the estimates and assumptions we have used to calculate the size of our target market are inaccurate, our future growth rate may be limited.

Our projections, assumptions and estimates of future opportunities within our target market are necessarily subject to a high degree of uncertainty and risk due to a variety of factors, including those described in this Annual Report on Form 10-K. If third-party or internally generated data prove to be inaccurate or we make errors in our assumptions based on that data, our future growth rate may be limited. In addition, these inaccuracies or errors may cause us to misallocate capital and other business resources, which could harm our business. Even if our target market meets our size estimates and experiences the forecasted growth, we may not grow our business at similar rates, or at all. Our growth is subject to many factors, including our success in implementing our business strategy, which is subject to many risks and uncertainties. Accordingly, the forecasts of market growth included in this Annual Report on Form 10-K should not be taken as indicative of our future growth.

Our business could be adversely affected if our customers are not satisfied with the deployment services provided by us or our partners.

The success of our business depends on our customers’ satisfaction with our platform, the support that we provide for our platform and the professional services that we provide to help our customers deploy our platform. Professional services may be performed by our own staff, by a third party or by a combination of the two. Our strategy is to work with third parties to increase the breadth, capability and depth of capacity for delivery of these services to our customers, and third parties provide a significant portion of our deployment services. If a customer is not satisfied with the quality of work performed by us or a third party or with the type of applications delivered, we could incur additional costs to address the deficiency, which would diminish the profitability of the customer relationship. Further, a customer’s dissatisfaction with our services could impair our ability to expand the number of licenses to our software purchased by that customer or adversely affect the customer’s renewal of existing licenses. In addition, negative publicity related to our customer relationships, regardless of accuracy, may further damage our business by affecting our ability to compete for new business with actual and prospective customers.

If customers do not expand their use of our platform beyond initial use cases and applications, our ability to grow our business and our operating results may be adversely affected.

Our ability to grow our business depends, in part, on our ability to persuade existing customers to expand their use of our platform to additional use cases and additional applications, and to purchase additional software licenses to our platform. Our goal is for customer satisfaction with initial applications developed on our platform to drive increased sales of licenses to our platform. However, if customers are not satisfied with their initial experience using our platform, they may choose not to renew licenses upon expiration or purchase additional software licenses, which would adversely affect our operating results.

We are substantially dependent upon customer renewals, the addition of new customers and the continued growth of our subscriptions revenue.

We derive, and expect to increasingly derive in the future, a substantial portion of our revenue from the sale of software subscriptions. For 2019, 2018 and 2017, approximately 58%, 56% and 52%, respectively, of our total revenue was subscriptions revenue. The market for our platform is still evolving, and competitive dynamics may cause pricing levels to change as the market matures and as existing and new market participants introduce new types of solutions and different approaches to enable customers to address their needs. As a result, we may be forced to reduce the prices we charge for software and may be required to offer terms less favorable to us for new and renewing agreements.

In order for us to improve our operating results, it is important that our customers renew their subscriptions with us when their initial term expires, as well as purchase additional subscriptions from us. In general, our customers have no renewal obligation after their initial term expires, and we cannot assure you that we will be able to renew subscriptions with any of our customers at the same or higher contract value.

Further, while we offer access to our platform primarily through multi-year subscription agreements, some agreements may have shorter durations. Additionally, some of our contracts limit the amount we can increase prices from period to period, or include pricing guarantees. If our customers do not renew their agreements, terminate their agreements, renew their agreements on terms less favorable to us or fail to purchase additional software subscriptions, our revenue may decline and our operating results would likely be harmed as a result.

Because we generally recognize revenue from cloud subscriptions ratably over the term of the subscription agreement, near term changes in sales may not be reflected immediately in our operating results.

We offer our solution primarily through multi-year cloud subscription agreements and generally recognize revenue ratably over the related subscription period. As a result, much of the revenue that we report in each quarter is derived from the recognition of previously unbilled contract value relating to agreements entered into during prior periods. Accordingly, a decline in new or renewal subscription agreements in any quarter is not likely to be reflected immediately in our revenue results for that quarter. Such declines, however, would negatively affect our revenue and to a lesser extent deferred revenue balance in future periods, and the effect of significant downturns in sales and market acceptance of our platform, and potential changes in our rate of renewals, may not be fully reflected in our results of operations until future periods.

Failure to effectively develop and expand our sales and marketing capabilities could harm our ability to increase our customer base and achieve broader market acceptance of our platform.

Our ability to increase our customer base and achieve broader market acceptance of our platform will depend to a significant extent on our ability to expand our sales and marketing operations. We plan to continue expanding our sales force and third-party strategic sales partners, both domestically and internationally; however, there is no assurance that we will be successful in attracting and retaining talented sales personnel or strategic partners or that any new sales personnel or strategic partners will be able to achieve productivity in a reasonable period of time or at all. We also plan to dedicate significant resources to sales and marketing programs, including through electronic marketing campaigns and trade event sponsorship and participation. All of these efforts will require us to invest significant financial and other resources and our business will be harmed if our efforts do not generate a correspondingly significant increase in revenue.

If we are not able to maintain and enhance our brand, our business and operating results may be adversely affected.

We believe that developing and maintaining widespread awareness of our brand in a cost-effective manner is critical to achieving widespread acceptance of our platform and attracting new customers. Brand promotion activities may not generate customer awareness or increase revenue and, even if they do, any increase in revenue may not offset the expenses we incur in building our brand. If we fail to successfully promote and maintain our brand, or incur substantial expenses, we may fail to attract or retain customers necessary to realize a sufficient return on our brand-building efforts, or to achieve the widespread brand awareness that is critical for broad customer adoption of our platform.

If our platform fails to perform properly or there are defects or disruptions in the rollout of our platform updates or enhancements, our reputation could be adversely affected, our market share could decline and we could be subject to liability claims.

Our platform is inherently complex and may contain material defects or errors. Any defects in functionality or that cause interruptions in the availability of our platform could result in:

- loss or delayed market acceptance and sales;
- breach of warranty claims;
- sales credits or refunds for prepaid amounts related to unused subscription services;
- loss of customers;
- diversion of development and support resources; and/or
- injury to our reputation.

The costs incurred in correcting any material defects or errors might be substantial and could adversely affect our operating results.

Our customer agreements often provide service level commitments on a monthly basis. If we are unable to meet the stated service level commitments or suffer extended periods of unavailability for our platform, we may be contractually obligated to provide these customers with service credits, refunds for prepaid amounts or we could face contract terminations. Our revenue could be significantly affected if we suffer unscheduled downtime that exceeds the allowed downtimes under our agreements with our customers.

Because of the large amount of data that we collect and manage, it is possible that hardware failures or errors in our systems could result in data loss or corruption, or cause the information that we collect to be incomplete or contain inaccuracies that our customers regard as significant. Furthermore, the availability or performance of our platform could be adversely affected by a number of factors, including customers' inability to access the internet, the failure of our network or software systems, security breaches or variability in user traffic for our services. For example, our cloud offering customers access our platform through their internet service providers. If a customer's service provider fails to provide sufficient capacity to support our platform or otherwise experiences service outages, such failure could interrupt our customers' access to our platform, adversely affect their perception of our platform's reliability and reduce our revenue. In addition to potential liability, if we experience interruptions in the availability of our cloud offering, our reputation could be adversely affected and we could lose customers.

We also provide frequent incremental releases of software updates and functional enhancements to our platform. Despite extensive pre-release testing, such new versions occasionally contain undetected errors when first introduced or released. We have, from time to time, found errors in our software, and new errors in our existing software may be detected in the future. Since our customers use our software for important aspects of their business, any errors, defects, disruptions in our platform or other performance problems with our solution could hurt our reputation and may damage our customers' businesses. If that occurs, our customers may delay or withhold payment to us, elect not to renew, make service credit claims, warranty claims or other claims against us, and we could lose future sales. The occurrence of any of these events could result in an increase in our bad debt expense, an increase in collection cycles for accounts receivable, decreased future revenue and earnings, require us to increase our warranty provisions or incur the risk or expense of litigation.

If we fail to offer high-quality support, our business and reputation would suffer.

Our customers rely on our personnel for support of our platform. High-quality support is important for the renewal of our agreements with existing customers and to our existing customers purchasing additional software. The importance of high-quality support will increase as we expand our business and pursue new customers. If we do not help our customers quickly resolve issues and provide effective ongoing support, our ability to sell new software to existing and new customers would suffer and our reputation with existing or potential customers would be harmed.

As a result of our customers' increased usage of our cloud offering, we will need to continually improve our computer network and infrastructure to avoid service interruptions or slower system performance.

As usage of our cloud offering grows and as customers use it for more complicated applications and with increased data requirements, we will need to devote additional resources to improving our platform architecture and our infrastructure in order to maintain the performance of our cloud offering. Any failure or delays in our computer systems could cause service interruptions or slower system performance. If sustained or repeated, these performance issues could reduce the attractiveness of our platform to customers. These performance issues could result in lost customer opportunities and lower renewal rates, any of which could hurt our revenue growth, customer loyalty and reputation.

We rely upon Amazon Web Services to operate our cloud offering; any disruption of or interference with our use of Amazon Web Services would adversely affect our business, results of operations and financial condition.

We outsource substantially all of the infrastructure relating to our cloud offering to AWS, which hosts our platform on our customers' behalf. Customers of our cloud offering need to be able to access our platform at any time, without interruption or degradation of performance, and we provide them with service level commitments with respect to uptime. AWS runs its own platform that we access, and we are, therefore, vulnerable to service interruptions at AWS. We may experience interruptions, delays and outages in service and availability from time to time as a result of problems with our AWS provided infrastructure, which could render our cloud offering inaccessible to customers. Additionally, AWS has suffered outages at specific customer locations in the past, rendering the customer unable to access our offering for periods of time. Lack of availability of our AWS infrastructure could be due to a number of potential causes including technical failures, natural disasters, fraud or security attacks that we cannot predict or prevent. Such outages could lead to the triggering of our service level agreements and the issuance of credits to our cloud offering customers, which may impact our operating results.

In addition, if the security of the AWS infrastructure is compromised or believed to have been compromised, our business, results of operations and financial condition could be adversely affected. It is possible that our customers and potential customers would hold us accountable for any breach of security affecting the AWS infrastructure and we may incur significant liability from those customers and from third parties with respect to any breach affecting AWS systems. Because our agreement with AWS limits AWS's liability for damages, we may not be able to recover a material portion of our liabilities to our customers and third parties from AWS. Customers and potential customers may refuse to do business with us because of the perceived or actual failure of our cloud offering as hosted by AWS and our operating results could be harmed.

Our agreement with AWS allows AWS to terminate the agreement by providing two years' prior written notice, and may allow AWS to terminate in case of a breach of contract if such breach is uncured for 30 days, or to terminate upon thirty days' advance written notice if AWS's further provision of services to us becomes impractical for legal or regulatory reasons. Although we expect that we could receive similar services from other third parties if any of our arrangements with AWS are terminated, we could experience interruptions on our platform and in our ability to make our platform available to customers, as well as delays and additional expenses in arranging alternative cloud infrastructure services.

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

We believe that a critical component to our success has been our corporate culture. We have invested substantial time and resources in building our team and maintaining that corporate culture through the growth of our company. As we grow and develop the infrastructure of a public company, we may find it difficult to maintain important aspects of our corporate culture. Any failure to preserve our culture could negatively affect our future success, including our ability to retain and recruit personnel and to effectively focus on and pursue our corporate objectives.

Our growth depends in part on the success of our strategic relationships with third parties.

In order to grow our business, we anticipate that we will continue to depend on relationships with strategic partners to provide broader customer coverage and solution delivery capabilities. Identifying partners, and negotiating and documenting relationships with them, requires significant time and resources. Our agreements with our strategic partners are non-exclusive and do not prohibit them from working with our competitors or offering competing solutions. Our competitors may be effective in providing incentives to third parties to favor their products or services or to prevent or reduce subscriptions to our services. If our partners choose to place greater emphasis on products of their own or those offered by our competitors or do not effectively market and sell our platform, our ability to grow our business and sell software and professional services may be adversely affected. In addition, acquisitions of our partners by our competitors could result in a decrease in the number of our current and potential customers, as our partners may no longer facilitate the adoption of our platform by potential customers.

If we are unsuccessful in establishing or maintaining our relationships with third parties, our ability to compete in the marketplace or to grow our revenue could be impaired and our operating results may suffer. Even if we are successful, we cannot assure you that these relationships will result in increased customer usage of our platform or increased revenue.

Because our long-term growth strategy involves further expansion of our sales to customers outside the United States, our business will be susceptible to risks associated with international operations.

A component of our growth strategy involves the further expansion of our operations and customer base internationally. In 2019, 2018 and 2017, revenue generated from customers outside the United States was 32%, 29% and 27%, respectively, of our total revenue. We currently have international offices in the United Kingdom, continental Europe, Australia and Singapore, which focus primarily on selling and implementing our platform in those regions. In the future, we may expand to other international locations. Our current international operations and future initiatives will involve a variety of risks, including:

- changes in a specific country's or region's political or economic conditions;
- unexpected changes in regulatory requirements, taxes or trade laws;
- more stringent regulations relating to data security and the unauthorized use of, or access to, commercial and personal information, particularly in the European Union;
- differing labor regulations, especially in the European Union, where labor laws are generally more advantageous to employees as compared to the United States, including deemed hourly wage and overtime regulations in these locations;
- challenges inherent in efficiently managing an increased number of employees over large geographic distances, including the need to implement appropriate systems, policies, benefits and compliance programs;
- difficulties in managing a business in new markets with diverse cultures, languages, customs, legal systems, alternative dispute systems and regulatory systems;
- increased travel, real estate, infrastructure and legal compliance costs associated with international operations;
- currency exchange rate fluctuations and the resulting effect on our revenue and expenses, and the cost and risk of entering into hedging transactions if we choose to do so in the future;
- limitations on our ability to reinvest earnings from operations in one country to fund the capital needs of our operations in other countries;
- laws and business practices favoring local competitors or general preferences for local vendors;
- limited or insufficient levels of protection of our corporate proprietary information and assets, including intellectual property and customer information and records;
- political instability or terrorist activities;
- exposure to liabilities under anti-corruption and anti-money laundering laws, including the U.S. Foreign Corrupt Practices Act and similar laws and regulations in other jurisdictions; and
- adverse tax burdens and foreign exchange controls that could make it difficult to repatriate earnings and cash.

Our limited experience in operating our business internationally increases the risk that any potential future expansion efforts that we may undertake will not be successful. If we invest substantial time and resources to expand our international operations and are unable to do so successfully and in a timely manner, our business and operating results will suffer.

We may require additional capital to support business growth, and this capital might not be available on acceptable terms, if at all.

We intend to continue to make investments to support our business growth and may require additional funds to respond to business challenges, including the need to develop new features or enhance our platform, improve our operating infrastructure or acquire complementary businesses and technologies. Accordingly, we may need to engage in equity or debt financings to secure additional funds. If we raise additional funds through future issuances of equity or convertible debt securities, our existing stockholders could suffer significant dilution, and any new equity securities we issue could have rights, preferences and privileges superior to those of holders of our Class A common stock. Our loan and security agreement with Silicon Valley Bank for our current line of credit includes restrictive covenants relating to our capital raising activities and other financial and operational matters, which may make it more difficult for us to obtain additional capital and to pursue business opportunities, including potential acquisitions, and any debt financing that we secure in the future could include similar restrictive covenants. We may not be able to obtain additional financing on terms favorable to us, if at all. If we are unable to obtain adequate financing or financing on terms satisfactory to us when we require it, our ability to continue to support our business growth and to respond to business challenges could be significantly impaired, and our business may be adversely affected.

We may not achieve market acceptance of our pre-built solutions, which may adversely impact our financial results.

We have begun the process of developing and releasing pre-built solutions on our software platform in order to maximize the value of our platform to our customers and to reduce the sales cycles associated with software sales to new and existing customers. For example, in the fall of 2019, we introduced the Institutional On-Boarding Solution for sale to financial institutions to manage the processes relating to on-boarding new institutional customers. Each solution requires an investment in development, marketing, sales, support, finance and legal resources to bring the solution to market. Although we make efforts to identify the solutions that will receive favorable market acceptance, there can be no guarantee that any solution will become the source of material revenue, and the investment in the solution could not produce a positive return. If unsuccessful, such solutions may adversely impact our financial results to the extent that our expenses increase without any increase in sales, or to the extent that attempted sales of such solutions reduce sales of our existing platform.

Legal, political and economic uncertainty surrounding the exit of the United Kingdom, or UK, from the European Union, or EU, may be a source of instability in international markets, create significant currency fluctuations, adversely affect our operations in the United Kingdom and pose additional risks to our business, revenue, financial condition, and results of operations.

The uncertainty concerning the UK's legal, political and economic relationship with the EU after the Transition Period may be a source of instability in the international markets, create significant currency fluctuations, and/or otherwise adversely affect trading agreements or similar cross-border co-operation arrangements (whether economic, tax, fiscal, legal, regulatory or otherwise).

These developments, or the perception that any of them could occur, have had, and may continue to have, a significant adverse effect on global economic conditions and the stability of global financial markets, and could significantly reduce global market liquidity and limit the ability of key market participants to operate in certain financial markets. In particular, it could also lead to a period of considerable uncertainty in relation to the UK financial and banking markets, as well as on the regulatory process in Europe. Asset valuations, currency exchange rates and credit ratings may also be subject to increased market volatility.

If the UK and the EU are unable to negotiate acceptable trading and customs terms or if other EU Member States pursue withdrawal, barrier-free access between the UK and other EU Member States or among the European Economic Area, or EEA, overall could be diminished or eliminated. The long-term effects of Brexit will depend on any agreements (or lack thereof) between the UK and the EU and, in particular, any arrangements for the UK to retain access to EU markets after the Transition Period.

Such a withdrawal from the EU is unprecedented, and it is unclear how the UK's access to the European single market for goods, capital, services and labor within the EU, or single market, and the wider commercial, legal and regulatory environment, will impact our UK operations and customers following the expiry of the Transition Period. Our UK operations service customers in the UK as well as in other countries in the EU and EEA and these operations could be disrupted by Brexit, particularly if there is a change in the UK's relationship to the single market.

We may also face new regulatory costs and challenges as a result of Brexit that could have an adverse effect on our operations. For example, the European Parliament and the Council of the EU adopted a comprehensive general data protection regulation, or GDPR, in 2016 to replace the current European Union Data Protection Directive and related country-specific legislation. Although the United Kingdom enacted the Data Protection Act 2018 which is consistent with the GDPR, uncertainty remains regarding how data transfers to and from the United Kingdom will be regulated following the Transition Period.

There may continue to be legal, political and economic uncertainty surrounding the consequences of Brexit which could adversely impact customer confidence resulting in customers reducing their spending budgets on our solutions, which, in turn, could adversely affect our business, revenue, financial condition and results of operations.

If currency exchange rates fluctuate substantially in the future, our financial results, which are reported in U.S. dollars, could be adversely affected.

Generally, contracts executed by our foreign operations are denominated in the currency of that country or region and a portion of our revenue is therefore subject to foreign currency risks. As we continue to expand our international operations, we become more exposed to the effects of fluctuations in currency exchange rates. A strengthening of the U.S. dollar could reduce the dollar value of revenues generated by our customers outside of the United States, adversely affecting our business operations and financial results. We incur expenses for employee compensation and other operating expenses at our non-U.S. locations in the local currency, and fluctuations in the exchange rates between the U.S. dollar and other currencies could result in the dollar equivalent of such expenses being higher. This could have a negative impact on our reported operating results. To date, we have not engaged in any hedging strategies, and any such strategies, such as forward contracts, options and foreign exchange swaps related to transaction exposures that we may implement to mitigate this risk may not eliminate our exposure to foreign exchange fluctuations.

We employ third-party licensed software for use in or with our software, and the inability to maintain these licenses or errors in the software we license could result in increased costs, or reduced service levels, which would adversely affect our business.

Our software incorporates certain third-party software obtained under licenses from other companies, including database software from Kx. We anticipate that we will continue to rely on such third-party software and development tools from third parties in the future. Although we believe that there are commercially reasonable alternatives to the third-party software we currently license, including open source software, this may not always be the case, or it may be difficult or costly to migrate to other third-party software. Our use of additional or alternative third-party software would require us to enter into license agreements with third parties. In addition, integration of the third-party software used in our software with new third-party software may require significant work and require substantial investment of our time and resources. Also, any undetected errors or defects in third-party software could prevent the deployment or impair the functionality of our software, delay new updates or enhancements to our platform, result in a failure of our platform and injure our reputation.

If we do not or cannot maintain the compatibility of our platform with third-party applications that our customers use in their businesses, our revenue will decline.

The functionality and attractiveness of our platform depends, in part, on our ability to integrate our platform with third-party applications and platforms, including customer relationship management, human resources information, accounting and enterprise resource planning systems that our customers use and from which they obtain data. Third-party providers of applications and APIs may change the features of their applications and platforms, restrict our access to their applications and platforms or alter the terms governing use of their applications and APIs and access to those applications and platforms in an adverse manner. Such changes could functionally limit or terminate our ability to use these third-party applications and platforms in conjunction with our platform, which could negatively impact our offerings and harm our business. If we fail to integrate our software with new third-party applications and platforms that our customers use, we may not be able to offer the functionality that our customers need, which would negatively impact our ability to generate revenue and adversely impact our business.

Portions of our platform utilize open source software, and any failure to comply with the terms of one or more of these open source licenses could negatively affect our business.

Our software contains software licensed to us by third parties under so-called “open source” licenses, including the GNU Lesser General Public License, the BSD License and others. From time to time, there have been claims against companies that distribute or use open source software in their products and services, asserting that such open source software infringes the claimants’ intellectual property rights. We could be subject to suits by parties claiming that what we believe to be licensed open source software infringes their intellectual property rights. Use and distribution of open source software may entail greater risks than use of third-party commercial software, as open source licensors generally do not provide warranties or other contractual protections regarding infringement claims or the quality of the code. In addition, certain open source licenses require that source code for software programs that are subject to the license be made available to the public and that any modifications or derivative works to such open source software continue to be licensed under the same terms.

Although we monitor our use of open source software in an effort both to comply with the terms of the applicable open source licenses and to avoid subjecting our software to conditions we do not intend, the terms of many open source licenses have not been interpreted by U.S. courts, and there is a risk that these licenses could be construed in a way that could impose unanticipated conditions or restrictions on our ability to commercialize our platform. By the terms of certain open source licenses, we could be required to release the source code of our software and to make our software available under open source licenses, if we combine or distribute our software with open source software in a certain manner. In the event that portions of our software are determined to be subject to an open source license, we could be required to publicly release the affected portions of our source code, re-engineer all, or a portion of, that software or otherwise be limited in the licensing of our software, each of which could reduce or eliminate the value of our platform. Many of the risks associated with usage of open source software cannot be eliminated, and could negatively affect our business, results of operations and financial condition.

Catastrophic events may disrupt our business.

Our corporate headquarters are located in northern Virginia. The area around Washington, D.C. could be subjected to terrorist attacks. Additionally, we rely on our network and third-party infrastructure and enterprise applications, internal technology systems and our website for our development, marketing, operational support, hosted services and sales activities. In the event of a major hurricane, earthquake or catastrophic event such as fire, power loss, telecommunications failure, cyberattack, outbreak of regional or global pandemic diseases, war or terrorist attack, we may be unable to continue our operations and may endure system interruptions, reputational harm, delays in our software development, lengthy interruptions in our services, breaches of data security and loss of critical data, all of which could have an adverse effect on our future operating results. For example, the ongoing coronavirus outbreak emanating from China at the beginning of 2020 has resulted in increased travel restrictions and extended shutdown of certain businesses in the region. At this point, the extent to which the coronavirus may impact our operating results is uncertain.

Our reported financial results may be adversely affected by changes in accounting principles generally accepted in the United States.

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

In particular, in May 2014, the FASB issued ASC 606, which supersedes the revenue recognition requirements in ASC Topic 605, *Revenue Recognition*, or ASC 605. The core principle of ASU 2014-09 is that an entity should recognize revenue to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. Because we were an “emerging growth company” until December 31, 2019, the Jumpstart Our Business Startups Act, or the JOBS Act, allowed us to delay adoption of new or revised accounting pronouncements applicable to public companies until such pronouncements are made applicable to private companies. We elected to use this extended transition period under the JOBS Act with respect to ASC 606, which means ASC 606 became applicable to us for the annual period beginning on January 1, 2019. In accordance with guidance, the new standard has been adopted in this Annual Report on Form 10-K but was not adopted in prior periods. Therefore, such periods are not directly comparable.

While the new standard has not had a material impact on the timing of revenue recognition related to our cloud-based subscriptions and standalone professional services, the new standard has had a significant impact on the timing of revenue recognition related to our on-premises term licenses since we are now required to recognize a portion of revenue from the on-premises term license contracts upon delivery of the software. These changes may cause variability in our reported operating results due to periodic or long-term changes in the mix between term license subscriptions and cloud subscriptions to our platform. For more information about ASC 606, see Note 2, Summary of Significant Accounting Policies, to our consolidated financial statements included elsewhere in this Annual Report on Form 10-K.

Additionally, in February 2016, the FASB issued ASU No. 2016-2, *Leases (Topic 842)*, or ASU 2016-2, which requires that lessees recognize assets and liabilities for leases with lease terms greater than 12 months in the statement of financial position. ASU 2016-2 also requires improved disclosures to help users of financial statements better understand the amount, timing and uncertainty of cash flows arising from leases. The update is effective for fiscal years beginning after

December 15, 2019, and interim periods within fiscal years beginning after December 15, 2020. Early adoption is permitted. At December 31, 2019, we no longer qualified as an emerging growth company, at which point we were required to retrospectively adopt ASU 2016-2 effective January 1, 2019, in line with the adoption requirements for large accelerated filers. For more information about ASU 2016-2, see Note 2, Summary of Significant Accounting Policies, to our consolidated financial statements included elsewhere in this Annual Report on Form 10-K.

If our estimates or judgments relating to our critical accounting policies prove to be incorrect, our results of operations could be adversely affected.

The preparation of consolidated financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the amounts reported in the consolidated financial statements and accompanying notes. We base our estimates on historical experience and on various other assumptions that we believe to be reasonable under the circumstances, as provided in Part II, Item 7, "Management's Discussion and Analysis of Financial Condition and Results of Operations" of this Annual Report on Form 10-K. The results of these estimates form the basis for making judgments about the carrying values of assets, liabilities and equity, and the amount of revenue and expenses that are not readily apparent from other sources. Significant assumptions and estimates used in preparing our consolidated financial statements include those related to revenue recognition, income taxes and the related valuation allowance, stock-based compensation and fair value measurements for our previously outstanding preferred stock warrant. Our results of operations may be adversely affected if our assumptions change or if actual circumstances differ from those in our assumptions, which could cause our results of operations to fall below the expectations of securities analysts and investors, resulting in a decline in the trading price of our Class A common stock.

Adverse economic conditions may negatively impact our business.

Our business depends on the overall demand for enterprise software and on the economic health of our current and prospective customers. The economies of countries in Europe have been experiencing weakness associated with high sovereign debt levels, weakness in the banking sector and uncertainty over the future of the Euro zone and the United Kingdom's membership in the European Union. We have operations in the United Kingdom and in Europe and current and potential new customers in Europe. If economic conditions in Europe and other key markets for our platform continue to remain uncertain or deteriorate further, many customers may delay or reduce their information technology spending. This could result in reductions in sales of our platform, a decrease in our renewal rate, longer sales cycles, reductions in subscription duration and value, slower adoption of new technologies and increased price competition. Any of these events would likely have an adverse effect on our business, operating results and financial position.

Our services revenue is highly dependent on selling software to new and existing customers.

We derive a majority of our services revenue from professional services that relate to the development and delivery of new applications using our platform, after a customer has made an initial or additional software purchase. Accordingly, our failure to sell software may have a collateral adverse impact on our services revenue and our overall operational results.

Future acquisitions could disrupt our business and adversely affect our business operations and financial results.

We may choose to expand by acquiring businesses or technologies. For instance, in January 2020, we acquired Novayre Solutions S.L., developer of the Jidoka RPA platform, which we are continuing to integrate along with their personnel. Our ability as an organization to successfully acquire and integrate technologies or businesses is unproven. Acquisitions involve many risks, including the following:

- an acquisition may negatively affect our financial results because it may require us to incur charges or assume substantial debt or other liabilities, may cause adverse tax consequences or unfavorable accounting treatment, may expose us to claims and disputes by third parties, including intellectual property claims and disputes, or may not generate sufficient financial return to offset additional costs and expenses related to the acquisition;
- we may encounter difficulties or unforeseen expenditures in integrating the business, technologies, products, personnel or operations of any company that we acquire, particularly if key personnel of the acquired company decide not to work for us;
- an acquisition may disrupt our ongoing business, divert resources, increase our expenses and distract our management;

- an acquisition may result in a delay or reduction of customer purchases for both us and the company acquired due to customer uncertainty about continuity and effectiveness of service from either company;
- we may encounter difficulties in successfully selling, or may be unable to successfully sell, any acquired solutions;
- an acquisition may involve the entry into geographic or business markets in which we have little or no prior experience or where competitors have stronger market positions;
- our use of cash to pay for an acquisition would limit other potential uses for our cash; and
- if we incur debt to fund such acquisition, such debt may subject us to material restrictions on our ability to conduct our business as well as financial maintenance covenants.

The occurrence of any of these risks could have a material adverse effect on our business operations and financial results. In addition, we may only be able to conduct limited due diligence on an acquired company's operations. Following an acquisition, we may be subject to unforeseen liabilities arising from an acquired company's past or present operations and these liabilities may be greater than the warranty and indemnity limitations that we negotiate. Any unforeseen liability that is greater than these warranty and indemnity limitations could have a negative impact on our financial condition.

Risks Related to Government Regulation, Data Collection, Intellectual Property and Litigation

Failure to comply with governmental laws and regulations could harm our business.

Our business is subject to regulation by various federal, state, local and foreign governments. In certain jurisdictions, these regulatory requirements may be more stringent than those in the United States. Noncompliance with applicable regulations or requirements could subject us to investigations, sanctions, mandatory product recalls, enforcement actions, disgorgement of profits, fines, damages, civil and criminal penalties, injunctions or other collateral consequences. If any governmental sanctions are imposed, or if we do not prevail in any possible civil or criminal litigation, our business, results of operations, and financial condition could be materially adversely affected. In addition, responding to any action will likely result in a significant diversion of management's attention and resources and an increase in professional fees. Enforcement actions and sanctions could harm our business, reputation, results of operations and financial condition.

Because our software could be used to collect and store personal information, domestic and international privacy concerns could result in additional costs and liabilities to us or inhibit sales of our software.

Personal privacy has become a significant issue in the United States and in many other countries where we offer our software for sale. The regulatory framework for privacy issues worldwide is rapidly evolving and is likely to remain uncertain for the foreseeable future. Many federal, state and foreign government bodies and agencies have adopted or are considering adopting laws and regulations regarding the collection, use, storage and disclosure of personal information and breach notification procedures. Interpretation of these laws, rules and regulations and their application to our software and professional services in the United States and foreign jurisdictions is ongoing and cannot be fully determined at this time.

In the United States, these include rules and regulations promulgated under the authority of the Federal Trade Commission, the Electronic Communications Privacy Act, Computer Fraud and Abuse Act, the Health Insurance Portability and Accountability Act of 1996, the Gramm Leach Bliley Act, the California Consumer Privacy Act, or the CCPA, and other state laws relating to privacy and data security. The CCPA, which became effective on January 1, 2020, drastically changes the ability for individuals to control the use of their personal data. It contains detailed requirements regarding collecting and processing personal information, imposes certain limitations on how such information may be used, and provides rights to consumers that have never before been available in the past, all of which may be imposed on us by our customers. This could increase our costs of doing business. Internationally, the European Union adopted the GDPR, which took effect in May 2018 and virtually every jurisdiction in which we operate has established its own data security and privacy legal framework with which we or our customers must comply. Since we are agnostic as to the data uploaded into our cloud offering by our cloud offering customers or processed by our platform in on-premises deployments, we may be hosting or otherwise processing substantial amounts of individually identifiable health information and other types of personally identifiable information.

In addition to government regulation, privacy advocates and industry groups may propose new and different self-regulatory standards that may apply to us. Because the interpretation and application of privacy and data protection laws are still uncertain, it is possible that these laws and other actual or alleged legal obligations, such as contractual or self-regulatory obligations, may be interpreted and applied in a manner that is inconsistent with our existing data management practices or the features of our platform. If so, in addition to the possibility of fines, lawsuits and other claims, we could be required to fundamentally change our business activities and practices or modify our software, which could have an adverse effect on our business. Any inability to adequately address privacy concerns, even if unfounded, or comply with applicable privacy or data protection laws, regulations and policies, could result in additional cost and liability to us, damage our reputation, inhibit sales and adversely affect our business.

Furthermore, the costs of compliance with, and other burdens imposed by, the laws, regulations, and policies that are applicable to the businesses of our customers may limit the use and adoption of, and reduce the overall demand for, our platform. Privacy concerns, whether valid or not valid, may inhibit market adoption of our platform particularly in certain industries and foreign countries.

Any failure to protect our proprietary technology and intellectual property rights could substantially harm our business and operating results.

Our success and ability to compete depend in part on our ability to protect our proprietary technology and intellectual property. To safeguard these rights, we rely on a combination of patent, trademark, copyright and trade secret laws and contractual protections in the United States and other jurisdictions, all of which provide only limited protection and may not now or in the future provide us with a competitive advantage.

As of December 31, 2019, we had five granted patents and three patents pending related to our platform and its technology. We cannot assure you that any of our patent applications will result in the issuance of a patent or that the examination process will not require us to narrow our claims. Any patents that issue from any patent applications may not give us the protection that we seek or may be challenged, invalidated or circumvented. Any patents that may issue in the future from our pending or future patent applications may not provide sufficiently broad protection and may not be valid and enforceable in actions against alleged infringers. Any patents we have obtained or may obtain in the future may be found to be invalid or unenforceable in light of recent and future changes in the law, or because of technology developed prior to the inventions we have sought to patent or because of defects in our patent prosecution process.

We have registered the “Appian” name and logo in the United States and certain other countries. We have registrations and/or pending applications for additional marks in the United States; however, we cannot assure you that any future trademark registrations will be issued for pending or future applications or that any registered trademarks will be enforceable or provide adequate protection of our proprietary rights. We also license software from third parties for integration into our products, including open source software and other software available on commercially reasonable terms. We cannot assure you that such third parties will maintain such software or continue to make it available.

In order to protect our unpatented proprietary technologies and processes, we rely on trade secret laws and confidentiality and invention assignment agreements with our employees, consultants, strategic partners, vendors and others. Some of our customer contracts also require us to place our proprietary source code in escrow for the benefit of our customer in the event we go bankrupt, become insolvent or are unable to fulfill our support obligations under our customer contracts. Also, despite our efforts to protect our proprietary technology and trade secrets, unauthorized parties may attempt to misappropriate, copy, reverse engineer or otherwise obtain and use them. In addition, others may independently discover our trade secrets, in which case we would not be able to assert trade secret rights or develop similar technologies and processes. Further, the contractual provisions that we enter into may not prevent unauthorized use or disclosure of our proprietary technology or intellectual property rights and may not provide an adequate remedy in the event of unauthorized use or disclosure of our proprietary technology or intellectual property rights. Moreover, policing unauthorized use of our technologies, trade secrets and intellectual property is difficult, expensive and time-consuming, particularly in foreign countries where the laws may not be as protective of intellectual property rights as those in the United States and where mechanisms for enforcement of intellectual property rights may be weak. To the extent that we expand our activities outside of the United States, our exposure to unauthorized copying and use of our platform and proprietary information may increase. We may be unable to determine the extent of any unauthorized use or infringement of our platform, technologies or intellectual property rights.

There can be no assurance that the steps that we take will be adequate to protect our proprietary technology and intellectual property, that others will not develop or patent similar or superior technologies, products or services, or that our trademarks, patents, and other intellectual property will not be challenged, invalidated or circumvented by others. Furthermore, effective trademark, patent, copyright, and trade secret protection may not be available in every country in which our software is available or where we have employees or independent contractors. In addition, the legal standards relating to the validity, enforceability, and scope of protection of intellectual property rights in internet and software-related industries are uncertain and still evolving.

In order to protect our intellectual property rights, we may be required to spend significant resources to monitor and protect these rights. Litigation brought to protect and enforce our intellectual property rights could be costly, time-consuming and distracting to management and could result in the impairment or loss of portions of our intellectual property. Furthermore, our efforts to enforce our intellectual property rights may be met with defenses, counterclaims and countersuits attacking the validity and enforceability of our intellectual property rights. Our failure to secure, protect and enforce our intellectual property rights could seriously adversely affect our brand and adversely impact our business.

We may be subject to intellectual property rights claims by third parties, which are extremely costly to defend, could require us to pay significant damages and could limit our ability to use certain technologies.

Companies in the software and technology industries, including some of our current and potential competitors, own significant numbers of patents, copyrights, trademarks and trade secrets and frequently enter into litigation based on allegations of infringement or other violations of intellectual property rights. In addition, many of these companies have the capability to dedicate substantially greater resources to enforce their intellectual property rights and to defend claims that may be brought against them. The litigation may involve patent holding companies or other adverse patent owners that have no relevant product revenue and against which our patents may therefore provide little or no deterrence. In the past, we have been subject to allegations of patent infringement that were unsuccessful, and we may in the future be subject to claims that we have misappropriated, misused, or infringed other parties' intellectual property rights, and, to the extent we gain greater market visibility or face increasing competition, we face a higher risk of being the subject of intellectual property infringement claims, which is not uncommon with respect to enterprise software companies. We also generally grant our customers ownership of any custom applications that we develop for them, subject to our continued ownership of our pre-existing intellectual property rights and, in the past, a customer for whom we have developed custom applications has incorrectly alleged that applications we have independently developed infringed the customer's intellectual property rights. In addition, we have in the past and may in the future be subject to claims that employees or contractors, or we, have inadvertently or otherwise used or disclosed trade secrets or other proprietary information of our competitors or other parties. To the extent that intellectual property claims are made against our customers based on their usage of our technology, we have certain obligations to indemnify and defend such customers from those claims. The term of our contractual indemnity provisions often survives termination or expiration of the applicable agreement. Large indemnity payments, defense costs or damage claims from contractual breach could harm our business, results of operations and financial condition.

There may be third-party intellectual property rights, including issued or pending patents that cover significant aspects of our technologies or business methods. Any intellectual property claims, with or without merit, could be very time-consuming, could be expensive to settle or litigate, could divert our management's attention and other resources and could result in adverse publicity. These claims could also subject us to making substantial payments for legal fees, settlement payments, and other costs or damages, potentially including treble damages if we are found to have willfully infringed patents or copyrights. These claims could also result in our having to stop making, selling, offering for sale, or using technology found to be in violation of a third party's rights. We might be required to seek a license for the third-party intellectual property rights, which may not be available on reasonable terms or at all. Even if a license is available to us, we may be required to pay significant upfront fees, milestones or royalties, which would increase our operating expenses. Moreover, to the extent we only have a license to any intellectual property used in our platform, there may be no guarantee of continued access to such intellectual property, including on reasonable terms. As a result, we may be required to develop alternative non-infringing technology, which could require significant effort and expense. If a third party is able to obtain an injunction preventing us from accessing such third-party intellectual property rights, or if we cannot license or develop technology for any infringing aspect of our business, we would be forced to limit or stop sales of our software or cease business activities covered by such intellectual property and may be unable to compete effectively. Any of these results would adversely affect our business, results of operations, financial condition and cash flows.

Changes in laws and regulations related to the internet or changes in the internet infrastructure itself may diminish the demand for our platform and could have a negative impact on our business.

The future success of our business, and particularly our cloud offering, depends upon the continued use of the internet as a primary medium for commerce, communication and business applications. Federal, state or foreign government bodies or agencies have in the past adopted, and may in the future adopt, laws or regulations affecting the use of the internet as a commercial medium. Changes in these laws or regulations could require us to modify our platform in order to comply with these changes. In addition, government agencies or private organizations may begin to impose taxes, fees or other charges for accessing the internet or commerce conducted via the internet. These laws or charges could limit the growth of internet-related commerce or communications generally, resulting in reductions in the demand for internet-based solutions such as ours.

In addition, the use of the internet as a business tool could be adversely affected due to delays in the development or adoption of new standards and protocols to handle increased demands of internet activity, security, reliability, cost, ease of use, accessibility, and quality of service. The performance of the internet and its acceptance as a business tool have been adversely affected by "viruses," "worms" and similar malicious programs, along with distributed denial of service (DDoS) and similar attacks. As a result, the internet has experienced a variety of outages and other delays as a result of such damage to or attacks on portions of its infrastructure. If the use of the internet is adversely affected by these issues, demand for our platform could suffer.

Our operating results may be negatively affected if we are required to pay additional state sales tax, value added, or other transaction taxes, and we could be subject to liability with respect to all or a portion of past or future sales.

We currently collect and remit sales and use, value added and other transaction taxes in certain of the jurisdictions where we do business based on our assessment of whether tax is owed by us in such jurisdictions. However, in some jurisdictions in which we do business, we do not believe that we owe such taxes, and therefore we currently do not collect and remit such taxes in those jurisdictions or record contingent tax liabilities in respect of those jurisdictions.

Further, due to uncertainty in the application and interpretation of applicable tax laws in various jurisdictions, we may be exposed to sales and use, value added or other transaction tax liability. A successful assertion that we are required to pay additional taxes in connection with sales of our platform, or the imposition of new laws or regulations requiring the payment of additional taxes, would create increased costs and administrative burdens for us. If we are subject to additional taxes and determine to offset such increased costs by collecting and remitting sales taxes from our customers, or otherwise passing those costs through to our customers, companies may be discouraged from using our platform. Any increased tax burden may decrease our ability or willingness to compete in relatively burdensome tax jurisdictions, result in substantial tax liabilities related to past sales or otherwise harm our business and operating results.

We are a multinational organization faced with increasingly complex tax issues in many jurisdictions, and we could be obligated to pay additional taxes in various jurisdictions.

As a multinational organization, we may be subject to taxation in several jurisdictions around the world with increasingly complex tax laws and the amount of taxes we pay in these jurisdictions could increase substantially as a result of changes in the applicable tax principles, including increased tax rates, new tax laws or revised interpretations of existing tax laws and precedents, which could have a material adverse effect on our liquidity and operating results. For example, we continue to maintain a full valuation allowance on the deferred tax assets of our subsidiary in Switzerland as we determined that it was not more likely than not that we would be able to realize a benefit from the gross net operating loss at that subsidiary. Based on our cumulative operating results as of December 31, 2019, and assessment of our expected future results of operations, we determined that it was not more-likely-than not that we would be able to realize the deferred tax assets prior to expiration.

In addition, the authorities in these jurisdictions could review our tax returns and impose additional tax, interest and penalties, and the authorities could claim that various withholding requirements apply to us or our subsidiaries or assert that benefits of tax treaties are not available to us or our subsidiaries, any of which could have a material impact on us and the results of our operations.

Our ability to use net operating losses to offset future taxable income may be subject to certain limitations.

As of December 31, 2019, we had U.S. federal and state net operating loss carryforwards, or NOLs, of $99.3 million and $100.9 million, respectively, available to offset future taxable income. NOLs generated in tax years ended on or prior to December 31, 2017 will substantially expire by 2037 if unused. As a result of certain provisions in the Tax Cuts and Jobs Act of 2017, or the TCJA, U.S. federal NOLs and certain state NOLs generated after 2017 have an indefinite carryforward period.

A lack of future taxable income would adversely affect our ability to utilize these NOLs before they expire. Under the provisions of the Internal Revenue Code of 1986, as amended, or the Internal Revenue Code, substantial changes in our ownership may limit the amount of pre-change NOLs that can be utilized annually in the future to offset taxable income. Section 382 of the Internal Revenue Code imposes limitations on a company's ability to use NOLs if a company experiences a more-than-50-percent ownership change over a three-year testing period. Based upon our analysis as of December 31, 2019, we have determined that we do not expect these limitations to impair our ability to use our NOLs prior to expiration. However, if changes in our ownership occur in the future, our ability to use our NOLs may be further limited. For these reasons, we may not be able to utilize a material portion of the NOLs, even if we achieve profitability.

As of December 31, 2019, we also had foreign NOLs of $62.8 million, primarily at Appian Software Switzerland (k/n/a Appian Software International), our wholly-owned subsidiary. These NOLs will begin to expire in 2021 to 2026, if unused. If we are limited in our ability to use our NOLs in future years in which we have taxable income, we will pay more taxes than if we were able to fully utilize our NOLs. This could adversely affect our operating results and the market price of our Class A common stock.

Forecasting our estimated annual effective tax rate for financial accounting purposes is complex and subject to uncertainty, and there may be material differences between our forecasted and actual tax rates.

Forecasts of our income tax position and effective tax rate for financial accounting purposes are complex and subject to uncertainty because our income tax position for each year combines the effects of a mix of profits earned and losses incurred by us in various tax jurisdictions with a broad range of income tax rates, as well as changes in the valuation of deferred tax assets and liabilities, the impact of various accounting rules and changes to these rules and tax laws, the results of examinations by various tax authorities, and the impact of any acquisition, business combination or other reorganization or financing transaction. To forecast our global tax rate, we estimate our pre-tax profits and losses by jurisdiction and forecast our tax expense by jurisdiction. If the mix of profits and losses, our ability to use tax credits, or effective tax rates by jurisdiction is different than those estimated, our actual tax rate could be materially different than forecasted, which could have a material impact on our results of business, financial condition and results of operations.

The U.S. Department of Treasury has broad authority to issue regulations and interpretative guidance that may significantly impact how we will apply the law and impact our results of operations in the period issued. As additional regulatory guidance is issued by the applicable taxing authorities, as accounting treatment is clarified, as we perform additional analysis on the application of the law, and as we refine estimates in calculating the effect, our final analysis, which will be recorded in the period completed, may be different from our current provisional amounts, which could materially affect our tax obligations and effective tax rate.

We are subject to anti-corruption laws with respect to our domestic and international operations and non-compliance with such laws can subject us to criminal and/or civil liability and materially harm our business.

We are subject to the U.S. Foreign Corrupt Practices Act of 1977, as amended, or the FCPA, the U.S. domestic bribery statute contained in 18 U.S.C. § 201, the U.S. Travel Act, the United Kingdom Bribery Act 2010, and other anti-corruption laws in countries in which we conduct activities. Anti-corruption laws are interpreted broadly and prohibit our company from authorizing, offering, or providing, directly or indirectly, improper payments or benefits to recipients in the public or private sector. We use third-party law firms, accountants, and other representatives for regulatory compliance, sales, and other purposes in several countries. We can be held liable for the corrupt or other illegal activities of these third-party representatives, our employees, contractors, and other agents, even if we do not explicitly authorize such activities. In addition, although we have implemented policies and procedures to ensure compliance with anti-corruption laws, there can be no assurance that all of our employees, representatives, contractors, or agents will comply with these laws at all times.

Noncompliance with these laws could subject us to whistleblower complaints, investigations, sanctions, settlements, prosecution, other enforcement actions, disgorgement of profits, significant fines, damages, other civil and criminal penalties or injunctions, suspension and/or debarment from contracting with certain persons, the loss of export privileges, reputational harm, adverse media coverage, and other collateral consequences. If any subpoenas or investigations are launched, or governmental or other sanctions are imposed, or if we do not prevail in any possible civil or criminal litigation, our business, results of operations and financial condition could be materially harmed. In addition, responding to any action will likely result in a materially significant diversion of management's attention and resources and significant defense costs and other professional fees. Enforcement actions and sanctions could further harm our business, results of operations, and financial condition. Moreover, as an issuer of securities, we also are subject to the accounting and internal controls provisions of the FCPA. These provisions require us to maintain accurate books and records and a system of internal controls sufficient to detect and prevent corrupt conduct. Failure to abide by these provisions may have an adverse effect on our business, operations or financial condition.

We are subject to governmental export and import controls and economic and trade sanctions that could impair our ability to conduct business in international markets and subject us to liability if we are not in compliance with applicable laws and regulations.

The United States and other countries maintain and administer export and import laws and regulations, including various economic and trade sanctions including those administered by the Office of Foreign Assets Control, or OFAC, which apply to our business. We are required to comply with these laws and regulations. If we fail to comply with such laws and regulations, we and certain of our employees could be subject to substantial civil or criminal penalties, including the possible loss of export or import privileges; fines, which may be imposed on us and responsible employees or managers; and, in extreme cases, the incarceration of responsible employees or managers.

Changes in our platform, or changes in applicable export or import laws and regulations may create delays in the introduction and sale of our platform in international markets or, in some cases, prevent the export or import of our platform to certain countries, governments or persons altogether. Any change in export or import laws and regulations or economic or trade sanctions, shift in the enforcement or scope of existing laws and regulations, or change in the countries, governments, persons or technologies targeted by such laws and regulations could also result in decreased use of our platform, or in our decreased ability to export or sell our platform to existing or potential customers. Any decreased use of our services or limitation on our ability to export or sell our services would likely adversely affect our business, financial condition, and results of operations.

We incorporate encryption technology into certain of our products. Encryption products may be exported outside of the United States only with the required export authorization, including by license, license exception or other appropriate government authorization. Obtaining the necessary export license or other authorization for a particular sale may be time-consuming and may result in the delay or loss of sales opportunities. In addition, various countries regulate the import of certain encryption technology, including import permitting and licensing requirements, and have enacted laws that could limit our ability to distribute our products or could limit our customers’ ability to implement our products in those countries. Although we take precautions to prevent our products from being provided in violation of such laws, our products may have been in the past, and could in the future be, provided inadvertently in violation of such laws, despite the precautions we take. Governmental regulation of encryption technology and regulation of imports or exports, or our failure to obtain required import or export approval for our products, could harm our international sales and adversely affect our revenue.

Moreover, U.S. export control laws and economic sanctions programs prohibit the provision of services to countries, governments and persons that are subject to U.S. economic embargoes and trade sanctions. Even though we take precautions to prevent our platform from being used by U.S. sanctions targets, our platform could be used by a sanctioned person or in an embargoed country despite such precautions. Any such shipment could have negative consequences, including government investigations, penalties and reputational harm.

If our platform fails to function in a manner that allows our customers to operate in compliance with regulations and/or industry standards, our revenue and operating results could be harmed.

Certain of our customers use our platform to create applications that ensure secure communications given the nature of the content being distributed and associated applicable regulatory requirements. Governmental and other customers may also require our platform to comply with certain privacy, security and other certifications and standards. Our cloud platform holds various security certifications from government agencies and industry organizations, including the Federal Risk and Authorization Management Program (FedRAMP) compliance, HITRUST certification, and meets the ISO 27001, Payment Card Industry Data Security Standard (PCI DSS) and the various United States Health Insurance Portability and Accountability Act (HIPAA) standards. Governments and industry organizations may also adopt new laws, regulations or requirements, or make changes to existing laws or regulations, that could impact the demand for, or value of, our applications, such as the European Banking Authority's regulations updated in September 2019 and the CCPA that took effect January 1, 2020. If we fail to maintain our current security certifications and/or to continue to meet security standards, or if we are unable to adapt our platform to changing legal and regulatory standards or other requirements in a timely manner, our customers may lose confidence in our platform and our business could be negatively impacted.

Our business could be adversely affected if our employees cannot obtain and maintain required security clearances or we cannot maintain our facility security clearance.

If and when awarded, certain U.S. government contracts require our employees to maintain various levels of security clearances, and we would be required to maintain our facility security clearance, to comply with Department of Defense, or DoD, requirements. The DoD has strict security clearance requirements for personnel who work on classified programs. Obtaining and maintaining security clearances for employees involves a lengthy process, and it is difficult to identify, recruit and retain employees who already hold security clearances. If our employees are unable to obtain security clearances in a timely manner, or at all, or if our employees who hold security clearances are unable to maintain their clearances or terminate employment with us, then a customer requiring classified work could terminate an existing contract or decide not to renew the contract upon its expiration. To the extent we are not able to maintain our facility security clearance, we may not be able to bid on or win new classified contracts.

Risks Related to Our Class A Common Stock

Our stock price may be volatile, and you may lose some or all of your investment.

The market price of our Class A common stock may be highly volatile and may fluctuate substantially as a result of a variety of factors. Since shares of our Class A common stock were sold in our initial public offering, or IPO, in May 2017 at a price of $12.00 per share, our stock price has ranged from an intraday low of $14.60 to an intraday high of $63.77 through February 19, 2020. Factors that may affect the market price of our Class A common stock include:

- actual or anticipated fluctuations in our financial condition and operating results;
- variance in our financial performance from expectations of securities analysts;
- changes in the prices of subscriptions to our platform;
- changes in our projected operating and financial results;
- changes in laws or regulations applicable to our platform;
- announcements by us or our competitors of significant business developments, acquisitions or new offerings;
- our involvement in any litigation;
- our sale of our Class A common stock or other securities in the future;
- changes in senior management or key personnel;
- the trading volume of our Class A common stock;
- changes in the anticipated future size and growth rate of our market; and
- general economic, regulatory and market conditions.

The stock markets have experienced extreme price and volume fluctuations that have affected and continue to affect the market prices of equity securities of many companies. These fluctuations have often been unrelated or disproportionate to the operating performance of those companies. Broad market and industry fluctuations, as well as general economic, political, regulatory and market conditions, may negatively impact the market price of our Class A common stock. In the past, companies that have experienced volatility in the market price of their securities have been subject to securities class action litigation. We may be the target of this type of litigation in the future, which could result in substantial costs and divert our management's attention.

An active public trading market may not be sustained.

An active public trading market for our Class A common stock may not be sustained. The lack of an active market may impair your ability to sell your shares of Class A common stock at the time you wish to sell them or at a price that you consider reasonable. The lack of an active market may also reduce the fair value of your shares. An inactive market may also impair our ability to raise capital to continue to fund operations by selling shares and may impair our ability to acquire other companies or technologies by using our shares as consideration.

Future sales of our Class A common stock in the public market could cause the market price of our Class A common stock to decline.

Sales of a substantial number of shares of our Class A common stock in the public market, or the perception that these sales might occur, could depress the market price of our Class A common stock and could impair our ability to raise capital through the sale of additional equity securities. We are unable to predict the effect that such sales may have on the prevailing market price of our Class A common stock.

As of December 31, 2019, there were 3,749,311 shares of Class B common stock and 709,300 shares of Class A common stock subject to outstanding options and 1,022,835 shares of Class A common stock to be issued upon the vesting of outstanding restricted stock units. We have registered all of the shares of Class A common stock issuable (i) upon conversion of the shares of Class B common stock issuable upon exercise of outstanding options, (ii) upon the exercise of outstanding options, (iii) upon the vesting of outstanding restricted stock units and (iv) upon exercise or settlement of any options or other equity incentives we may grant in the future, for public resale under the Securities Act. Accordingly, these shares may be freely sold in the public market upon issuance as permitted by any applicable vesting requirements, subject to the lock-up agreements described above and compliance with applicable securities laws.

The sale of shares of our Class A common stock by a single large stockholder could cause the market price of our Class A common stock to decline.

As of December 31, 2019, approximately 20% of our publicly traded Class A common stock was held by a single stockholder. Should this stockholder elect to sell all or a significant portion of its shares of our Class A common stock, the market price of our Class A common stock and our ability to raise capital through the sale of additional equity securities could be negatively affected. We cannot predict the effect that such a sale may have on the prevailing market price of our Class A common stock.

The dual class structure of our common stock and the existing ownership of capital stock by Matthew Calkins, our founder and Chief Executive Officer, has the effect of concentrating voting control with Mr. Calkins for the foreseeable future, which will limit your ability to influence corporate matters.

Our Class B common stock has ten votes per share, and our Class A common stock has one vote per share. Given the greater number of votes per share attributed to our Class B common stock, our Class B stockholders collectively beneficially owned shares representing approximately 91% of the voting power of our outstanding capital stock as of December 31, 2019. Further, Mr. Calkins, our founder and Chief Executive Officer, together with his affiliates, collectively beneficially owned shares representing approximately 77% of the voting power of our outstanding capital stock as of December 31, 2019. Consequently, Mr. Calkins, together with his affiliates, is able to control a majority of the voting power even if their stock holdings represent as few as approximately 27% of the outstanding number of shares of our common stock. This concentrated control will limit your ability to influence corporate matters for the foreseeable future. For example, Mr. Calkins will be able to control elections of directors, amendments of our certificate of incorporation or bylaws, increases to the number of shares available for issuance under our equity incentive plans or adoption of new equity incentive plans and approval of any merger or sale of assets for the foreseeable future. This concentrated control could also discourage a potential investor from acquiring our Class A common stock due to the limited voting power of such stock relative to the Class B common stock and might harm the market price of our Class A common stock. In addition, Mr. Calkins has the ability to control the management and major strategic investments of our company as a result of his position as our Chief Executive Officer and his ability to control the election or replacement of our directors. As a board member and officer, Mr. Calkins owes a fiduciary duty to our stockholders and must act in good faith in a manner he reasonably believes to be in the best interests of our stockholders. However, as a stockholder, even a controlling stockholder, Mr. Calkins is entitled to vote his shares, and shares over which he has voting control, in his own interests, which may not always be in the interests of our stockholders generally.

Future transfers by Mr. Calkins and other holders of Class B common stock will generally result in those shares converting on a 1:1 basis to Class A common stock, which will have the effect, over time, of increasing the relative voting power of those holders of Class B common stock who retain their shares in the long-term.

We have not elected to take advantage of the "controlled company" exemption to the corporate governance rules for publicly-listed companies but may do so in the future.

Because our Chief Executive Officer, Mr. Calkins, owns in excess of 50% of the voting power of our outstanding capital stock, we are eligible to elect the "controlled company" exemption to the corporate governance rules for publicly-listed companies. We have not elected to do so. If we decide to become a “controlled company” under the corporate governance rules for publicly-listed companies, we would not be required to have a majority of our board of directors be independent, nor would we be required to have a compensation committee or an independent nominating function. If we chose controlled company status in the future, our status as a controlled company could cause our Class A common stock to be less attractive to certain investors or otherwise harm our trading price.

If securities or industry analysts do not publish research or reports about our business, or publish negative reports about our business, our stock price and trading volume could decline.

The trading market for our Class A common stock depends, in part, on the research and reports that securities or industry analysts publish about us or our business. We do not have any control over these analysts. If our financial performance fails to meet analyst estimates or one or more of the analysts who cover us downgrade our shares or change their opinion of our shares, our share price would likely decline. If one or more of these analysts cease coverage of our company or fail to regularly publish reports on us, we could lose visibility in the financial markets, which could cause our share price or trading volume to decline.

We do not intend to pay dividends for the foreseeable future and, as a result, your ability to achieve a return on your investment will depend on appreciation in the price of our Class A common stock.

We have never declared or paid any cash dividends on our common stock and we do not intend to pay any cash dividends in the foreseeable future. Although we paid a cash dividend in connection with the conversion of our Series A preferred stock to Class B common stock immediately prior to the closing of the IPO, which was agreed to at the time of the original issuance of the Series A preferred stock, we anticipate that we will retain all of our future earnings for use in the development of our business and for general corporate purposes. Additionally, our ability to pay dividends on our common stock is limited by restrictions under the terms of our loan and security agreement with Silicon Valley Bank. Any determination to pay dividends in the future will be at the discretion of our board of directors. Accordingly, investors must rely on sales of their Class A common stock after price appreciation, which may never occur, as the only way to realize any future gains on their investments.

We are obligated to develop and maintain proper and effective internal controls over financial reporting and any failure to maintain the adequacy of these internal controls may adversely affect investor confidence in our company and, as a result, the value of our Class A common stock.

We are required, pursuant to Section 404 of the Sarbanes-Oxley Act, or Section 404, to furnish a report by management on, among other things, the effectiveness of our internal control over financial reporting on an annual basis. This assessment includes disclosure of any material weaknesses identified by our management in our internal control over financial reporting.

During the evaluation and testing process of our internal controls, if we identify one or more material weaknesses in our internal control over financial reporting, we will be unable to assert that our internal control over financial reporting is effective. While we have established certain procedures and controls over our financial reporting processes, we cannot assure you that these efforts will prevent restatements of our financial statements in the future. Our independent registered public accounting firm is also required, pursuant to Section 404, to attest to, and report on, management's assessment of our internal control over financial reporting, which report is included elsewhere in this Annual Report on Form 10-K. This assessment is required to include disclosure of any material weaknesses identified by our management in our internal control over financial reporting. For future reporting periods, our independent registered public accounting firm may issue a report that is adverse in the event it is not satisfied with the level at which our controls are documented, designed or operating. We may not be able to remediate any future material weaknesses, or to complete our evaluation, testing and any required remediation in a timely fashion.

Any failure to maintain internal control over financial reporting could severely inhibit our ability to accurately report our financial condition or results of operations. If we are unable to conclude that our internal control over financial reporting is effective, or if our independent registered public accounting firm determines we have a material weakness or significant deficiency in our internal control over financial reporting, we could lose investor confidence in the accuracy and completeness of our financial reports, the market price of our Class A common stock could decline, and we could be subject to sanctions or investigations by the Nasdaq Stock Market, the SEC or other regulatory authorities. Failure to remedy any material weakness in our internal control over financial reporting, or to implement or maintain other effective control systems required of public companies, could also restrict our future access to the capital markets.

Anti-takeover provisions in our charter documents and under Delaware law could make an acquisition of us more difficult, limit attempts by our stockholders to replace or remove our current management and limit the market price of our Class A common stock.

In addition to the effects of our dual class structure, provisions in our amended and restated certificate of incorporation and amended and restated bylaws may have the effect of delaying or preventing a change in control or changes in our management. Our amended and restated certificate of incorporation and amended and restated bylaws include provisions that 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. In addition, because we are incorporated in Delaware, we are governed by the provisions of Section 203 of the Delaware General Corporation Law, which generally prohibit a Delaware corporation from engaging in any of a broad range of business combinations with any "interested" stockholder for a period of three years following the date on which the stockholder became an "interested" stockholder. Any of the foregoing provisions could limit the price that investors might be willing to pay in the future for shares of our Class A common stock, and they could deter potential acquirers of our company, thereby reducing the likelihood that you would receive a premium for your shares of our Class A common stock in an acquisition.

Our amended and restated certificate of incorporation designates the Court of Chancery of the State of Delaware as the exclusive forum for certain litigation that may be initiated by our stockholders, which could limit our stockholders' ability to obtain a favorable judicial forum for disputes with us and limit the market price of our Class A common stock.

Pursuant to our amended and restated certificate of incorporation, unless we consent in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware will be the sole and exclusive forum for (1) any derivative action or proceeding brought on our behalf, (2) any action asserting a claim of breach of a fiduciary duty owed by any of our directors, officers or other employees to us or our stockholders, (3) any action asserting a claim arising pursuant to any provision of the Delaware General Corporation Law, our amended and restated certificate of incorporation or our amended and restated bylaws or (4) any action asserting a claim governed by the internal affairs doctrine. Our amended and restated certificate of incorporation also provides that the federal district courts of the United States will be the exclusive forum for resolving any complaint asserting a cause of action arising under the Securities Act, subject to and contingent upon a final adjudication in the State of Delaware of the enforceability of such exclusive forum provision. Our amended and restated certificate of incorporation further provides that any person or entity purchasing or otherwise acquiring any interest in shares of our Class A common stock is deemed to have notice of and consented to the foregoing provisions. The forum selection clause in our amended and restated certificate of incorporation may limit our stockholders' ability to obtain a favorable judicial forum for disputes with us and limit the market price of our Class A common stock. If a court were to find either exclusive-forum provision in our amended and restated certificate of incorporation to be inapplicable or unenforceable, we may incur additional costs associated with resolving the dispute in other jurisdictions. For example, the Court of Chancery of the State of Delaware recently determined that the exclusive forum provision of federal district courts of the United States for resolving any complaint asserting a cause of action arising under the Securities Act is not enforceable. However, this decision is being reviewed and may be ultimately overturned by the Delaware Supreme Court. If this ultimate adjudication were to occur, we would enforce the federal district court exclusive forum provision in our amended and restated certificate of incorporation.

Item 1B. Unresolved Staff Comments.

Not applicable.

Item 2. Properties.

Our corporate headquarters occupies approximately 210,000 square feet in Tysons, Virginia under an operating lease that expires in October 2031. We also lease space in the United Kingdom and Australia under operating lease agreements with various expiration dates through 2026. We believe that our facilities are suitable and adequate to meet our needs.

Item 3. Legal Proceedings.

From time to time we may become involved in legal proceedings or be subject to claims arising in the ordinary course of our business. We are not presently a party to any legal proceedings that, if determined adversely to us, would individually or taken together have a material adverse effect on our business, operating results, financial condition or cash flows. Regardless of the outcome, litigation can have an adverse impact on us because of defense and settlement costs, diversion of management time and resources and other factors.

Item 4. Mine Safety Disclosures.

Not applicable.

PART II

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

Market Information

Our Class A common stock is listed on the Nasdaq Global Market under the symbol "APPN". Our Class B common stock is not listed or traded on any stock exchange.

As of February 14, 2020, there were 16 holders of record of our Class A common stock and 50 holders of record of our Class B common stock. Because many of our shares of Class A common stock are held by brokers and other institutions on behalf of stockholders, we are unable to estimate the total number of stockholders represented by these record holders.

Dividends

We have never declared or paid, and do not anticipate declaring or paying in the foreseeable future, any cash dividends on our common stock. Any future determination as to the declaration and payment of dividends, if any, will be at the discretion of our board of directors, subject to applicable laws, and will depend on then existing conditions, including our financial condition, operating results, contractual restrictions, capital requirements, business prospects and other factors our board of directors may deem relevant.

Stock Performance Graph

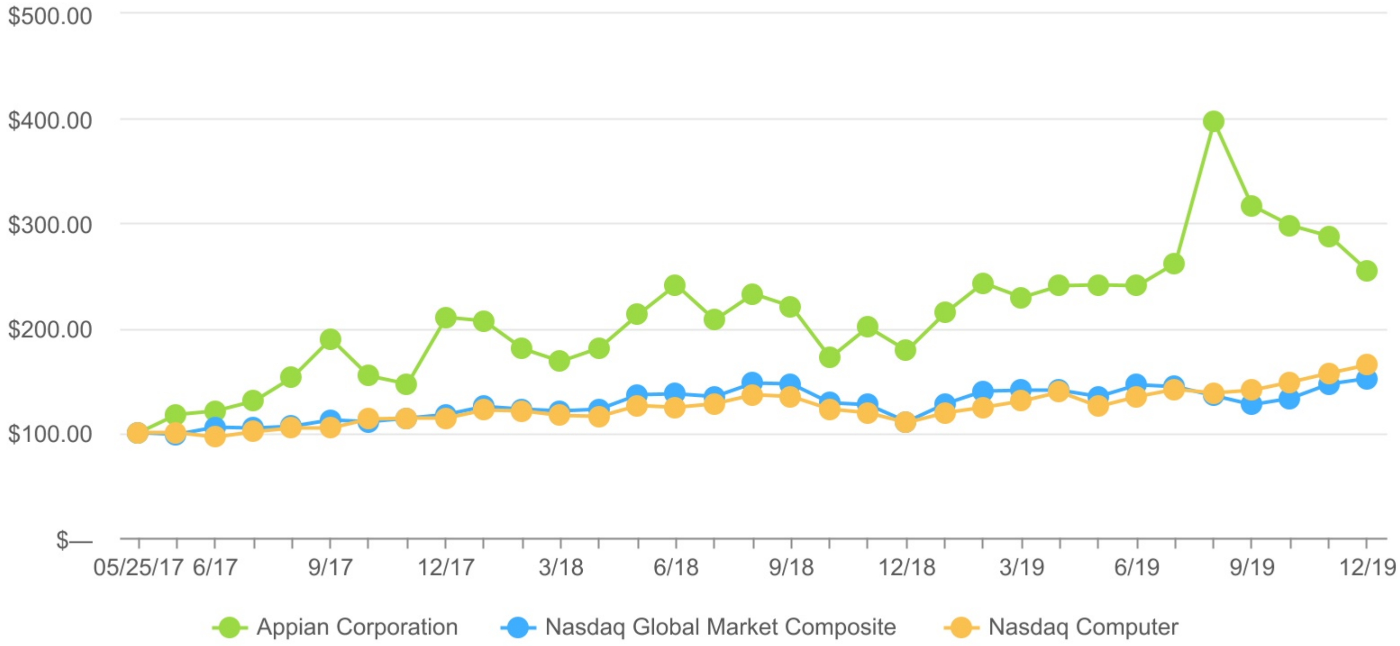
This section is not deemed "filed" with the SEC and shall not be deemed incorporated by reference into any of our other filings under the Exchange Act or the Securities Act, irrespective of any general incorporation language in any such filing.

The following graph shows a comparison from May 25, 2017 (the date our Class A common stock commenced trading on the Nasdaq Global Market) through December 31, 2019, of the cumulative total return for an investment of $100 in our Class A common stock, the Nasdaq Global Market Composite Index and the Nasdaq Computer Index. Data for the Nasdaq Global Market Composite Index and the Nasdaq Computer Index assume reinvestment of any dividends.

The comparisons in the graph below are based upon historical data and are not indicative of, nor intended to forecast, future performance of our common stock.

COMPARISON OF CUMULATIVE TOTAL RETURN

Among Appian Corporation, the Nasdaq Global Market Composite Index and the Nasdaq Computer Index



	May 25, 2017	June 30, 2017	September 30, 2017	December 31, 2017	March 31, 2018	June 30, 2018	September 30, 2018	December 31, 2018	March 31, 2019	June 30, 2019	September 30, 2019	December 31, 2019
Appian Corporation	$ 100.00	$ 120.92	$ 189.61	$ 209.73	$ 167.75	$ 240.91	$ 220.52	$ 177.95	$ 229.38	$ 240.31	$ 316.46	$ 254.56
Nasdaq Global Market Composite	100.00	105.12	112.43	117.68	121.11	137.10	146.69	110.09	140.17	145.34	126.55	151.77
Nasdaq Computer	100.00	96.18	104.59	113.49	116.34	124.53	134.20	109.31	129.74	134.76	140.73	164.33

Recent Sales of Unregistered Securities

Not applicable.

Use of Proceeds from Public Offering of Common Stock

Not applicable.

Purchase of Equity Securities by the Issuer and Affiliated Purchases

None.

Item 6. Selected Financial Data.

The following selected historical financial data should be read in conjunction with Item 7, “Management’s Discussion and Analysis of Financial Condition and Results of Operations,” and our consolidated financial statements and the related notes appearing in Item 8, “Financial Statements and Supplementary Data,” of this Annual Report on Form 10-K to fully understand the factors that may affect the comparability of the information presented below.

The selected consolidated financial data in this section are not intended to replace the consolidated financial statements and are qualified in their entirety by the consolidated financial statements and related notes included elsewhere in this Annual Report on Form 10-K.

The following selected consolidated statement of operations data for the years ended December 31, 2019, 2018 and 2017, and the consolidated balance sheet data as of December 31, 2019 and 2018, have been derived from our audited consolidated financial statements included elsewhere in this Annual Report on Form 10-K. The consolidated statement of operations data for the years ended December 31, 2016 and 2015 and the consolidated balance sheet data as of December 31, 2017, 2016 and 2015 have been derived from our audited consolidated financial statements not included in this Annual Report on Form 10-K.

	Year Ended December 31,				
	2019[1]	2018	2017	2016	2015
	(in thousands, except share and per share data)				
Revenue:					
Subscriptions	$ 151,299	$ 126,012	$ 91,514	$ 69,972	$ 53,207
Professional services	109,053	100,731	85,223	62,951	57,997
Total revenue	260,352	226,743	176,737	132,923	111,204
Cost of revenue[2]:					
Subscriptions	17,098	11,997	9,379	7,437	6,079
Professional services	76,743	72,928	55,218	42,686	42,402
Total cost of revenue	93,841	84,925	64,597	50,123	48,481
Gross profit	166,511	141,818	112,140	82,800	62,723
Operating expenses[2]:					
Sales and marketing	117,440	105,992	81,966	54,137	38,300
Research and development	58,043	44,724	34,835	22,994	16,750
General and administrative	41,496	37,821	27,150	17,039	12,515
Total operating expenses	216,979	188,537	143,951	94,170	67,565
Operating loss	(50,468)	(46,719)	(31,811)	(11,370)	(4,842)
Other (income) expense:					
Other (income) expense, net	(941)	2,295	(2,038)	1,792	1,579
Interest expense	367	198	473	982	188
Total other (income) expense	(574)	2,493	(1,565)	2,774	1,767
Loss before income taxes	(49,894)	(49,212)	(30,246)	(14,144)	(6,609)
Income tax expense (benefit)	820	239	761	(1,683)	378
Net loss	(50,714)	(49,451)	(31,007)	(12,461)	(6,987)
Accretion of dividends on convertible preferred stock[3]	—	—	357	857	861
Net loss attributable to common stockholders	$ (50,714)	$ (49,451)	$ (31,364)	$ (13,318)	$ (7,848)
Net loss per share attributable to common stockholders:					
Basic and diluted	$ (0.77)	$ (0.80)	$ (0.63)	$ (0.39)	$ (0.23)
Weighted average common shares outstanding[4]:					
Basic and diluted	65,479,327	62,140,684	49,529,833	34,274,718	34,274,718

(1) On January 1, 2019, we adopted ASC 606 using the modified retrospective method. See Note 2 to our consolidated financial statements appearing in Item 8 for additional discussion of the impact of the adoption of this new accounting guidance.

(2) Includes stock-based compensation expense below. For the years ended December 31, 2016 and 2015, no stock-based compensation expense was recognized because a qualifying event had not yet occurred.

	Year Ended December 31,				
	2019	2018	2017	2016	2015
	(in thousands)				
Cost of revenue					
Subscriptions	$ 647	$ 514	$ 575	$ —	$ —
Professional services	2,748	1,717	1,295	—	—
Operating expenses					
Sales and marketing	4,742	3,473	3,233	—	—
Research and development	3,480	2,416	2,822	—	—
General and administrative	4,826	7,934	5,051	—	—
Total stock-based compensation expense	$ 16,443	$ 16,054	$ 12,976	$ —	$ —

(3) See Note 8 to our consolidated financial statements appearing in Item 8 for further details on the calculation of accretion of preferred stock to redemption value and basic and diluted net loss per share attributable to common stockholders.

(4) Immediately prior to the completion of our IPO on May 31, 2017, 18.2 million shares of convertible preferred stock were converted and reclassified to Class B common stock. In addition, immediately prior to the completion of the IPO, a warrant to purchase 84,360 shares of convertible preferred stock was converted to a warrant to purchase 84,360 shares of Class B common stock, and 79,363 shares of our Class B common stock were issued upon the net exercise of this warrant.

	As of December 31,				
	2019(1)	2018	2017	2016	2015
	(in thousands)				
Consolidated Balance Sheet Data:					
Cash and cash equivalents	$ 159,755	$ 94,930	$ 73,758	$ 31,143	$ 31,393
Working capital	165,381	81,225	50,107	12,365	19,463
Total assets	371,485	233,180	161,052	102,738	83,400
Total deferred revenue	89,340	111,668	89,087	70,108	53,110
Total debt	—	—	—	20,000	10,000
Convertible preferred stock	—	—	—	55,415	54,558
Total stockholders' equity (deficit)	205,237	73,192	45,524	(63,492)	(50,533)

(1) On January 1, 2019, we adopted ASC 606 using the modified retrospective method. See Note 2 to our consolidated financial statements appearing in Item 8 for additional discussion of the impact of the adoption of this new accounting guidance.

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

The following discussion and analysis of our financial condition and results of operations should be read in conjunction with our consolidated financial statements and related notes included elsewhere in this Annual Report on Form 10-K. In addition to historical financial information, the following discussion contains forward-looking statements that reflect our plans, estimates and beliefs. Our actual results could differ materially from those contained in or implied by any forward-looking statements. Factors that could cause or contribute to these differences include those under "Risk Factors" included in Part I, Item 1A or in other parts of this Annual Report on Form 10-K.

Overview

We provide a low-code automation platform that accelerates the creation of high-impact business applications, enabling our customers to automate the most important aspects of their business. Global organizations use our applications to improve customer experience, achieve operational excellence and simplify global risk management and compliance.

With our platform, organizations can rapidly and easily design, build and implement powerful, enterprise-grade custom applications through our intuitive, visual interface with little or no coding required. Our customers have used applications built on our platform to launch new business lines, automate vital employee workflows, manage complex trading platforms, accelerate drug development and build global procurement systems. With our platform, decision makers can reimagine their products, services, processes and customer interactions by removing much of the complexity and many of the challenges associated with traditional approaches to software development.

We have generated the majority of our revenue from sales of subscriptions, which include (1) SaaS subscriptions bundled with maintenance and support and hosting services, and (2) term license subscriptions bundled with maintenance and support.

Our subscription fees are based primarily on the number of users who access and utilize the applications built on our platform or, alternatively, non-user based single application licenses. Our customer contract terms generally vary from one to three years with most providing for payment in advance on an annual, quarterly or monthly basis. Due to the variability of our billing terms and the episodic nature of our customers purchasing additional subscriptions, we do not believe that changes in our deferred revenue in a given period are directly correlated with our revenue growth.

Since inception, we have invested in our professional services organization to help ensure that customers are able to build and deploy applications on our platform. We have several strategic partnerships, including with KPMG, PwC and Deloitte, for them to refer customers to us in order to purchase subscriptions and then to provide professional services directly to the customers using our platform. We intend to further grow our base of strategic partners to provide broader customer coverage and solution delivery capabilities. In addition, over time we expect professional services revenue as a percentage of total revenue to decline as we increasingly rely on strategic partners to help our customers deploy our software. We believe our investment in professional services, including strategic partners building their practices around Appian, will drive increased adoption of our platform.

As of December 31, 2019, we had 533 customers in a wide variety of industries, of which 427 customers were commercial and 106 customers were government or non-commercial entities. Our customers include financial services, life sciences, government, telecommunications, media, energy, manufacturing and transportation organizations. Generally, our sales force targets its efforts to organizations with over 2,000 employees and $2 billion in annual revenue. As of December 31, 2019, 24% of our commercial customers were Global 2000 organizations and included 48 Fortune 500 companies. Revenue from government agencies represented 17.1%, 15.7% and 15.4% of our total revenue in 2019, 2018 and 2017, respectively. No single end-customer accounted for more than 10% of our total revenue in 2019, 2018 or 2017.

Our platform supports multiple languages to facilitate collaboration and address challenges in multi-national organizations. We offer our platform globally. In 2019, 2018 and 2017, 32.3%, 28.7% and 27.0%, respectively, of our total revenue was generated from customers outside of the United States. As of December 31, 2019, we operated in 12 countries. We believe that we have a significant opportunity to grow our international footprint. We are investing in new geographies, including through investment in direct and indirect sales channels, professional services and customer support and implementation partners.

We have experienced strong revenue growth, with revenue of $260.4 million, $226.7 million and $176.7 million in 2019, 2018 and 2017, respectively. Our subscriptions revenue was $151.3 million, $126.0 million and $91.5 million in 2019, 2018 and 2017, respectively and includes sales of our SaaS subscriptions, on-premises term license subscriptions and maintenance support. Our cloud subscription revenue was $95.0 million, $67.4 million and $40.2 million in 2019, 2018 and 2017, respectively.

We have invested in developing our platform, expanding our sales and marketing and research and development capabilities, and providing general and administrative resources to support our growth. We intend to continue to invest in our business to take advantage of our market opportunity. As a result, we incurred net losses of $50.7 million, $49.5 million and $31.0 million in 2019, 2018 and 2017, respectively. We also used cash in operations of $8.9 million, $31.3 million and $9.1 million in 2019, 2018 and 2017, respectively.

Adoption of Revenue from Contracts with Customers (Topic 606)

In May 2014, the FASB issued ASC 606, which replaced the revenue recognition requirements in ASC 605. The new revenue standard outlines a single, comprehensive model for accounting for revenue from contracts with customers and requires more detailed disclosure to enable users of financial statements to understand the nature, amount, timing and uncertainty of revenue and cash flows arising from such contracts. The new revenue standard provides a five-step analysis of transactions to determine when and how revenue is recognized. The core principle is that a company should recognize revenue to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods and services.

We adopted ASC 606 effective January 1, 2019 using the modified retrospective method. Under this method of adoption, we recognized the cumulative effect of initially applying the new revenue standard as an adjustment to the opening balance of accumulated deficit. See Note 2 to our consolidated financial statements appearing in Item 8 for additional discussion of the impact of the adoption of this new accounting guidance and changes in accounting policies relating to revenue recognition and accounting for costs to obtain and fulfill a customer contract. For the year ended December 31, 2019, we recognized revenue based on ASC 606; however, revenue for the prior years was recognized based on ASC 605. Therefore, the periods are not directly comparable, however we have included a reconciliation of the impacts of ASC 606 on our consolidated financial statements for the year ended December 31, 2019.

Our Business Model

Our business model focuses on maximizing the lifetime value of customer relationships, which is a function of the duration of a customer's deployment of Appian as well as the price and number of subscriptions of Appian that a customer purchases. We incur significant customer acquisition costs, including expenses associated with hiring new sales representatives, who generally take more than one year to become productive given the length of our sales cycle, and marketing costs, all of which, with the exception of sales commissions, are expensed as incurred.

At the same time, we believe that the costs we incur to retain customers and drive additional purchases of software are lower than our customer acquisition costs on a relative basis. Over time, we expect a large portion of our customers to renew their subscriptions and purchase additional subscriptions as they continue to build more applications and add more users to our platform. Over the last three completed fiscal years, we had an average cloud subscription renewal rate of 97%. We calculate our cloud subscription renewal rate by dividing (i) the cloud subscription revenue from renewing cloud customers in the current 12-month period that were cloud customers during the entirety of the prior 12-month period, giving effect to price increases but excluding additional cloud subscriptions for additional users, or upsells, by (ii) our cloud subscription revenue from all cloud customers in the corresponding prior 12-month period that were cloud customers during the entirety of such prior 12-month period. For example, to obtain our cloud subscription renewal rate for the 12-month period ended December 31, 2019, we identified the amount of cloud subscription revenue in 2019 from cloud customers that were our cloud customers for all of 2018 and subtracted the amount of upsells to such cloud customers and new users from those cloud customers in 2019. We then divided the balance of 2019 cloud subscription revenue from such cloud customers by all cloud subscription revenue generated in 2018 from cloud customers that were cloud customers for the entirety of 2018. With respect to the average for our last three completed fiscal years, we calculated the average of the three applicable 12-month periods. We also expect the proportion of annual revenue from existing customers to grow relative to annual revenue from new customers. We believe this mix shift over time will have a positive impact on our operating margins, as we expect the percentage of revenue spent on sales and marketing to decline.

We measure the effectiveness of our business model by comparing the lifetime value of our customer relationships to our customer acquisition costs. For the years revenue was recognized under ASC 605, we calculate lifetime customer value as (1) average gross margin multiplied by average subscription and maintenance and support revenue from customers for a given month divided by (2) the average percentage of monthly recurring revenue that did not renew in each month for the previous 12 months. We then divide this calculated lifetime customer value by our customer acquisition cost, which is the total sales and marketing expense incurred during the corresponding month. In order to be consistent with our new key metrics, we revised the calculation of the lifetime value of our customer relationships for the year ended December 31, 2019. For the year ended December 31, 2019, we replaced subscription revenue with cloud subscription revenue in the calculation of lifetime customer value. Because we primarily recognize revenue from our on-premises term license subscriptions upfront under ASC 606, we believe cloud subscription revenue better reflects the performance of our business. The calculation of lifetime customer value as compared to customer acquisition costs for the prior years were unchanged. On a rolling 12 month basis, we estimate that for each of the past five fiscal years the average lifetime value of a customer has exceeded 7x the associated average cost of acquiring them, including the year ended December 31, 2019.

Key Factors Affecting Our Performance

The following are several key factors that affect our performance:

- ***Market Adoption of Our Platform.*** Our ability to grow our customer base and drive market adoption of our platform is affected by the pace at which organizations digitally transform. We expect that our revenue growth will be primarily driven by the pace of adoption and penetration of our platform. We offer a leading custom software automation platform and intend to continue to invest to expand our customer base. The degree to which prospective customers recognize the need for low-code software that enables organizations to digitally transform, and subsequently allocate budget dollars to purchase our software, will drive our ability to acquire new customers and increase sales to existing customers, which, in turn, will affect our future financial performance.
- ***Growth of Our Customer Base.*** We believe we have a substantial opportunity to grow our customer base. We define a customer as an entity with an active subscription or maintenance and support contract related to a perpetual software license as of the specified measurement date. To the extent we contract with one or more entities under common control, we count those entities as separate customers. We have aggressively invested, and intend to continue to invest, in our sales force in order to drive sales to new customers. In particular, we have recently made, and plan to continue to make, investments to enhance the expertise of our sales and marketing organization within our key industry verticals of financial services, life sciences and government. In addition, we have established relationships with strategic partners who work with organizations undergoing digital transformations. We had a total customer count of 533, 436 and 356 as of December 31, 2019, 2018 and 2017, respectively, which includes customers with active software subscription agreements or with maintenance and support contracts, and our number of customers with active software subscription agreements was 487, 378 and 291 as of December 31, 2019, 2018 and 2017, respectively. As of December 31, 2019, 24% of our commercial customers were Global 2000 organizations and included 48 Fortune 500 companies. Our ability to continue to grow our customer base is dependent, in part, upon our ability to compete within the increasingly competitive markets in which we participate.
- ***Further Penetration of Existing Customers.*** Our sales force seeks to generate additional revenue from existing customers by adding new users to our platform. Many of our customers begin by building a single application and then grow to build dozens of applications on our platform. Generally, the development of new applications on our platform results in the expansion of our user base within an organization and a corresponding increase in revenue to us because we charge subscription fees on a per-user basis for the significant majority of our customer contracts. As a result of this “land and expand” strategy, we have generated significant additional revenue from our customer base. Our ability to increase sales to existing customers will depend on a number of factors, including the size of our sales force and professional services teams, customers’ level of satisfaction with our platform and professional services, pricing, economic conditions and our customers’ overall spending levels. We have also re-focused some of our professional services personnel to become customer success managers. Their role is to ensure the customer realizes value from our platform and support the "land and expand" strategy versus delivering billable hours.
- ***Mix of Subscriptions and Professional Services Revenue.*** We believe our professional services have driven customer success and facilitated the adoption of our platform by customers. During the initial period of deployment by a customer, we generally provide a greater amount of support in building applications and training than later in the deployment, with a typical engagement extending from two to six months. At the same time, many of our customers have historically purchased subscriptions only for a limited set of their total potential end users. As a result of these factors, the proportion of total revenue for a customer associated with professional services is relatively high during the initial deployment period. Over time, as the need for professional services associated with user deployments decreases and the number of end users increases, we expect subscriptions revenue as a percentage of total revenue to increase. In addition, we intend to further grow our base of strategic partners to provide broader customer coverage and solution delivery capabilities. These partners perform professional services with respect to any new service contracts they sign. As the usage of partners expands, we expect the proportion of our total revenue from subscriptions to increase over time relative to professional services. In 2019, 2018 and 2017, 58.1%, 55.6% and 51.8% of our revenue, respectively, was derived from sales of subscriptions, while the remaining 41.9%, 44.4% and 48.2%, respectively, was derived from the sale of professional services.

- ***Investments in Growth.*** We have made and plan to continue to make investments for long-term growth, including investment in our platform and infrastructure to continuously maximize the power and simplicity of the platform to meet the evolving needs of our customers and to take advantage of our market opportunity. We intend to continue to invest in sales and marketing, as we further expand our sales teams, increase our marketing activities and grow our international operations.

Key Metrics

We monitor the following metrics to help us measure and evaluate the effectiveness of our operations (dollars in thousands):

	Year Ended December 31,		
	2019	2018	2017
Cloud Subscription Revenue	$ 95,028	$ 67,447	$ 40,234

	As of December 31,		
	2019	2018	2017
Cloud Subscription Revenue Retention Rate	115 %	131 %	132 %

Cloud Subscription Revenue

Because we primarily recognize revenue from our on-premises term license subscriptions upfront under ASC 606, we believe our previous key business metric, subscription revenue, no longer best reflects the performance of our business and overemphasizes the volatility in our results. Therefore, we are no longer presenting subscription revenue and will instead report a new key metric, cloud subscription revenue. Cloud subscription revenue is a portion of our revenue and includes SaaS subscriptions bundled with maintenance and support and hosting services and is increasingly becoming a larger percentage of our subscriptions revenue. In 2019, 2018 and 2017, 62.8%, 53.5% and 44.0%, respectively, of subscriptions revenue was cloud subscription revenue. As we generally sell our SaaS subscriptions on a per-user basis, our cloud subscription revenue for any customer is primarily determined by the number of users who access and utilize the applications built on our platform, as well as the price paid. We believe that increasing cloud subscription revenue is an indicator of the demand for our platform, the pace at which the market for our solutions is growing, the productivity of our sales force and strategic relationships in growing our customer base, and our ability to further penetrate our existing customer base. The year-over-year growth rate in our cloud subscription revenue for the year ended December 31, 2018 was elevated as we focused on converting customers with on-premises term license subscriptions to cloud subscriptions. The adoption of ASC 606 did not have a material impact on our cloud subscription revenue.

Cloud Subscription Revenue Retention Rate

Because we primarily recognize revenue from our on-premises term license subscriptions upfront under ASC 606, we believe our previous key business metric, subscription revenue, no longer best reflects the performance of our business and overemphasizes the volatility in our results. Therefore, we are no longer presenting subscription revenue and will instead report a new key metric, cloud subscription revenue. A key factor to our success is the renewal and expansion of subscription agreements with our existing customers. We calculate this metric over a set of customers who have been with us for at least one full year. To calculate our cloud subscription revenue retention rate for a particular trailing 12-month period, we first establish the recurring cloud subscription revenue for the previous trailing 12-month period. This effectively represents recurring dollars that we should expect in the current trailing 12-month period from the cohort of customers from the previous trailing 12-month period without any expansion or contraction. We subsequently measure the recurring cloud subscription revenue in the current trailing 12-month period from the cohort of customers from the previous trailing 12-month period. Cloud subscription revenue retention rate is then calculated by dividing the aggregate recurring cloud subscription revenue in the current trailing 12-month period by the previous trailing 12-month period. This calculation includes the impact on our revenue from customer non-renewals, pricing changes and growth in the number of users on our platform. Our cloud subscription revenue retention rate can fluctuate from period to period due to large customer contracts in any given period. The cloud subscription revenue retention rates as of December 31, 2018 and 2017 were elevated as we focused on converting customers with on-premises term license subscriptions to cloud subscriptions. The adoption of ASC 606 did not have a material impact on our cloud subscription revenue retention rate.

Non-GAAP Financial Measures

To supplement our consolidated financial statements, which are prepared and presented in accordance with GAAP, we provide investors with certain non-GAAP financial measures, including non-GAAP operating loss, non-GAAP net loss, non-GAAP net loss per share, non-GAAP weighted average shares outstanding and adjusted EBITDA, which we collectively refer to as non-GAAP financial measures. These non-GAAP financial measures exclude all or a combination of the following (as reflected in the following reconciliation tables): stock-based compensation expense, change in fair value of warrant liability, loss on extinguishment of debt and gain or loss on disposal of asset. We define non-GAAP operating loss as operating loss before stock-based compensation expense. We define non-GAAP net loss as net loss before stock-based compensation expense, change in fair value of warrant liability, loss on extinguishment of debt and gain or loss on disposal of asset. We define adjusted EBITDA as net loss before (1) other (income) expense, net, (2) interest expense, (3) income tax expense, (4) depreciation expense and (5) stock-based compensation expense.

The presentation of the non-GAAP financial measures is not intended to be considered in isolation or as a substitute for, or superior to, the financial information prepared and presented in accordance with GAAP. We use these non-GAAP financial measures for financial and operational decision-making purposes and as a means to evaluate period-to-period comparisons. We believe that these non-GAAP financial measures provide useful information about our operating results, enhance the overall understanding of past financial performance and future prospects and allow for greater transparency with respect to metrics used by our management in its financial and operational decision making. While our non-GAAP financial measures are an important tool for financial and operational decision making and for evaluating our own operating results over different periods of time, you should review the reconciliation of our non-GAAP financial measures to the comparable GAAP financial measures included below, and not rely on any single financial measure to evaluate our business.

We exclude stock-based compensation expense because of varying available valuation methodologies, subjective assumptions and the variety of equity instruments that can impact our non-cash expense. We believe that providing non-GAAP financial measures that exclude stock-based compensation expense allow for more meaningful comparisons between our operating results from period to period. We exclude the impact of change in the fair value of warrant liability, loss on extinguishment of debt and gain or loss on disposal of asset as these transactions are unrelated to current operations nor predictive of future results, which we believe allows for a more meaningful comparison between the operating results from period to period. Accordingly, we believe that excluding these expenses and income provides investors and management with greater visibility into the underlying performance of our business operations, facilitates comparison of our results with other periods and may also provide comparison with the results of other companies in our industry.

Our non-GAAP financial measures may not provide information that is directly comparable to that provided by other companies in our industry, as other companies in our industry may calculate non-GAAP financial results differently, particularly related to non-recurring, unusual items. Non-GAAP financial measures do not have uniform definitions and our definitions will likely differ from the definitions used by other companies, including peer companies. In addition, there are limitations in using non-GAAP financial measures because the non-GAAP financial measures are not prepared in accordance with GAAP, may be different from non-GAAP financial measures used by other companies and exclude expenses that may have a material impact upon our reported financial results. Further, stock-based compensation expense will continue to be for the foreseeable future a significant recurring expense in our business and an important part of the compensation provided to our employees.

Also, for the year ended December 31, 2019, we recognized revenue based on ASC 606; however, revenue for the prior years was recognized based on ASC 605. Therefore, our non-GAAP financial measures as of December 31, 2019 are not directly comparable to our non-GAAP financial measures as of December 31, 2018 or December 31, 2017

The following table reconciles GAAP operating loss to non-GAAP operating loss for the years ended December 31, 2019, 2018 and 2017 (in thousands):

	Year Ended December 31,		
	2019	**2018**	**2017**
GAAP operating loss	$ (50,468)	$ (46,719)	$ (31,811)
Add back:			
Stock-based compensation expense	16,443	16,054	12,976
Non-GAAP operating loss	$ (34,025)	$ (30,665)	$ (18,835)

The adoption of ASC 606 resulted in a reduction of our non-GAAP operating loss by $1.4 million for the year ended December 31, 2019.

The following table reconciles GAAP net loss to non-GAAP net loss for the years ended December 31, 2019, 2018 and 2017 (in thousands):

	Year Ended December 31,		
	2019	2018	2017
GAAP net loss	$ (50,714)	$ (49,451)	$ (31,007)
Add back:			
Stock-based compensation expense	16,443	16,054	12,976
Loss (gain) on disposal of asset	146	(4)	—
Change in fair value of warrant liability	—	—	341
Loss on extinguishment of debt	—	—	384
Non-GAAP net loss	$ (34,125)	$ (33,401)	$ (17,306)

The adoption of ASC 606 resulted in a reduction of our non-GAAP net loss by $1.3 million for the year ended December 31, 2019.

The following table sets forth non-GAAP net loss per share for the years ended December 31, 2019, 2018 and 2017 (in thousands except share and per share data):

	Year Ended December 31,		
	2019	2018	2017
Non-GAAP net loss	$ (34,125)	$ (33,401)	$ (17,306)
Non-GAAP weighted average shares used to compute net loss per share attributable to common stockholders, basic and diluted	65,479,327	62,140,684	57,043,906
Non-GAAP net loss per share, basic and diluted	$ (0.52)	$ (0.54)	$ (0.30)

The following table reconciles GAAP net loss per share to non-GAAP net loss per share for the years ended December 31, 2019, 2018 and 2017:

	Year Ended December 31,		
	2019	2018	2017
GAAP net loss per share attributable to common stockholders, basic and diluted	$ (0.77)	$ (0.80)	$ (0.63)
Add back:			
Non-GAAP adjustments to net loss per share	0.25	0.26	0.33
Non-GAAP net loss per share, basic and diluted	$ (0.52)	$ (0.54)	$ (0.30)

The adoption of ASC 606 resulted in a reduction of our non-GAAP net loss per share, basic and diluted by $0.02 for the year ended December 31, 2019.

The following table reconciles GAAP weighted average shares outstanding, basic and diluted, to non-GAAP weighted average shares outstanding, basic and diluted, for the years ended December 31, 2019, 2018 and 2017:

	Year Ended December 31,		
	2019	2018	2017
GAAP weighted average shares used to compute net loss per share attributable to common stockholders, basic and diluted	65,479,327	62,140,684	49,529,833
Add back:			
Additional weighted average shares giving effect to conversion of preferred stock at the beginning of the period	—	—	7,514,073
Non-GAAP weighted average shares used to compute net loss per share attributable to common stockholders, basic and diluted	65,479,327	62,140,684	57,043,906

The following table reconciles GAAP net loss to adjusted EBITDA for the years ended December 31, 2019, 2018 and 2017 (in thousands):

	Year Ended December 31,		
	2019	2018	2017
GAAP net loss	$ (50,714)	$ (49,451)	$ (31,007)
Other (income) expense, net	(941)	2,295	(2,038)
Interest expense	367	198	473
Income tax expense	820	239	761
Depreciation expense	4,742	2,020	886
Stock-based compensation expense	16,443	16,054	12,976
Adjusted EBITDA	$ (29,283)	$ (28,645)	$ (17,949)

The adoption of ASC 606 resulted in a reduction of our adjusted EBITDA by $1.4 million for the year ended December 31, 2019.

Key Components of Results of Operations

Revenue

We generate revenue primarily through sales of subscriptions to our platform, as well as professional services. We generally sell our software on a per-user basis and, to a lesser degree, non-user based single application licenses. We generally bill customers and collect payment for subscriptions to our platform in advance on an annual, quarterly or monthly basis. In certain instances, we have had customers pay their entire contract value up front.

Our revenue is comprised of the following:

Subscriptions

Subscriptions revenue is primarily derived from:

- SaaS subscriptions bundled with maintenance and support and hosting services; and
- on-premises term license subscriptions bundled with maintenance and support.

Our maintenance and support agreements provide customers with the right to unspecified software upgrades, maintenance releases and patches released during the term of the maintenance and support agreement on a when-and-if-available basis, and rights to technical support. When our platform is deployed within a customer’s own data center or private cloud, it is installed on the customer’s infrastructure and offered as a term license. When our platform is delivered as a SaaS subscription, we handle its operational needs in third-party hosted data centers.

Professional Services

Our professional services revenue is comprised of fees for consulting services, including application development and deployment assistance and training related to our platform. Over time, as the need for professional services associated with user deployments decreases and the number of end users increases, we expect professional services revenue as percentage of total revenue to decrease. We have several strategic partnerships, including with KPMG, PwC and Deloitte. Our agreements with our strategic partners have indefinite terms and may be terminated for convenience by either party. We intend to further grow our base of strategic partners to provide broader customer coverage and solution delivery capabilities. These partners refer software subscription customers to us and, generally, perform professional services with respect to any new service contracts they originate, increasing our subscriptions revenue without any change to our professional services revenue. As we expand the network of strategic partners, we expect professional services revenue to decline as a percentage of total revenue over time since our strategic partners may perform professional services associated with software subscriptions that we sell.

Cost of Revenue

Subscriptions

Cost of subscriptions revenue consists primarily of fees paid to our third-party managed hosting providers and other third-party service providers, personnel costs, including payroll and benefits for our technology operations and customer support teams, and allocated facility costs and overhead. We expect cost of revenue to continue to increase in absolute dollars for the foreseeable future as our customer base grows.

Professional Services

Cost of professional services revenue includes all direct and indirect costs to deliver our professional services and training, including employee compensation for our global professional services and training personnel, travel costs, third-party contractor costs and allocated facility costs and overhead, as well as the costs of billable expenses, such as travel and lodging. The unpredictability of the timing of entering into significant professional services agreements sold on a standalone basis may cause significant fluctuations in our quarterly financial results.

Gross Margin

Gross profit and gross margin, or gross profit as a percentage of total revenue, has been, and will continue to be, affected by various factors, including the mix of subscriptions revenue and professional services revenue. Subscription pricing, the costs associated with third-party hosting facilities, and the extent to which we expand our professional services to support future growth will impact our gross margins. Our gross margin may fluctuate from period to period based on the above factors.

Subscriptions Gross Margin. Subscriptions gross margin is primarily affected by the growth in our subscriptions revenue as compared to the growth in, and timing of, costs to support such revenue. We expect to continue to invest in the customer support and SaaS operations to support the growth in the business and the timing of those investments is expected to cause gross margins to fluctuate in the short term but improve over time.

Professional Services Gross Margin. Professional services gross margin is affected by the growth in our professional services revenue as compared to the growth in, and timing of, the cost of our professional services organization as we continue to invest in the growth of our business. Professional services gross margin is impacted by the amount of services performed by subcontractors as opposed to internal resources. Our professional services gross margin is also impacted by the amount of services performed by partners as opposed to internal resources.

Operating Expenses

Operating expenses consist of sales and marketing, research and development and general and administrative expenses. Salaries, bonuses and other personnel-related costs are the most significant components of each of these expense categories. We grew from 1,058 employees at December 31, 2018 to 1,275 employees at December 31, 2019, and we expect to continue to hire new employees in order to support our anticipated revenue growth.

Sales and Marketing Expense

Sales and marketing expense primarily includes personnel costs, including salaries, bonuses, commissions, stock-based compensation and other personnel costs related to sales teams. Additional expenses in this category include travel and entertainment, marketing and promotional events, marketing activities, subcontracting fees and allocated facility costs and overhead.

The number of employees in sales and marketing functions grew from 367 at December 31, 2018 to 403 at December 31, 2019. In order to continue to grow our business, geographical footprint and brand awareness, we expect to continue investing resources in sales and marketing by increasing the number of sales and account management teams. As a result, we expect sales and marketing expense to increase in absolute dollars as we continue to invest to acquire new customers and further expand usage of our platform within our existing customer base.

Research and Development Expense

Research and development expense consists primarily of personnel costs for our employees who develop and enhance our platform, including salaries, bonuses, stock-based compensation and other personnel costs. Also included are non-personnel costs such as subcontracting, consulting and professional fees to third party development resources, allocated facility costs, overhead and depreciation and amortization costs.

Our research and development efforts are focused on enhancing the speed and power of our software platform. The number of employees in research and development functions grew from 247 at December 31, 2018 to 332 at December 31, 2019. We expect research and development expenses to continue to increase as they are critical to maintain and improve our quality of applications and our competitive position.

General and Administrative Expense

General and administrative expense consists primarily of personnel costs, including salaries, bonuses, stock-based compensation and other personnel costs for our administrative, legal, information technology, human resources, finance and accounting employees and executives. Additional expenses included in this category are non-personnel costs, such as travel-related expenses, contracting and professional fees, audit fees, tax services and legal fees, as well as insurance and other corporate expenses, along with allocated facility costs and overhead.

The number of employees in general and administrative functions grew from 126 at December 31, 2018 to 156 at December 31, 2019. We expect our general and administrative expense to increase in absolute dollars as we continue to support our growth and as a result of our becoming a public company.

Other (Income) Expense

Other (Income) Expense, Net

Other (income) expense, net consists primarily of unrealized and realized gains and losses related to changes in foreign currency exchange rates, interest income on our cash and cash equivalents, gain or loss on the disposal of property and equipment, loss on our extinguishment of debt and fair value adjustments for our preferred stock warrant liability.

Interest Expense

Interest expense consists primarily of interest on our finance leases and debt, unused credit facility fees and commitment fees on our letters of credit.

Results of Operations

The following table sets forth our consolidated statement of operations data:

	Year Ended December 31,		
	2019	2018	2017
	(in thousands)		
Consolidated Statement of Operations Data:			
Revenue:			
Subscriptions	$ 151,299	$ 126,012	$ 91,514
Professional services	109,053	100,731	85,223
Total revenue	260,352	226,743	176,737
Cost of revenue[(1)]:			
Subscriptions	17,098	11,997	9,379
Professional services	76,743	72,928	55,218
Total cost of revenue	93,841	84,925	64,597
Gross profit	166,511	141,818	112,140
Operating expenses[(1)]:			
Sales and marketing	117,440	105,992	81,966
Research and development	58,043	44,724	34,835
General and administrative	41,496	37,821	27,150
Total operating expenses	216,979	188,537	143,951
Operating loss	(50,468)	(46,719)	(31,811)
Other (income) expense:			
Other (income) expense, net	(941)	2,295	(2,038)
Interest expense	367	198	473
Total other (income) expense	(574)	2,493	(1,565)
Loss before income taxes	(49,894)	(49,212)	(30,246)
Income tax expense	820	239	761
Net loss	$ (50,714)	$ (49,451)	$ (31,007)

(1) Includes stock-based compensation expense below.

	Year Ended December 31,		
	2019	2018	2017
	(in thousands)		
Cost of revenue			
Subscriptions	$ 647	$ 514	$ 575
Professional services	2,748	1,717	1,295
Operating expenses			
Sales and marketing	4,742	3,473	3,233
Research and development	3,480	2,416	2,822
General and administrative	4,826	7,934	5,051
Total stock-based compensation expense	$ 16,443	$ 16,054	$ 12,976

The following table sets forth our consolidated statement of operations data expressed as a percentage of total revenue:

	Year Ended December 31,		
	2019	2018	2017
Consolidated Statement of Operations Data:			
Revenue:			
Subscriptions	58.1 %	55.6 %	51.8 %
Professional services	41.9	44.4	48.2
Total revenue	100.0	100.0	100.0
Cost of revenue:			
Subscriptions	6.6	5.3	5.3
Professional services	29.5	32.2	31.2
Total cost of revenue	36.1	37.5	36.5
Gross margin	63.9	62.5	63.5
Operating expenses:			
Sales and marketing	45.1	46.7	46.4
Research and development	22.3	19.7	19.7
General and administrative	15.9	16.7	15.4
Total operating expenses	83.3	83.1	81.5
Operating loss	(19.4)	(20.6)	(18.0)
Other (income) expense:			
Other (income) expense, net	(0.4)	1.0	(1.2)
Interest expense	0.1	0.1	0.3
Total other (income) expense	(0.3)	1.1	(0.9)
Loss before income taxes	(19.1)	(21.7)	(17.1)
Income tax expense	0.3	0.1	0.4
Net loss	(19.4)%	(21.8)%	(17.5)%

Year Ended December 31, 2019 Compared to the Year Ended December 31, 2018

Revenue

	Year Ended December 31,		% Change
	2019	2018	
	(dollars in thousands)		
Revenue:			
Subscriptions	$ 151,299	$ 126,012	20.1 %
Professional services	109,053	100,731	8.3
Total revenue	$ 260,352	$ 226,743	14.8

Total revenue increased $33.6 million, or 14.8%, in 2019 compared to 2018, due to an increase in our subscriptions revenue of $25.3 million and an increase in our professional services revenue of $8.3 million. The increase in subscriptions revenue was attributable to $17.4 million of revenue from expanded deployments and corresponding sales of additional subscriptions to existing customers and $7.9 million in sales of subscriptions to new customers. The increase in professional services revenue was due to $17.7 million in sales to new customers, offset by a $9.4 million decrease in revenue from existing customers. The adoption of ASC 606 resulted in a reduction of our subscriptions revenue by $8.8 million, offset by an increase of our professional services revenue by $2.8 million in 2019 compared to if we had calculated our revenue for 2019 in accordance with ASC 605. Refer to Note 2 of our consolidated financial statements for further details regarding the impact of the adoption of ASC 606.

Cost of Revenue

	Year Ended December 31,		% Change
	2019	2018	
	(dollars in thousands)		
Cost of revenue:			
Subscriptions	$ 17,098	$ 11,997	42.5 %
Professional services	76,743	72,928	5.2
Total cost of revenue	$ 93,841	$ 84,925	10.5
Subscriptions gross margin	88.7 %	90.5 %	
Professional services gross margin	29.6	27.6	
Total gross margin	64.0	62.5	

Cost of revenue increased $8.9 million, or 10.5%, in 2019 compared to 2018, primarily due to a $6.4 million increase in professional services and product support personnel costs, a $3.1 million increase in other cost of revenue and a $2.1 million increase in facility and overhead costs, offset by a $2.4 million decrease in contractor costs and a $0.3 million decrease in billable expenses. Personnel costs increased due to an increase in professional services and product support staff personnel headcount of 20.8% from December 31, 2018 to December 31, 2019 and a $1.2 million increase in stock-based compensation expense in 2019 due to the vesting of restricted stock units granted to our co-founders. These restricted stock units vested in the three months ended March 31, 2019. The increase in other cost of revenue was due to increased hosting costs as sales of our cloud offering increased in 2019. Facility and overhead costs increased to support our personnel growth. Subcontractor costs decreased in 2019 compared to 2018 because of a decrease in the usage of subcontractors for professional service engagements and a decrease in the average hourly rate for subcontractors. Billable expenses decreased in 2019 compared to 2018 because of a decrease in the utilization rate of professional services resources. Total cost of revenue was not impacted by the adoption of ASC 606.

Subscriptions gross margin decreased to 88.7% in 2019 compared to 90.5% in 2018 due to increased hosting costs as sales of our cloud offering increased and became a larger proportion of our overall software and support revenue. Subscriptions gross margin was also negatively impacted by the $8.8 million decrease in subscriptions revenue as a result of the adoption of ASC 606 compared to if we had calculated subscriptions revenue for 2019 in accordance with ASC 605, as well as the sale of a $4.4 million perpetual software license in 2018. There is minimal cost of revenue for our perpetual software revenue and, therefore, our subscriptions gross margin was higher during 2018. Professional services gross margin increased to 29.6% in 2019 compared to 27.6% in 2018 due to the $2.8 million increase in professional services revenue as a result of the adoption of ASC 606 compared to if we had calculated professional services revenue for 2019 in accordance with ASC 605. To a lesser extent, professional services gross margin increased due to a decrease in the usage of subcontractors for professional services engagements. Due to the increase in our professional services margin, gross margin increased to 64.0% in 2019 compared to 62.5% in 2018.

Sales and Marketing Expense

	Year Ended December 31,		% Change
	2019	2018	
	(dollars in thousands)		
Sales and marketing	$ 117,440	$ 105,992	10.8 %
% of revenue	45.1 %	46.7 %	

Sales and marketing expense increased $11.4 million, or 10.8%, in 2019 compared to 2018, primarily due to a $5.8 million increase in sales and marketing personnel costs, a $2.8 million increase in facility and overhead costs, a $1.7 million increase in marketing costs and a $1.1 million increase in professional fees. Personnel costs increased due to an increase in sales and marketing personnel headcount by 9.8% from December 31, 2018 to December 31, 2019 and a $1.3 million increase in stock-based compensation expense in 2019 due to the vesting of restricted stock units granted to our co-founders. These restricted stock units vested in the three months ended March 31, 2019. Facility and overhead costs increased to support our personnel growth. Marketing costs increased due to increased costs for our annual user conference, Appian World, as well as a rise in marketing event sponsorship and attendance. Professional fees increased due to an increase in consulting fees to support our ongoing marketing events and activities. The adoption of ASC 606 resulted in a reduction of our sales and marketing expense by $4.6 million in 2019 compared to if we had capitalized and amortized our costs to obtain a contract in accordance with ASC 605.

Research and Development Expense

	Year Ended December 31,		% Change
	2019	2018	
	(dollars in thousands)		
Research and development	$ 58,043	$ 44,724	29.8 %
% of revenue	22.3 %	19.7 %	

Research and development expense increased $13.3 million, or 29.8%, in 2019 compared to 2018, primarily due to a $10.2 million increase in research and development personnel costs, a $2.9 million increase in facility and overhead costs and a $0.2 million increase in professional fees. Personnel costs increased due to an increase in research and development personnel headcount by 34.4% from December 31, 2018 to December 31, 2019 and a $1.1 million increase in stock-based compensation expense in 2019 due to the vesting of restricted stock units granted to our co-founders. These restricted stock units vested in the three months ended March 31, 2019. Facility and overhead costs increased to support our personnel growth. Professional fees increased due to an increase in consulting fees to support the development and enhancement of our platform.

General and Administrative Expense

	Year Ended December 31,		% Change
	2019	2018	
	(dollars in thousands)		
General and administrative expense	$ 41,496	$ 37,821	9.7 %
% of revenue	15.9 %	16.7 %	

General and administrative expense increased $3.7 million, or 9.7%, in 2019 compared to 2018, primarily due to a $1.7 million increase in professional fees, a $1.4 million increase in facility and overhead costs and a $0.6 million increase in general and administrative personnel costs. Facility and overhead costs increased to support our personnel growth. Professional fees increased due to the use of consulting services to support our back-office initiatives as well as increased legal costs. Personnel costs increased due to an increase in general and administrative personnel headcount by 23.8% from December 31, 2018 to December 31, 2019, offset by a $3.1 million decrease in stock-based compensation expense in 2019 due to the vesting of an option to purchase 1,828,080 shares of our Class A common stock in August 2018, resulting in $4.5 million of stock-based compensation expense.

Other (Income) Expense, Net

	Year Ended December 31,	
	2019	2018
	(dollars in thousands)	
Other (income) expense, net	(941)	2,295
% of revenue	(0.4)%	1.0 %

Other (income) expense, net decreased by $3.2 million in 2019 compared to 2018, due to $0.2 million in foreign exchange loss in 2019 compared to $3.0 million in foreign exchange loss in 2018. The decrease in foreign exchange loss was primarily due to currency fluctuations of the British Pound Sterling, Euro, Australian dollar and Swiss Franc versus the U.S. dollar during 2019 compared to 2018. There was also a $0.6 million increase in interest income in 2019 compared to 2018, which was offset by a $0.1 million loss on the disposal of property and equipment in 2019 and a $0.1 million increase in other expenses in 2019 as compared to 2018.

Interest Expense

	Year Ended December 31,		% Change
	2019	2018	
	(dollars in thousands)		
Interest expense	367	198	85.4 %
% of revenue	0.1 %	0.1 %	

Interest expense increased by $0.2 million in 2019 compared to 2018, primarily due to interest expense on the finance leases entered into during 2019 and an increase in commitment fees on the letter of credit to fund the security deposit required by the lease for our new headquarters.

Year Ended December 31, 2018 Compared to the Year Ended December 31, 2017

Revenue

	Year Ended December 31,		% Change
	2018	2017	
	(dollars in thousands)		
Revenue			
Subscriptions	$ 126,012	$ 91,514	37.7 %
Professional services	100,731	85,223	18.2
Total revenue	$ 226,743	$ 176,737	28.3

Total revenue increased $50.0 million, or 28.3%, in 2018 compared to 2017, due to an increase in our subscriptions revenue of $34.5 million and an increase in our professional services revenue of $15.5 million. The increase in subscriptions revenue was attributable to $28.2 million of revenue from expanded deployments and corresponding sales of additional subscriptions to existing customers, including a $4.4 million perpetual software license sold to a U.S. federal agency and $6.3 million in sales of subscriptions to new customers. The increase in professional services revenue was due to $3.2 million of additional revenue from existing customers and $12.3 million in sales to new customers.

Cost of Revenue

	Year Ended December 31,		% Change
	2018	2017	
	(dollars in thousands)		
Cost of revenue:			
Subscriptions	$ 11,997	$ 9,379	27.9 %
Professional services	72,928	55,218	32.1
Total cost of revenue	$ 84,925	$ 64,597	31.5
Subscriptions gross margin	90.5 %	89.8 %	
Professional services gross margin	27.6	35.2	
Total gross margin	62.5	63.5	

Cost of revenue increased $20.3 million, or 31.5%, in 2018 compared to 2017, primarily due to a $9.8 million increase in contractor costs, a $6.5 million increase in professional services and product support personnel costs, a $1.7 million increase in billable expenses, a $1.2 million increase in facility and overhead costs and a $1.1 million increase in other cost of revenue. Contractor costs increased in 2018 compared to 2017 because of an increase in the usage of subcontractors for professional service engagements. Personnel costs increased due to an increase in professional services and product support staff personnel headcount of 21.4% from December 31, 2017 to December 31, 2018 and a $0.4 million increase in stock-based compensation expense in 2018. Billable expenses increased because we had more professional services engagements in 2018 as compared to 2017. The increase in other cost of revenue was due to increased hosting costs as sales of our cloud offering increased in 2018. Facility and overhead costs increased to support our personnel growth.

Subscriptions gross margin increased to 90.5% in 2018 compared to 89.8% in 2017 primarily due to the sale of a $4.4 million perpetual software license sold to a U.S. federal agency and a $0.1 million decrease in stock-based compensation expense. Our subscriptions gross margin increased as there was minimal cost of revenue for our perpetual software revenue. Professional services gross margin decreased to 27.6% in 2018 compared to 35.2% in 2017 due to an increase in the usage of subcontractors for professional services engagements and the re-focusing of some professional services personnel to customer success managers. To a lesser degree, the gross margin of our professional services revenue in 2018 was also negatively impacted by a decrease in the utilization rate of professional services resources as compared to 2017 due to an increase in hiring. Due to the decrease in our professional services margin, gross margin decreased to 62.5% in 2018 compared to 63.5% in 2017.

Sales and Marketing Expense

	Year Ended December 31,		% Change
	2018	2017	
	(dollars in thousands)		
Sales and marketing	$ 105,992	$ 81,966	29.3 %
% of revenue	46.7 %	46.4 %	

Sales and marketing expense increased $24.0 million, or 29.3%, in 2018 compared to 2017, primarily due to a $16.6 million increase in sales and marketing personnel costs, a $4.7 million increase in facility and overhead costs, a $2.2 million increase in marketing costs and a $0.5 million increase in professional fees. Personnel costs increased due to an increase in sales and marketing personnel headcount by 19.5% from December 31, 2017 to December 31, 2018 and increased sales commissions driven primarily by our revenue growth in 2018. Facility and overhead costs increased to support our personnel growth. Marketing costs increased due to a rise in marketing event sponsorship and attendance, as well as an increase in advertising costs. Professional fees increased due to an increase in consulting fees to support our ongoing marketing events and activities.

Research and Development Expense

	Year Ended December 31,		% Change
	2018	2017	
	(dollars in thousands)		
Research and development	$ 44,724	$ 34,835	28.4 %
% of revenue	19.7 %	19.7 %	

Research and development expense increased $9.9 million, or 28.4%, in 2018 compared to 2017, primarily due to a $7.7 million increase in research and development personnel costs and a $2.0 million increase in facility and overhead costs and a $0.2 million increase in professional fees. Personnel costs increased due to an increase in research and development personnel headcount by 28.6% from December 31, 2017 to December 31, 2018, offset by a $0.4 million decrease in stock-based compensation expense during 2018. Facility and overhead costs increased to support our personnel growth. Professional fees increased due to an increase in consulting fees to support the development and enhancement of our platform.

General and Administrative Expense

	Year Ended December 31,		% Change
	2018	2017	
	(dollars in thousands)		
General and administrative expense	$ 37,821	$ 27,150	39.3 %
% of revenue	16.7 %	15.4 %	

General and administrative expense increased $10.7 million, or 39.3%, in 2018 compared to 2017, primarily due to a $6.5 million increase in general and administrative personnel costs, a $2.8 million increase in facility and overhead costs and a $1.4 million increase in professional fees. Personnel costs increased due to a $2.9 million increase in stock-based compensation expense in 2018 and an increase in general and administrative personnel headcount by 28.6% from December 31, 2017 to December 31, 2018 in order to support the additional requirements of being a public company. Stock-based compensation expense increased during 2018 due to the vesting of an option previously granted to our chief executive officer to purchase 1,828,080 shares of our Class A common stock in August 2018, resulting in a $2.9 million increase in stock-based compensation expense in 2018 as compared to 2017. Facility and overhead costs increased to support our personnel growth. Professional fees increased due to the use of consulting services to assist with the implementation of new software to support our back-office functions, legal costs incurred during the negotiation of the lease agreement for our new headquarters and additional costs incurred as a result of becoming a public company, offset by a decrease in legal costs after the completion of the secondary offering in November 2017.

Other Expense (Income), Net

	Year Ended December 31,	
	2018	2017
	(dollars in thousands)	
Other expense (income) , net	2,295	(2,038)
% of revenue	1.0 %	(1.2)%

Other expense (income), net reflected a $4.3 million increase in expense in 2018 compared to 2017, primarily due to $3.0 million in foreign exchange loss in 2018 compared to $2.6 million in foreign exchange gain in 2017, offset by a $0.4 million loss on the extinguishment of debt and a $0.3 million fair value adjustment of the preferred stock warrant liability in 2017. There was also a $0.6 million increase in interest income in 2018 compared to 2017. The increase in foreign exchange loss was primarily due to currency fluctuations of the British Pound Sterling, Euro, Australian dollar and Swiss Franc versus the U.S. dollar during 2018 compared to 2017.

Interest Expense

	Year Ended December 31,		% Change
	2018	2017	
	(dollars in thousands)		
Interest expense	198	473	(58.1)%
% of revenue	0.1 %	0.3 %	

Interest expense decreased by $0.3 million in 2018 compared to 2017, primarily due to the repayment of our $20.0 million senior term loan in April 2017.

Seasonality

We have historically experienced seasonality in terms of when we enter into agreements with customers. We typically enter into a significantly higher percentage of agreements with new customers, as well as renewal agreements with existing customers, in the fourth quarter. The increase in customer agreements for the fourth quarter is attributable to large enterprise account buying patterns typical in the software industry. Furthermore, we usually enter into a significant portion of agreements with customers during the last month of each quarter. However, we recognize the majority of our subscriptions revenue ratably over the terms of our subscriptions agreements, which are generally one to three years in length. As a result, a substantial portion of the subscriptions revenue that we report in each period will be derived from the recognition of deferred revenue relating to agreements entered into during previous periods. Consequently, a decline in new sales or renewals in any one period may not be immediately reflected in our revenue results for that period. This decline, however, will negatively affect our revenue in future periods. Accordingly, the effect of significant downturns in sales and market acceptance of our platform and potential changes in our rate of renewals may not be fully reflected in our results of operations until future periods.

While we will continue to recognize the majority of our subscriptions revenue ratably over the terms of our subscription agreements, as a result of the adoption of ASC 606, we may experience greater variability and reduced comparability of our quarterly revenue and results with respect to the timing and nature of our term license subscription agreements due to the upfront revenue recognition.

Backlog

Backlog represents non-cancellable future amounts to be recognized under SaaS and term license subscription agreements. Our backlog is equivalent to our remaining performance obligations. As of December 31, 2019 and 2018, we had backlog of approximately $176 million and $230 million, respectively. Approximately 41% of our backlog as of December 31, 2019 is not expected to be recognized in 2020. The decrease in backlog is due to the primarily upfront revenue recognition of our on-premises term license subscriptions under ASC 606 and the reduced contract lengths of our on-premises term license subscriptions.

We expect that the amount of backlog relative to the total value of our contracts will change from quarter to quarter and year to year for several reasons, including the specific timing and duration of SaaS and term license subscription agreements with large customers, the specific timing of customer renewals, changes in customer financial circumstances and foreign currency fluctuations.

We often sign multiple-year SaaS subscription agreements. Backlog may vary based on changes in the average non-cancellable term of SaaS and term license subscription agreements. The change in backlog that results from changes in the average non-cancellable term of SaaS and term license subscription agreements may not be an indicator of the likelihood of renewal or expected future revenue. Accordingly, we believe that fluctuations in backlog may not be a reliable indicator of future revenue, and we do not utilize backlog as a key management metric internally.

Liquidity and Capital Resources

As of December 31, 2019, we had $159.8 million of cash and cash equivalents. On May 31, 2017, we completed our IPO, in which we sold 7,187,500 shares of our Class A common stock at an offering price of $12.00 per share, including 937,500 shares pursuant to the underwriters' option to purchase additional shares of our Class A common stock, resulting in net proceeds of $77.8 million. In August 2018, we closed our sale of 1,675,000 shares of our Class A common stock in an underwritten public offering at an offering price to the public of $35.15 per share, resulting in net proceeds of $57.8 million. In September 2019, we closed our sale of 1,825,000 shares of our Class A common stock in an underwritten public offering at an offering price to the public of $55.70 per share, resulting in net proceeds of $101.3 million.

We believe that our existing cash and cash equivalents, together with any positive cash flows from operations and available borrowings under our line of credit, will be sufficient to support working capital and capital expenditure requirements for at least the next 12 months. Our future capital requirements will depend on many factors, including our growth rate, the timing and extent of spending to support research and development efforts, the expansion of sales and marketing activities, particularly internationally, and the introduction of new and enhanced products and functions, platform enhancements and professional services offerings, the level of market acceptance of our applications and spending on our new headquarters. In the event that additional financing is required from outside sources, we may be unable to raise the funds on acceptable terms, if at all. To the extent existing cash and cash equivalents and investments and cash from operations are not sufficient to fund future activities, we may need to raise additional funds. We may seek to raise additional funds through equity, equity-linked or debt financings. If we raise additional funds through the incurrence of indebtedness, such indebtedness may have rights that are senior to holders of our equity securities and could contain covenants that restrict operations. Any additional equity financing may be dilutive to our existing stockholders. We recently have and, in the future, may enter into, investments in, or acquisitions of, complementary businesses, products or technologies, which could also require us to seek additional equity financing, incur indebtedness, or use cash resources. If we are unable to raise additional capital when desired, our business, operating results and financial condition could be adversely affected.

The following table shows a summary of our cash flows for the years ended December 31, 2019, 2018 and 2017:

	Year Ended December 31,		
	2019	2018	2017
		(in thousands)	
Cash used in operating activities	$ (8,926)	$ (31,321)	$ (9,128)
Cash used in investing activities	(32,421)	(7,010)	(433)
Cash provided by financing activities	105,549	60,962	50,948

Sources of Funds

We have financed our operations in large part with equity and debt financing arrangements, including net proceeds of $77.8 million from our initial public offering in May 2017, net proceeds of $57.8 million from our underwritten public offering in August 2018 and net proceeds of $101.3 million from our underwritten public offering in September 2019, as well as through sales of subscriptions and professional services and borrowings under our credit facilities. We also financed $3.7 million of office furniture and fixtures and $0.8 million of computer hardware, both associated with the build out of our new headquarters.

2017 Financing Facility

In April 2017, we entered into a financing facility consisting of a $5.0 million senior revolving credit facility, a $20.0 million senior term loan and a $10.0 million subordinated term loan. In connection with the execution of this financing facility, our prior line of credit was terminated, and we borrowed the full $20.0 million available under the senior term loan and repaid the outstanding balance under our prior term loan. Additionally, in connection with the execution of this financing facility, the lender waived the prepayment fee associated with our prior line of credit.

In June 2017, we used proceeds from our IPO to pay all remaining outstanding principal and interest under the senior term loan and subsequently terminated the senior term loan and subordinated term loan. This financing facility was terminated in November 2017 in connection with our entry into a new $20.0 million revolving line of credit.

2017 Revolving Line of Credit

In November 2017, we entered into a $20.0 million revolving line of credit with a lender. The facility matures in November 2022. We may elect whether amounts drawn on the revolving line of credit bear interest at a floating rate per annum equal to either the LIBOR or the prime rate plus an additional interest rate margin that is determined by the availability of borrowings under the revolving line of credit. The additional interest rate margin will range from 2.00% to 2.50% in the case of LIBOR advances and from 1.00% to 1.50% in the case of prime rate advances. The revolving line of credit contains an unused facility fee in an amount between 0.15% and 0.25% of the average unused portion of the revolving line of credit, which is payable quarterly. The agreement contains certain customary affirmative and negative covenants and requires us to maintain (i) an adjusted quick ratio of at least 1.35 to 1.0 and (ii) minimum adjusted EBITDA in the amounts and for the periods set forth in the agreement. Any amounts borrowed under the credit facility are collateralized by substantially all of our assets. We were in compliance with all covenants as of December 31, 2019. As of December 31, 2019, we had not made any borrowings under this revolving line of credit and we had outstanding letters of credit totaling $10.5 million under the 2017 revolving line of credit in connection with securing our leased office space.

Use of Funds

Our principal uses of cash are funding operations and other working capital requirements. Over the past several years, revenue has increased significantly from year to year and, as a result, cash flows from customer collections have increased. However, operating expenses have also increased as we have invested in growing our business. During 2018 and 2019, our uses of cash included the build out of our new headquarters, which we completed during the three months ended September 30, 2019. We spent approximately $21 million above the $18.4 million tenant improvement allowance provided by the landlord for the build out. This spend included $4.5 million of office furniture and fixtures and computer hardware that has been financed. For the year ended December 31, 2019, substantially all of the $32.4 million of cash used in investing activities was related to the build out.

Historical Cash Flows

Operating Activities

For the year ended December 31, 2019, net cash used in operating activities of $8.9 million consisted of a net loss of $50.7 million, offset by $21.1 million in adjustments for non-cash items and $20.7 million of cash provided by changes in working capital. Adjustments for non-cash items consisted of stock-based compensation of $16.4 million, depreciation and amortization expense of $4.7 million, a loss on disposal of equipment of $0.1 million and bad debt expense of $0.1 million, offset by a provision for deferred income taxes of $0.3 million. The increase in cash and cash equivalents resulting from changes in working capital primarily consisted of a $12.6 million increase in deferred revenue adjusted for the impact of the $35.4 million reduction to the opening balance resulting from the adoption of ASC 606. The increase in deferred revenue was due to increased subscription sales. There was also a $9.0 million decrease in prepaid expenses and other assets adjusted for the impact of the $20.4 million increase to the opening balance from the adoption of ASC 606. The decrease in prepaid expenses and other assets was primarily due to the receipt of the non-trade receivable resulting from our tenant improvement allowance. In accordance with GAAP, the $17.0 million of tenant improvement allowance reimbursements received during the year ended December 31, 2019 are a source of cash in operating activities, whereas the capital expenditures are recorded as cash used in investing activities. There was also a $7.4 million decrease in accounts receivable, due to increased cash collections during the year ended December 31, 2019. There was also a $6.8 million increase in operating lease liabilities following the adoption of ASC 842, as a result of taking initial possession of the second phase of our new headquarters in February 2019. There was also a $1.3 million increase in other current liabilities. These increases were partially offset by a $9.3 million increase in deferred commissions adjusted for the impact of the $5.1 million increase to the opening balance from the adoption of ASC 606. The increase was due to increased sales as well as an increase in the estimated economic life over which deferred commissions are amortized. There was also a $4.0 million decrease in accounts payable and accrued expenses, primarily due to the timing of payments and a $3.1 million decrease in accrued compensation and related benefits, primarily due to a decrease in accrued vacation expense because of our new paid-time off policy, which took effect on January 1, 2019.

For the year ended December 31, 2018, net cash used in operating activities of $31.3 million consisted of a net loss of $49.5 million, offset by $18.1 million in adjustments for non-cash items and $0.1 million of cash provided by changes in working capital. Adjustments for non-cash items consisted of stock-based compensation of $16.1 million, depreciation and amortization expense of $2.0 million and bad debt expense of $0.2 million, offset by a provision for deferred income taxes of

$0.2 million. The increase in cash and cash equivalents resulting from changes in working capital primarily consisted of a $23.0 million increase in deferred revenue, as a result of increased subscription sales. There was also a $7.5 million increase in accounts payable and accrued expenses, primarily due to the timing of payments and a $1.8 million increase in other current liabilities due to the commencement of the lease for our new headquarters. The increases were partially offset by a $23.3 million increase in accounts receivable due to increased sales in 2018 as well as the timing of billings and collections. There was also a $7.6 million increase in deferred commissions due to increased sales, a $1.0 million increase in prepaid expenses and other assets and a $0.3 million decrease in deferred rent, non-current.

For the year ended December 31, 2017, net cash used in operating activities of $9.1 million consisted of a net loss of $31.0 million, offset by $14.4 million in adjustments for non-cash items and $7.5 million of cash provided by changes in working capital. Adjustments for non-cash items consisted of stock-based compensation of $13.0 million, depreciation and amortization expense of $0.9 million, loss on extinguishment of debt of $0.4 million and fair value adjustment for the warrant liability of $0.3 million, offset by a provision for deferred income taxes of $0.2 million. The increase in cash and cash equivalents resulting from changes in working capital primarily consisted of an increase in deferred revenue of $18.3 million, as a result of increased subscription sales, a $4.1 million increase in accounts payable and accrued expenses and a $2.4 million increase in accrued compensation and related benefits, primarily due to the timing of year-end bonus payments. This increase was partially offset by a $9.7 million increase in accounts receivable, primarily due to the timing of billings, a $4.2 million increase in prepaid expenses and other assets and a $3.5 million increase in deferred commissions due to increased sales.

Investing Activities

For the year ended December 31, 2019, net cash used in investing activities was $32.4 million, related to the build-out of our new headquarters and the purchase of property and equipment. For the year ended December 31, 2018, net cash used in investing activities was $7.0 million, related to the build-out of our new headquarters and the purchase of property and equipment. For the year ended December 31, 2017, net cash used in investing activities was $0.4 million, related to the purchase of property and equipment.

Financing Activities

For the year ended December 31, 2019, net cash provided by financing activities was $105.5 million, consisting of $101.7 million in proceeds from our underwritten public offering, net of underwriting discounts and commissions, and $4.9 million in proceeds received from stock option exercises. These increases were offset by the principal payments on finance lease obligations of $0.7 million and payment of public offering costs of $0.3 million.

For the year ended December 31, 2018, net cash provided by financing activities was $61.0 million, consisting of $58.3 million in proceeds from our underwritten public offering, net of underwriting discounts and commissions, and $3.1 million in proceeds received from stock option exercises. These increases were offset by the payment of public offering costs of $0.4 million.

For the year ended December 31, 2017, net cash provided by financing activities was $50.9 million, consisting of $80.2 million in proceeds from our IPO, net of underwriting discounts, $19.6 million in proceeds from the issuance of long-term debt, net of issuance costs and $1.1 million in proceeds received from stock option exercises. These increases were offset by the repayment of $40.0 million of long-term debt, a $7.6 million dividend payment to the Series A preferred stockholders and the payment of deferred IPO costs of $2.4 million.

Contractual Obligations and Commitments

The following table summarizes our commitments to settle contractual obligations as of December 31, 2019:

	Payments Due By Period				
	Total	**Less than 1 Year**	**1 to 3 Years**	**3 to 5 Years**	**More than 5 Years**
			(in thousands)		
Operating lease obligations	$ 90,026	$ 3,781	$ 13,903	$ 14,458	$ 57,884
Finance lease obligations	4,099	1,620	2,479	—	—
Purchase obligations[(1)]	1,650	330	660	660	—
Total contractual obligations	$ 95,775	$ 5,731	$ 17,042	$ 15,118	$ 57,884

(1) We have annual royalty fees of $0.3 million for a non-cancellable agreement for the use of technology that is integral in

the development of our software. No amounts were included in the "More than 5 Years" column as this agreement is perpetual and will be required as long as we continue to use the technology.

The commitment amounts in the table above are associated with contracts that are enforceable and legally binding and that specify all significant terms, including fixed or minimum services to be used, fixed, minimum or variable price provisions, and the approximate timing of the actions under the contracts. The table does not include obligations under agreements that we can cancel without a significant penalty. As of December 31, 2019, we had not made any borrowings under our $20.0 million revolving line of credit.

The Company entered into a Second Amendment to Deed of Lease, or the Lease Second Amendment, with Tamares 7950 Owner LLC, or the Landlord, effective as of January 1, 2020. The Lease Second Amendment modified the Deed of Lease dated as of April 17, 2018, as amended on December 23, 2019, between the Company and Landlord, or the Lease, for the Company’s headquarters in Tysons, Virginia. Under the Lease Second Amendment, the Company exercised an option to expand its lease to the fourth floor of the North Tower, or the Fourth Floor, adding approximately 34,158 square feet to the premises. The Company will commence occupancy of the Fourth Floor on the sooner of the completion of certain improvements to the Fourth Floor and October 14, 2020. The monthly base rent for the Fourth Floor will be $87,388 for the first 27 months of the lease term, subject to periodic increases thereafter.

Off-Balance Sheet Arrangements

During the year ended December 31, 2019, we did not have any relationships with unconsolidated entities or financial partnerships, including entities sometimes referred to as structured finance or special purpose entities that were established for the purpose of facilitating off-balance sheet arrangements or other contractually narrow or limited purposes. We do not engage in off-balance sheet financing arrangements. In addition, we do not engage in trading activities involving non-exchange traded contracts. We therefore believe that we are not materially exposed to any financing, liquidity, market or credit risk that could arise if we had engaged in these relationships.

Critical Accounting Policies and Estimates

We believe that the following accounting policies involve a high degree of judgment and complexity. Accordingly, these are the policies we believe are the most critical to aid in fully understanding and evaluating our consolidated financial condition and results of our operations. See Note 2 to our consolidated financial statements included elsewhere in this Annual Report on Form 10-K for a description of our other significant accounting policies. The preparation of our consolidated financial statements in conformity with accounting principles generally accepted in the U.S. requires us to make estimates and judgments that affect the amounts reported in those financial statements and accompanying notes. Although we believe that the estimates we use are reasonable, due to the inherent uncertainty involved in making those estimates, actual results reported in future periods could differ from those estimates.

Significant estimates embedded in the consolidated financial statements for the period presented include revenue recognition, stock-based compensation and income taxes.

Revenue Recognition

We generate subscriptions revenue primarily through the sale of SaaS subscriptions bundled with maintenance and support and hosting services and term license subscriptions bundled with maintenance and support. We generate professional services revenue from fees for our consulting services, including application development and deployment assistance and training related to our platform.

We adopted ASC 606 on January 1, 2019 using the modified retrospective method. Under this method of adoption, we recognized the cumulative effect of initially applying the new revenue standard as an adjustment to the opening balance of accumulated deficit. Comparative periods were not adjusted. Because we were an “emerging growth company” until December 31, 2019, the JOBS Act allowed us to delay adoption of new or revised accounting pronouncements applicable to public companies until such pronouncements are made applicable to private companies. We elected to use this extended transition period that allowed us not to adopt ASC 606 in our Quarterly Reports on Form 10-Q during 2019. The 2019 selected quarterly information in Note 14 of our consolidated financial statements have been recast in accordance with ASC 606.

Performance Obligations and Timing of Revenue Recognition

We primarily sell products and services that fall into the categories discussed below. Each category contains one or more performance obligations that are either (1) capable of being distinct (i.e. the customer can benefit from the product or service on its own or together with readily available resources, including those purchased separately from us) and distinct within the context of the contract (i.e. separately identified from other promises in the contract) or (2) a series of distinct products or services that are substantially the same and have the same pattern of transfer to the customer. Our term license subscriptions are delivered at a point in time. Our SaaS subscriptions, maintenance and support and professional services are delivered over time.

Subscriptions Revenue

Subscriptions revenue is primarily related to (1) SaaS subscriptions bundled with maintenance and support and hosting services and (2) term license subscriptions bundled with maintenance and support.

We generally charge subscription fees on a per-user basis and, to a lesser degree, non-user based single application licenses. We bill customers and collect payment for subscriptions to our platform in advance on an annual, quarterly or monthly basis. In certain instances, our customers have paid their entire contract up front.

SaaS Subscriptions

We generate cloud-based subscription revenue primarily from the sales of subscriptions to access our cloud offering, together with related support services to our customers. We perform all required maintenance and support for our cloud offering and we do not separately charge customers for hosting costs. Revenue is recognized on a ratable basis over the contract term beginning on the date the service is made available to the customer. Our cloud-based subscription contracts generally have a term of one to three years in length. We bill customers and collect payment for subscriptions to our platform in advance and they are non-cancellable.

Term License Subscriptions

Our term license subscription revenue is derived from customers with on-premises installations of our platform pursuant to contracts that were historically one to three years in length. The majority of recent contracts are one year in length. Although term license subscriptions are sold with maintenance and support, the software is fully functional at the beginning of the subscription and is considered a distinct performance obligation. On rare occasions, a cloud-based subscription may include the right for the customer to take possession of the license and as such, the revenue is treated as a license. Revenue from term license subscriptions is recognized when control of the software license has transferred to the customer, which is the later of delivery or commencement of the contract term.

Maintenance and Support

Maintenance and support subscriptions include both technical support and when-and-if-available software upgrades, which are treated as a single performance obligation as they are considered a series of distinct services that are substantially the same and have the same duration and measure of progress. Revenue from maintenance and support is recognized ratably over the contract period, which is the period over which the customer has continuous access to maintenance and support.

Professional Services

Our professional services revenue is comprised of fees for consulting services, including application development and deployment assistance and training services related to our platform. Our professional services are considered distinct performance obligations when sold stand alone or with other products.

Consulting Services

We sell consulting services to assist customers plan and execute deployment of our software. Customers are not required to use consulting services to fully benefit from the software. Consulting services are regularly sold on a standalone basis and either (1) a fixed-fee arrangement or (2) a time and materials basis. Consulting contracts are each considered separate performance obligations because they do not integrate with each other or with other products and services to deliver a combined output to the customer, do not modify or customize (or are not modified or customized by) each other or other products and services, and do not affect the customer's ability to use the other consulting offerings or other products and services. Revenue under consulting contracts is recognized over time as services are delivered. For time and materials-based consulting contracts, we have elected the practical expedient of recognizing revenue upon invoicing since the invoiced amount corresponds directly to the value of our service to-date.

Training Services

We sell various training services to our customers. Training services are sold in the form of prepaid training credits that are redeemed based on a fixed rate per course. Training revenue is recognized when the associated training services are delivered.

Significant Judgments and Estimates

Determine the Transaction Price

The transaction price includes both fixed and variable consideration. Variable consideration is included in the transaction price to the extent it is probable that a significant reversal will not occur. The amount of variable consideration excluded from the transaction price for the year ended December 31, 2019 was insignificant. Our estimates of variable consideration are also subject to subsequent true-up adjustments and may result in changes to its transaction prices but such true-up adjustments are not expected to be material.

Allocating the Transaction Price Based on Standalone Selling Prices

We allocate the transaction price to each performance obligation in a contract based on its relative standalone selling price, or SSP. The SSP is the observable price at which we sell the product or service separately. In the absence of observable pricing, we estimate SSP using the residual approach. We establish SSP as follows:

1. SaaS subscriptions - Given the highly variable selling price of our SaaS subscriptions, we establish the SSP of our SaaS subscriptions using a residual approach after first determining the SSP of consulting and training services. We have concluded that the residual approach to estimate SSP of our SaaS subscriptions is an appropriate allocation of the transaction price.

2. Term license subscriptions - Given the highly variable selling price of our term license subscriptions, we have established SSP of term license subscriptions using a residual approach after first determining the SSP of maintenance and support. Maintenance and support is sold on a standalone basis, with renewals of our legacy perpetual software licenses, within a narrow range of the net license fee and because an economic relationship exists between the license and maintenance and support, we have concluded that the residual approach to estimate SSP of term license subscriptions is an appropriate allocation of the transaction price.

3. Maintenance and support - We establish SSP of maintenance and support as a percentage of the stated net subscription fee based on observable pricing of maintenance and support renewals from our legacy perpetual software licenses.

4. Consulting services and training services - SSP of consulting services and training services is established based on the observable pricing of standalone sales within each geographic region where the services are sold.

Legacy Revenue Accounting Policy

For periods prior to January 1, 2019, revenue was recognized in accordance with ASC 605. Under ASC 605, we recognize revenue when all of the following conditions are met: (1) there is persuasive evidence of an arrangement; (2) the service or product has been provided to the customer; (3) the amount of fees to be paid by the customer is fixed or determinable; and (4) the collection of related fees is reasonably assured. If collection is not reasonably assured, we defer revenue recognition until collectability becomes reasonably assured. Our arrangements do not contain rights of return.

Subscriptions Revenue

Subscriptions revenue is primarily related to (1) SaaS subscriptions bundled with maintenance and support and hosting services and (2) term license subscriptions bundled with maintenance and support.

We generally charge subscription fees on a per-user basis, or alternatively, non-user based single application licenses. We bill customers and collect payment for subscriptions to our platform in advance on a monthly, quarterly or annual basis. In certain instances, our customers have paid their entire contract up front.

SaaS Subscriptions

Our SaaS subscription revenue is derived from customers accessing our cloud offering pursuant to contracts that are generally one to three years in length. We perform all required maintenance and support for our cloud offering and we do not separately charge customers for hosting costs. In these arrangements, our customers do not have the right to take the software on-premises and, as a result, such arrangements are not accounted for within the scope of the software revenue guidance. Revenue from SaaS subscriptions is recognized ratably over the term of the subscription, beginning with the date our service is made available to our customer.

Term License Subscriptions

Our term license subscription revenue is derived from customers with on-premises installations of our platform pursuant to contracts that were historically one to three years in length. The majority of recent contracts are one year in length. Customers with term license subscriptions have the right to use our software and receive maintenance and support. Since we do not sell maintenance and support separately from the subscription, revenue for the term license subscription and maintenance and support is recognized ratably over the term of the subscription, upon delivery of the platform to the customer when sold on a standalone basis.

Professional Services

Our professional services revenue is comprised of fees for consulting services, including application development and deployment assistance and training related to our platform. Our professional services are not essential to the functionality of our platform because the platform is ready for the customer’s use immediately upon delivery and is not modified or customized in any manner.

Consulting services are billed under both time-and-material and fixed-fee arrangements. For standalone time-and-material contracts, we recognize revenue at contractually agreed upon billing rates applied to hours performed. For standalone fixed-fee contracts, we also recognize revenue as the work is performed using the proportional performance method of accounting. Training revenue is recognized when the associated training services are delivered. Training is sold in the form of prepaid training credits that are redeemed based on a fixed rate per course.

We defer recognition of revenue from work performed on pending contract modifications until the period in which the modifications are accepted and funding is approved by the customer. Costs of work performed on pending contract modifications are expensed as incurred.

Multiple Element Arrangements

Our multiple element arrangements are from SaaS subscriptions and term license subscriptions that are generally sold in combination with maintenance and support service and frequently with professional services.

SaaS Subscriptions

For multiple element arrangements involving SaaS subscriptions that include professional services in addition to the subscription to our platform, we evaluate each element to determine whether it represents a separate unit of accounting. Because there are third-party vendors who routinely sell and provide the same professional services to our customers, our professional services are deemed to have standalone value apart from the SaaS subscription. Additionally, we offer both SaaS subscriptions and professional services on a standalone basis. Professional services revenue is therefore accounted for separately from subscription fees and recognized as the professional services are performed. We allocate revenue to the elements based on the selling price hierarchy using vendor-specific objective evidence, or VSOE, of selling price, third-party evidence, or TPE, of selling price, or if neither exists, best estimated selling price, or BESP. In cases where we do not have VSOE or TPE of the elements of our arrangements, we use BESP to allocate revenue. We determine BESP for a service by considering multiple factors including, but not limited to, evaluating the weighted average of actual sales prices and other factors such as gross margin objectives, pricing practices and growth strategy. Pricing practices taken into consideration include historic contractually stated prices, volume discounts where applicable and our price lists. While we believe we can make reliable estimates regarding these matters, these estimates are inherently subjective. Once the revenue is allocated to these elements, revenue is recognized as such services are provided.

Term License Subscriptions

For multiple element arrangements involving term license subscriptions, maintenance and support and professional services, we do not have VSOE of fair value for the maintenance and support. Our term license subscriptions are generally not sold on a standalone basis, and therefore, we have not established VSOE of fair value for the subscriptions. Consequently, for our bundled arrangements that include certain professional services, there are two undelivered elements for which VSOE of fair value has not been established and, therefore, we utilize the combined services approach and defer all revenue until the software has been delivered and the provision of all services has commenced. We then recognize the entire fee from the arrangement ratably over the remaining period of the arrangement, assuming all other software revenue recognition criteria have been met.

Assets Recognized from the Costs to Obtain a Contract with a Customer

We capitalize the incremental costs of obtaining a contract with a customer, including, sales commissions paid to our direct sales force that are incremental costs to obtaining customer contracts. These costs are recorded as deferred commissions in the consolidated balance sheets. Costs to obtain a contract for a new customer or up-sell are amortized on a straight-line basis over an estimated economic life of five years as sales commissions on initial sales are not commensurate with sales commissions on contract renewals. We determined the estimated economic life based on both qualitative and quantitative factors, such as expected renewals, product life cycles, contractual terms and customer attrition. We periodically review the carrying amount of deferred contract acquisition costs to determine whether events or changes in circumstances have occurred that could impact the estimated economic life. Commissions paid relating to contract renewals are deferred and amortized on a straight-line basis over the related renewal period. We also capitalize the incremental fringe benefits associated with commission expenses paid to our direct sales force. Costs to obtain a contract for professional services arrangements are expensed as incurred in accordance with the practical expedient as the contractual period of our professional services arrangements are one year or less.

Amortization expense associated with commission expense is recorded to sales and marketing costs in our consolidated statements of operations.

For the periods prior to January 1, 2019, under ASC 605, deferred commissions are the incremental costs that are directly associated with subscription agreements with customers and consist of sales commissions paid to our direct sales force. Commissions are considered direct and incremental and as such are deferred and amortized over the terms of the related customer contracts consistent with the related revenue.

Stock-Based Compensation

We measure and recognize compensation expense for all stock options and restricted stock units, or RSUs, based on the estimated fair value of the award on the grant date. The fair value is recognized as expense over the requisite service period, which is generally the vesting period of the respective award, on a straight-line basis when the only condition to vesting is continued service. For performance-based awards, stock-based compensation expense is recognized using the accelerated attribution method, based on the probability of satisfying the performance condition. For awards that contain market conditions, compensation expense is measured using a Monte Carlo simulation and recognized using the accelerated attribution method over the derived service period based on the expected market performance as of the grant date. We account for forfeitures as they occur, rather than estimating expected forfeitures.

We estimate the fair value of stock options using the Black-Scholes Option Pricing Model, which requires the use of subjective assumptions, including the expected term of the option, the current price of the underlying stock, the expected stock price volatility, expected dividend yield and the risk-free interest rate for the expected term of the option. The expected term represents the period of time the stock options are expected to be outstanding. Due to the lack of sufficient historical exercise data to provide a reasonable basis upon which to otherwise estimate the expected term of the stock options, we use the simplified method to estimate the expected term for its stock options. Under the simplified method, the expected term of an option is presumed to be the mid-point between the vesting date and the end of the contractual term. Expected volatility is based on historical volatilities for publicly traded stock of comparable companies over the estimated expected term of the stock options. We assume no dividend yield because dividends on our common stock are not expected to be paid in the near future, which is consistent with our history of not paying dividends on our common stock.

The fair value of RSUs is based on the closing market price of our common stock on the Nasdaq Global Market on the date of grant.

We will continue to use judgment in evaluating the assumptions related to our stock-based compensation on a prospective basis. As we continue to accumulate additional data related to our common stock, we may have refinements to our estimates, which could materially impact our future stock-based compensation expense.

Prior to our IPO in May 2017, we were a private company with no active public market for our common stock. Therefore, in response to Section 409A of the Internal Revenue Code of 1986, as amended, related regulations issued by the Internal Revenue Service and accounting standards related to stock-based compensation, we periodically determined for financial reporting purposes the estimated per share fair value of our common stock at various dates using contemporaneous valuations performed in accordance with guidance outlined in the American Institute of Certified Public Accountants Practice Aid, “Valuation of Privately-Held Company Equity Securities Issued as Compensation.”

Following our IPO, we established a policy of using the closing sale price per share of our Class A common stock as quoted on the Nasdaq Global Market on the date of grant for purposes of determining the exercise price per share of our options to purchase common stock.

Income Taxes

We use the asset and liability method of accounting for income taxes in which deferred tax assets and liabilities are recognized for the future tax consequences attributable to differences between the consolidated financial statement carrying amounts of existing assets and liabilities and their respective tax bases. We measure deferred tax assets and liabilities using enacted tax rates expected to apply to taxable income in the years in which those temporary differences are expected to be reversed. We recognize the effect on deferred tax assets and liabilities of a change in tax rates as income and expense in the period that includes the enactment date. A valuation allowance is established if it is more likely than not that all or a portion of the deferred tax asset will not be realized.

Our tax positions are subject to income tax audits by multiple tax jurisdictions throughout the world. We recognize the tax benefit of an uncertain tax position only if it is more likely than not the position is sustainable upon examination by the taxing authority. We measure the tax benefit recognized as the largest amount of benefit which is more likely than not to be realized upon settlement with the taxing authority. We recognize penalties and interest related to unrecognized tax benefits as income tax expense.

We calculate the current and deferred income tax provision based on estimates and assumptions that could differ from the actual results reflected in income tax returns filed in subsequent years and record adjustments based on filed income tax returns when identified. The amount of income taxes paid is subject to examination by U.S. federal, state and foreign tax authorities. The estimate of the potential outcome of any uncertain tax issue is subject to our assessment of relevant risks, facts and circumstances existing at that time. To the extent the assessment of such tax position changes, we record the change in estimate in the period in which we make that determination.

Recent Accounting Pronouncements

See Note 2 of our consolidated financial statements for information related to recently issued accounting standards.

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

We are exposed to market risks in the ordinary course of our business. Market risk represents the risk of loss that may impact our financial position due to adverse changes in financial market prices and rates. Our market risk exposure is primarily the result of fluctuations in interest rates and foreign currency exchange rates.

Interest Rate Risk

We had cash and cash equivalents of $159.8 million as of December 31, 2019, which consisted of cash in readily available checking accounts and overnight repurchase investments. These securities are not dependent on interest rate fluctuations that may cause the principal amount of these assets to fluctuate.

At December 31, 2019, we had no outstanding borrowings.

Inflation Risk

We do not believe that inflation has had a material effect on our business, financial condition or results of operations. If our costs become subject to significant inflationary pressures, we may not be able to fully offset such higher costs through price increases. Our inability or failure to do so could harm our business, financial condition and results of operations.

Foreign Currency Exchange Risk

Our reporting currency is the U.S. dollar. Due to our international operations, we have foreign currency risks related to revenue and operating expenses denominated in currencies other than the U.S. dollar, primarily the British Pound Sterling, Euro, Australian Dollar and Swiss Franc. Our sales contracts are primarily denominated in the local currency of the customer making the purchase. In addition, a portion of operating expenses are incurred outside the United States and are denominated in foreign currencies. Decreases in the relative value of the U.S. dollar to other currencies may negatively affect revenue and other operating results as expressed in U.S. dollars. We do not believe that an immediate 10% increase or decrease in the relative value of the U.S. dollar to other currencies would have a material effect on operating results.

We have experienced and will continue to experience fluctuations in net loss as a result of transaction gains or losses related to remeasuring certain current asset and current liability balances that are denominated in currencies other than the functional currency of the entities in which they are recorded. We have not engaged in the hedging of foreign currency transactions to date, although we may choose to do so in the future.

Item 8. Financial Statements and Supplementary Data.

INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

Consolidated Financial Statements:

Report of Independent Registered Public Accounting Firm

The Board of Directors and Stockholders
Appian Corporation
Tysons, Virginia

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated balance sheets of Appian Corporation (the "Company") as of December 31, 2019 and 2018, the related consolidated statements of operations, comprehensive loss, changes in stockholders' equity (deficit), and cash flows for each of the three years in the period ended December 31, 2019, and the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2019 and 2018, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2019, in conformity with accounting principles generally accepted in the United States of America.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) ("PCAOB"), the Company's internal control over financial reporting as of December 31, 2019, based on criteria established in Internal Control – Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO") and our report dated February 20, 2020 expressed an unqualified opinion thereon.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's consolidated financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud.

Our audits included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. We believe that our audits provide a reasonable basis for our opinion.

Critical Audit Matters

The critical audit matters communicated below are matters arising from the current period audit of the consolidated financial statements that were communicated or required to be communicated to the audit committee and that: (1) relate to accounts or disclosures that are material to the consolidated financial statements and (2) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matter below, providing separate opinions on the critical audit matters or on the accounts or disclosures to which they relate.

Revenue Recognition for Multiple Performance Obligations

As discussed in Note 2 to the consolidated financial statements, certain of the Company's revenue contracts contain multiple performance obligations that might include Software as a Service ("SaaS") subscriptions, term license subscriptions, maintenance and support and professional services. The Company accounts for individual products and services separately if they are capable of being distinct and distinct within the context of the contract. In such cases, the transaction price is allocated to the distinct performance obligations based on their relative standalone selling price or residual approach and revenue is recognized when control of the distinct performance obligation is transferred.

We identified the determination of distinct performance obligations, standalone selling prices and use of the residual approach to estimate standalone selling price for SaaS and term license subscriptions as a critical audit matter. Auditing these elements of revenue recognition involved especially challenging and subjective auditor judgment due to the nature and extent of audit effort required to address these matters.

The primary procedures we performed to address this critical audit matter included:

- Testing the design and operating effectiveness of internal controls over the Company's revenue recognition process including controls over: (i) the identification of distinct performance obligations, and (ii) the determination of standalone selling prices for the distinct performance obligations.
- Testing a sample of revenue contracts and underlying order documents to evaluate management’s identification of distinct performance obligations.
- Evaluating the reasonableness of management’s analysis supporting the standalone selling prices by tracing, on a sample basis, revenue transactions to the underlying source documents and recalculating the mathematical accuracy of the analysis.
- Testing the reasonableness of management’s use of the residual method to determine standalone selling price for SaaS and term license subscriptions.

Adoption of Topic ASC 606 Revenue from Contracts with Customers

As discussed in Note 2 to the consolidated financial statements, the Company adopted Accounting Standards Update (‘ASU’) No. 2014-09, Revenue from Contracts with Customers (“ASC 606”) on January 1, 2019 using the modified retrospective method and recorded an adjustment of $60.9 million to accumulated deficit on the date of adoption.

We identified the adoption of ASC 606 as a critical audit matter. The Company’s processes related to the adoption of ASC 606 included complex management’s judgments related to the following: (i) evaluating the new accounting standard and establishing new policies and practices, (ii) identifying and evaluating completeness and accuracy of relevant historical data for open contracts at the date of adoption, and (iii) analyzing various revenue contracts and identifying distinct performance obligations, determining standalone selling prices and residual approach to estimate standalone selling price for SaaS and term license subscriptions. Auditing the Company’s adoption was challenging and complex due to the effort required to analyze the effect of ASC 606 on the Company’s significant number of open revenue contracts.

The primary procedures we performed to address this critical audit matter included:

- Testing the design and operating effectiveness of internal controls specific to the adoption of ASU 606 including controls over: (i) evaluating the impact of the new accounting standard, (ii) evaluating the completeness and accuracy of relevant historical data for open contracts at the date of adoption, and (iii) assessing results and recording the impact of the adoption.
- Evaluating management’s accounting policies and practices, including the reasonableness of management’s judgments and assumptions related to the determination of distinct performance obligations and standalone selling price by testing a sample of revenue contracts.
- Testing the mathematical accuracy of the Company’s calculation of the cumulative effect of adoption.
- Utilizing personnel with specialized knowledge and skill to assist in evaluating the technical merits of management’s accounting policies used as a basis of management’s ASC 606 adoption.
- Testing the reasonableness of management’s use of the residual method to determine standalone selling price for SaaS and term license subscriptions.

/s/ BDO USA, LLP

We have served as the Company's auditor since 2013.

McLean, Virginia
February 20, 2020

Report of Independent Registered Public Accounting Firm

The Board of Directors and Stockholders
Appian Corporation
Tysons, Virginia

Opinion on Internal Control over Financial Reporting

We have audited Appian Corporation’s (the “Company”) internal control over financial reporting as of December 31, 2019, based on criteria established in Internal Control – Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (the “COSO criteria”). In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2019, based on the COSO criteria.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (“PCAOB”), the consolidated balance sheets of the Company as of December 31, 2019 and 2018, the related consolidated statements of operations, comprehensive loss, changes in stockholders’ equity (deficit), and cash flows for each of the three years in the period ended December 31, 2019, and the related notes and our report dated February 20, 2020 expressed an unqualified opinion thereon.

Basis for Opinion

The Company’s management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Item 9A, Management’s Report on Internal Control over Financial Reporting. Our responsibility is to express an opinion on the Company’s internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit of internal control over financial reporting in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audit also included performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control over Financial Reporting

A company’s internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company’s internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company’s assets that could have a material effect on the financial statements.

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

/s/ BDO USA, LLP
McLean, Virginia
February 20, 2020

APPIAN CORPORATION AND SUBSIDIARIES

CONSOLIDATED BALANCE SHEETS

(in thousands, except share and per share data)

	December 31, 2019	December 31, 2018
Assets		
Current assets		
Cash and cash equivalents	$ 159,755	$ 94,930
Accounts receivable, net of allowance of $600 at December 31, 2019 and 2018	70,408	79,383
Deferred commissions, current	14,543	14,020
Prepaid expenses and other current assets	32,955	21,293
Total current assets	277,661	209,626
Property and equipment, net	39,554	7,539
Operating right-of-use asset	24,205	—
Deferred commissions, net of current portion	28,979	15,088
Deferred tax assets	494	326
Other assets	592	601
Total assets	$ 371,485	$ 233,180
Liabilities and Stockholders' Equity		
Current liabilities		
Accounts payable	$ 5,222	$ 9,249
Accrued expenses	7,488	7,464
Accrued compensation and related benefits	10,691	13,796
Deferred revenue, current	82,201	95,523
Operating lease liability, current	3,836	—
Finance lease liability, current	1,447	—
Other current liabilities	1,395	2,369
Total current liabilities	112,280	128,401
Operating lease liability, net of current portion	44,416	—
Finance lease liability, net of current portion	2,375	—
Deferred revenue, net of current portion	7,139	16,145
Deferred tax liabilities	38	42
Deferred rent, net of current portion	—	15,400
Total liabilities	166,248	159,988
Stockholders' equity		
Class A common stock—par value $0.0001; 500,000,000 shares authorized and 34,525,386 shares issued and outstanding as of December 31, 2019; 500,000,000 shares authorized and 29,626,054 shares issued and outstanding as of December 31, 2018	3	3
Class B common stock—par value $0.0001; 100,000,000 shares authorized and 32,942,636 shares issued and outstanding as of December 31, 2019; 100,000,000 shares authorized and 34,290,383 shares issued and outstanding as of December 31, 2018	3	3
Additional paid-in capital	340,929	218,284
Accumulated other comprehensive (loss) income	(285)	542
Accumulated deficit	(135,413)	(145,640)
Total stockholders' equity	205,237	73,192
Total liabilities and stockholders' equity	$ 371,485	$ 233,180

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

APPIAN CORPORATION AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF OPERATIONS
(in thousands, except share and per share data)

	Year Ended December 31,		
	2019	2018	2017
Revenue:			
Subscriptions	$ 151,299	$ 126,012	$ 91,514
Professional services	109,053	100,731	85,223
Total revenue	260,352	226,743	176,737
Cost of revenue:			
Subscriptions	17,098	11,997	9,379
Professional services	76,743	72,928	55,218
Total cost of revenue	93,841	84,925	64,597
Gross profit	166,511	141,818	112,140
Operating expenses:			
Sales and marketing	117,440	105,992	81,966
Research and development	58,043	44,724	34,835
General and administrative	41,496	37,821	27,150
Total operating expenses	216,979	188,537	143,951
Operating loss	(50,468)	(46,719)	(31,811)
Other (income) expense:			
Other (income) expense, net	(941)	2,295	(2,038)
Interest expense	367	198	473
Total other (income) expense	(574)	2,493	(1,565)
Loss before income taxes	(49,894)	(49,212)	(30,246)
Income tax expense	820	239	761
Net loss	(50,714)	(49,451)	(31,007)
Accretion of dividends on convertible preferred stock	—	—	357
Net loss attributable to common stockholders	$ (50,714)	$ (49,451)	$ (31,364)
Net loss per share attributable to common stockholders:			
Basic and diluted	$ (0.77)	$ (0.80)	$ (0.63)
Weighted average common shares outstanding:			
Basic and diluted	65,479,327	62,140,684	49,529,833

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

APPIAN CORPORATION AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF COMPREHENSIVE LOSS
(in thousands)

	Year Ended December 31,		
	2019	**2018**	**2017**
Net loss	$ (50,714)	$ (49,451)	$ (31,007)
Comprehensive loss, net of income taxes:			
Foreign currency translation adjustment	(827)	103	(891)
Total other comprehensive loss, net of income taxes	$ (51,541)	$ (49,348)	$ (31,898)

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

APPIAN CORPORATION AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF CHANGES IN STOCKHOLDERS' EQUITY (DEFICIT)
(in thousands, except share data)

	Common Stock		Additional Paid-In Capital	Accumulated Other Comprehensive Income (Loss)	Accumulated Deficit	Total Stockholders' Equity (Deficit)
	Shares	Amount				
Balance, December 31, 2016	34,274,718	$ 3	$ —	$ 1,330	$ (64,825)	$ (63,492)
Net loss	—	—	—	—	(31,007)	(31,007)
Accretion of dividends on convertible preferred stock	—	—	—	—	(357)	(357)
Conversion of convertible preferred stock to common stock	18,163,158	2	48,205	—	—	48,207
Conversion of convertible preferred stock warrant to common stock warrant	—	—	1,191	—	—	1,191
Issuance of common stock from initial public offering, net of issuance costs	7,187,500	1	77,788	—	—	77,789
Exercise of common stock warrant	79,363	—	—	—	—	—
Issuance of common stock to directors	14,087	—	—	—	—	—
Vesting of restricted stock units	4,930	—	—	—	—	—
Exercise of stock options	876,121	—	1,108	—	—	1,108
Stock-based compensation expense	—	—	12,976	—	—	12,976
Other comprehensive loss	—	—	—	(891)	—	(891)
Balance, December 31, 2017	60,599,877	6	141,268	439	(96,189)	45,524
Net loss	—	—	—	—	(49,451)	(49,451)
Issuance of common stock from public offering, net of issuance costs	1,675,000	—	57,829	—	—	57,829
Issuance of common stock to directors	11,952	—	—	—	—	—
Vesting of restricted stock units	143,390	—	—	—	—	—
Exercise of stock options	1,486,218	—	3,133	—	—	3,133
Stock-based compensation expense	—	—	16,054	—	—	16,054
Other comprehensive income	—	—	—	103	—	103
Balance, December 31, 2018	63,916,437	6	218,284	542	(145,640)	73,192
Cumulative-effect adjustment for the adoption of ASC 606	—	—	—	—	60,941	60,941
Net loss	—	—	—	—	(50,714)	(50,714)
Issuance of common stock from public offering, net of issuance costs	1,825,000	—	101,303	—	—	101,303
Issuance of common stock to directors	10,654	—	—	—	—	—
Vesting of restricted stock units	521,460	—	—	—	—	—
Exercise of stock options	1,194,471	—	4,899	—	—	4,899
Stock-based compensation expense	—	—	16,443	—	—	16,443
Other comprehensive income	—	—	—	(827)	—	(827)
Balance, December 31, 2019	67,468,022	$ 6	$ 340,929	$ (285)	$ (135,413)	$ 205,237

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

APPIAN CORPORATION AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF CASH FLOWS
(in thousands)

	Year Ended December 31,		
	2019	**2018**	**2017**
Cash flows from operating activities:			
Net loss	$ (50,714)	$ (49,451)	$ (31,007)
Adjustments to reconcile net loss to net cash used in operating activities:			
Depreciation and amortization	4,742	2,021	886
Loss (gain) on disposal of equipment	146	(4)	—
Bad debt expense	99	211	62
Deferred income taxes	(334)	(218)	(251)
Stock-based compensation	16,443	16,054	12,976
Fair value adjustment for warrant liability	—	—	341
Loss on extinguishment of debt	—	—	384
Changes in assets and liabilities:			
Accounts receivable	7,432	(23,332)	(9,716)
Prepaid expenses and other assets	8,972	(1,025)	(4,162)
Deferred commissions	(9,319)	(7,615)	(3,487)
Accounts payable and accrued expenses	(4,039)	7,461	4,128
Accrued compensation and related benefits	(3,072)	(3)	2,365
Other current liabilities	1,318	1,823	383
Deferred revenue	12,573	23,023	18,344
Operating lease liabilities	6,827	—	—
Deferred rent, non-current	—	(266)	(374)
Net cash used in operating activities	(8,926)	(31,321)	(9,128)
Cash flows from investing activities:			
Purchases of property and equipment	(32,421)	(7,014)	(433)
Proceeds from sale of equipment	—	4	—
Net cash used in investing activities	(32,421)	(7,010)	(433)
Cash flows from financing activities:			
Proceeds from initial public offering, net of underwriting discounts	—	—	80,213
Proceeds from public offering, net of underwriting discounts	101,653	58,258	—
Payment of costs related to public offerings	(350)	(429)	(2,424)
Payment of dividend to Series A preferred stockholders	—	—	(7,565)
Proceeds from exercise of common stock options	4,899	3,133	1,108
Principal payments on finance lease obligations	(653)	—	—
Proceeds from issuance of long-term debt, net of debt issuance costs	—	—	19,616
Repayment of long-term debt	—	—	(40,000)
Net cash provided by financing activities	105,549	60,962	50,948
Effect of foreign exchange rate changes on cash and cash equivalents	623	(1,459)	1,228
Net increase in cash and cash equivalents	64,825	21,172	42,615
Cash and cash equivalents, beginning of period	94,930	73,758	31,143
Cash and cash equivalents, end of period	$ 159,755	$ 94,930	$ 73,758
Supplemental disclosure of cash flow information:			
Cash paid for interest	$ 331	$ 46	$ 515
Cash paid for income taxes	$ 356	$ 680	$ 615
Supplemental disclosure of non-cash financing activities:			
Finance lease obligations to acquire new office furniture and fixtures and computer hardware	$ 4,475	$ —	$ —
Conversion of convertible preferred stock to common stock	$ —	$ —	$ 48,207
Conversion of convertible preferred stock warrant to common stock warrant	$ —	$ —	$ 1,191
Accretion of dividends on convertible preferred stock	$ —	$ —	$ 357

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

1. Organization and Description of Business

Appian Corporation (together with its subsidiaries, “Appian,” the “Company,” “we” or “our”) provides a low-code automation platform that accelerates the creation of high-impact business applications, enabling our customers to automate the most important aspects of their business. Global organizations use our applications to improve customer experience, achieve operational excellence and simplify global risk management and compliance. We were incorporated in the state of Delaware in August 1999. We are headquartered in Tysons, Virginia and operate in Canada, Switzerland, the United Kingdom, France, Germany, the Netherlands, Italy, Australia, Spain, Singapore and Sweden.

2. Significant Accounting Policies

Basis of Presentation

The accompanying consolidated financial statements and footnotes have been prepared in accordance with accounting principles generally accepted in the United States (“U.S. GAAP”) as contained in the Financial Accounting Standards Board (“FASB”) Accounting Standards Codification (the “Codification” or “ASC”).

Use of Estimates

The preparation of our consolidated financial statements in conformity with U.S. GAAP requires us to make estimates and judgments that affect the amounts reported in these consolidated financial statements and accompanying notes. Although we believe that the estimates we use are reasonable, due to the inherent uncertainty involved in making these estimates, actual results reported in future periods could differ from those estimates.

Significant estimates embedded in the consolidated financial statements include revenue recognition, income taxes and the related valuation allowance and stock-based compensation.

Principles of Consolidation

The accompanying consolidated financial statements include the accounts of Appian and its wholly-owned subsidiaries. All intercompany accounts and transactions have been eliminated in consolidation.

Initial Public Offering

In May 2017, we completed an initial public offering ("IPO"), in which we sold 7,187,500 shares of our newly-authorized Class A common stock at an initial price to the public of $12.00 per share. We received net proceeds of $77.8 million, after deducting underwriting discounts and commissions and offering expenses paid and payable by us, from the IPO.

Deferred offering costs of $2.4 million, consisting of legal, accounting and other fees and costs related to our IPO, were recorded to additional paid-in capital as a reduction of the proceeds upon the closing of our IPO.

Secondary Offering

In November 2017, we completed a secondary offering in which stockholders sold an aggregate of 4,370,000 shares of our Class A common stock at a price of $20.25 per share. We did not receive any proceeds from the sale of the shares of our Class A common stock sold in the secondary offering.

Public Offerings

In August 2018, we completed an underwritten public offering of 2,000,000 shares of our Class A common stock, of which 1,675,000 shares of Class A common stock were sold by us and 325,000 shares of Class A common stock were sold by existing stockholders, at an offering price to the public of $35.15 per share. Our net proceeds from the offering were $57.8 million, after deducting underwriting discounts and commissions and offering expenses. We did not receive any of the proceeds from the sale of shares by the selling stockholders.

In September 2019, we completed an underwritten public offering of 2,329,000 shares of our Class A common stock, of which 1,825,000 shares of Class A common stock were sold by us and 504,000 shares of Class A common stock were sold by existing stockholders. The underwriter purchased the shares from us and the selling stockholders at a price of $55.70 per share. Our net proceeds from the offering were $101.3 million, after deducting underwriting discounts and commissions and offering expenses. We did not receive any of the proceeds from the sale of shares by the selling stockholders.

Revenue Recognition

We generate subscriptions revenue primarily through the sale of SaaS subscriptions bundled with maintenance and support and hosting services and term license subscriptions bundled with maintenance and support. We generate professional services revenue from fees for our consulting services, including application development and deployment assistance and training related to our platform. Because we were an "emerging growth company" until December 31, 2019, the Jumpstart Our Business Startups Act (the "JOBS Act") allowed us to delay adoption of new or revised accounting pronouncements applicable to public companies until such pronouncements are made applicable to private companies. We elected to use this extended transition period that allowed us not to adopt Financial Accounting Standards Board, or FASB, Accounting Standards Updated, or ASU, 2014-09, *Revenue from Contracts with Customers (Topic 606)* ("ASC 606") in our Quarterly Reports on Form 10-Q during 2019. The 2019 selected quarterly information in Note 14 have been recast in accordance with ASC 606.

We adopted ASC 606 on January 1, 2019 using the modified retrospective method. Under this method of adoption, we recognized the cumulative effect of initially applying the new revenue standard as an adjustment to the opening balance of accumulated deficit. Comparative periods were not adjusted.

The following table summarizes revenue from contracts with customers for the year ended December 31, 2019 (in thousands):

	Year Ended December 31, 2019
SaaS subscriptions	$ 95,028
Term license subscriptions	40,428
Maintenance and support	15,843
Professional services	109,053
Total revenue	$ 260,352

Performance Obligations and Timing of Revenue Recognition

We primarily sell products and services that fall into the categories discussed below. Each category contains one or more performance obligations that are either (1) capable of being distinct (i.e. the customer can benefit from the product or service on its own or together with readily available resources, including those purchased separately from us) and distinct within the context of the contract (i.e. separately identified from other promises in the contract) or (2) a series of distinct products or services that are substantially the same and have the same pattern of transfer to the customer. Our term license subscriptions are delivered at a point in time. Our SaaS subscriptions, maintenance and support and professional services are delivered over time.

Subscriptions Revenue

Subscriptions revenue is primarily related to (1) SaaS subscriptions bundled with maintenance and support and hosting services and (2) term license subscriptions bundled with maintenance and support.

We generally charge subscription fees on a per-user basis and, to a lesser degree, non-user based single application licenses. We bill customers and collect payment for subscriptions to our platform in advance on an annual, quarterly or monthly basis. In certain instances, our customers have paid their entire contract up front.

SaaS Subscriptions

We generate cloud-based subscription revenue primarily from the sales of subscriptions to access our cloud offering, together with related support services to our customers. We perform all required maintenance and support for our cloud offering and we do not separately charge customers for hosting costs. Revenue is recognized on a ratable basis over the contract term beginning on the date the service is made available to the customer. Our cloud-based subscription contracts generally have a term of one to three years in length. We bill customers and collect payment for subscriptions to our platform in advance and they are non-cancellable.

Term License Subscriptions

Our term license subscription revenue is derived from customers with on-premises installations of our platform pursuant to contracts that were historically one to three years in length. The majority of recent contracts are one year in length. Although term license subscriptions are sold with maintenance and support, the software is fully functional at the beginning of the subscription and is considered a distinct performance obligation. On rare occasions, a cloud-based subscription may include the right for the customer to take possession of the license and as such, the revenue is treated as a license. Revenue from term license subscriptions is recognized when control of the software license has transferred to the customer, which is the later of delivery or commencement of the contract term.

Maintenance and Support

Maintenance and support subscriptions include both technical support and when-and-if-available software upgrades, which are treated as a single performance obligation as they are considered a series of distinct services that are substantially the same and have the same duration and measure of progress. Revenue from maintenance and support is recognized ratably over the contract period, which is the period over which the customer has continuous access to maintenance and support.

Professional Services

Our professional services revenue is comprised of fees for consulting services, including application development and deployment assistance and training services related to our platform. Our professional services are considered distinct performance obligations when sold stand alone or with other products.

Consulting Services

We sell consulting services to assist customers plan and execute deployment of our software. Customers are not required to use consulting services to fully benefit from the software. Consulting services are regularly sold on a standalone basis and either (1) a fixed-fee arrangement or (2) a time and materials basis. Consulting contracts are each considered separate performance obligations because they do not integrate with each other or with other products and services to deliver a combined output to the customer, do not modify or customize (or are not modified or customized by) each other or other products and services, and do not affect the customer's ability to use the other consulting offerings or other products and services. Revenue under consulting contracts is recognized over time as services are delivered. For time and materials-based consulting contracts, we have elected the practical expedient of recognizing revenue upon invoicing since the invoiced amount corresponds directly to the value of our service to-date.

Training Services

We sell various training services to our customers. Training services are sold in the form of prepaid training credits that are redeemed based on a fixed rate per course. Training revenue is recognized when the associated training services are delivered.

Significant Judgments and Estimates

Determine the Transaction Price

The transaction price includes both fixed and variable consideration. Variable consideration is included in the transaction price to the extent it is probable that a significant reversal will not occur. The amount of variable consideration excluded from the transaction price for the year ended December 31, 2019 was insignificant. Our estimates of variable consideration are also subject to subsequent true-up adjustments and may result in changes to its transaction prices but such true-up adjustments are not expected to be material.

Allocating the Transaction Price Based on Standalone Selling Prices

We allocate the transaction price to each performance obligation in a contract based on its relative SSP. The SSP is the observable price at which we sell the product or service separately. In the absence of observable pricing, we estimate SSP using the residual approach. We establish SSP as follows:

1. SaaS subscriptions - Given the highly variable selling price of our SaaS subscriptions, we establish the SSP of our SaaS subscriptions using a residual approach after first determining the SSP of consulting and training services. We have concluded that the residual approach to estimate SSP of our SaaS subscriptions is an appropriate allocation of the transaction price.

2. Term license subscriptions - Given the highly variable selling price of our term license subscriptions, we have established SSP of term license subscriptions using a residual approach after first determining the SSP of maintenance and support. Maintenance and support is sold on a standalone basis, with renewals of our legacy perpetual software licenses, within a narrow range of the net license fee and because an economic relationship exists between the license and maintenance and support, we have concluded that the residual approach to estimate SSP of term license subscriptions is an appropriate allocation of the transaction price.

3. Maintenance and support - We establish SSP of maintenance and support as a percentage of the stated net subscription fee based on observable pricing of maintenance and support renewals from our legacy perpetual software licenses.

4. Consulting services and training services - SSP of consulting services and training services is established based on the observable pricing of standalone sales within each geographic region where the services are sold.

Contract Balances

Timing may differ between the satisfaction of performance obligations and the invoicing and collection of amounts related to our contracts with customers. Contract assets primarily relate to unbilled amounts for contracts with customers for which the amount of revenue recognized exceeds the amount billed to the customer. Contract assets are transferred to accounts receivable when the right to invoice becomes unconditional. As of January 1, 2019 and December 31, 2019, contract assets of $25.8 million and $22.8 million, respectively, are included in prepaid expenses and other current assets in our consolidated balance sheet.

Contract liabilities consists of deferred revenue and include payments received in advance of the satisfaction of performance obligations. For the year ended December 31, 2019, we recognized $66.6 million of revenue that was included in deferred revenue as of January 1, 2019. Deferred revenue that will be recognized during the succeeding 12-month period is recorded as current, and the remaining deferred revenue is recorded as non-current.

Transaction Price Allocated to the Remaining Performance Obligations

As of December 31, 2019, we had an aggregate transaction price of $175.8 million, allocated to unsatisfied performance obligations related to SaaS subscriptions, term license subscriptions and maintenance and support. We expect to recognize $153.7 million as revenue over the next 24 months with the remaining amount recognized thereafter.

Transition Disclosures

For periods prior to January 1, 2019, we recognized revenue in accordance with FASB ASC Topic 605, *Revenue Recognition* ("ASC 605"). In accordance with the modified retrospective method transition requirements, we will present the financial statement line items impacted and adjusted to compare to presentation under ASC 605 for the annual periods during the first year of adoption of ASC 606.

Consolidated Balance Sheets - Reconciliation of the Impacts from the Adoption of the New Revenue Recognition Standard

The following table summarizes the impacts from the adoption of the new revenue recognition standard on our consolidated balance sheet as of December 31, 2019 (in thousands):

	As of December 31,			
	2019			2018
	As Reported (ASC 606)	Impacts from Adoption	Without Adoption (ASC 605)	As Reported (ASC 605)
Assets				
Current assets				
Cash and cash equivalents	$ 159,755	$ —	$ 159,755	$ 94,930
Accounts receivable, net of allowance	70,408	—	70,408	79,383
Deferred commissions, current	14,543	(6,061)	20,604	14,020
Prepaid expenses and other current assets	32,955	16,343	16,612	21,293
Total current assets	277,661	10,282	267,379	209,626
Property and equipment, net	39,554	—	39,554	7,539
Operating right-of-use asset	24,205	—	24,205	—
Deferred commissions, net of current portion	28,979	15,780	13,199	15,088
Deferred tax assets	494	—	494	326
Other assets	592	—	592	601
Total assets	371,485	26,062	345,423	233,180
Liabilities and Stockholders' Equity				
Current liabilities				
Accounts payable	$ 5,222	$ —	$ 5,222	$ 9,249
Accrued expenses	7,488	—	7,488	7,464
Accrued compensation and related benefits	10,691	—	10,691	13,796
Deferred revenue, current	82,201	(28,985)	111,186	95,523
Operating lease liability, current	3,836	—	3,836	—
Finance lease liability, current	1,447	—	1,447	—
Other current liabilities	1,395	—	1,395	2,369
Total current liabilities	112,280	(28,985)	141,265	128,401
Operating lease liability, net of current portion	44,416	—	44,416	—
Finance lease liability, net of current portion	2,375	—	2,375	—
Deferred revenue, net of current portion	7,139	(4,891)	12,030	16,145
Deferred tax liabilities	38	—	38	42
Deferred rent, net of current portion	—	—	—	15,400
Total liabilities	166,248	(33,876)	200,124	159,988
Stockholders' equity				
Class A common stock	3	—	3	3
Class B common stock	3	—	3	3
Additional paid-in capital	340,929	—	340,929	218,284
Accumulated other comprehensive (loss) income	(285)	320	(605)	542
Accumulated deficit	(135,413)	59,618	(195,031)	(145,640)
Total stockholders' equity	205,237	59,938	145,299	73,192
Total liabilities and stockholders' equity	$ 371,485	26,062	$ 345,423	$ 233,180

The following summarizes the significant changes on the consolidated balance sheet as of December 31, 2019 as a result of the adoption of ASC 606 on January 1, 2019 compared to if we had continued to recognize revenue under ASC 605:

- Total deferred commissions increased $9.7 million due to the increase in the amortization period of costs to obtain a contract for a new customer or up-sell from the contract term to the five year estimated economic life.
- Prepaid expenses and other current assets increased $16.3 million and total deferred revenue decreased $33.9 million due to the change in timing of when we recognize revenue under ASC 606.

Consolidated Statements of Operations - Reconciliation of the Impacts from the Adoption of the New Revenue Recognition Standard

The following table summarizes the impacts from the adoption of the new revenue recognition standard on our consolidated statement of operations for the year ended December 31, 2019 (in thousands):

	Year Ended December 31,			
	2019			2018
	As Reported (ASC 606)	Impacts from Adoption	Without Adoption (ASC 605)	As Reported (ASC 605)
Revenue:				
Subscriptions	$ 151,299	$ (8,786)	$ 160,085	$ 126,012
Professional services	109,053	2,791	106,262	100,731
Total revenue	260,352	(5,995)	266,347	226,743
Cost of revenue:				
Subscriptions	17,098	—	17,098	11,997
Professional services	76,743	—	76,743	72,928
Total cost of revenue	93,841	—	93,841	84,925
Gross profit	166,511	(5,995)	172,506	141,818
Operating expenses:				
Sales and marketing	117,440	(4,625)	122,065	105,992
Research and development	58,043	—	58,043	44,724
General and administrative	41,496	—	41,496	37,821
Total operating expenses	216,979	(4,625)	221,604	188,537
Operating loss	(50,468)	(1,370)	(49,098)	(46,719)
Other (income) expense:				
Other (income) expense, net	(941)	(47)	(894)	2,295
Interest expense	367	—	367	198
Total other (income) expense	(574)	(47)	(527)	2,493
Loss before income taxes	(49,894)	(1,323)	(48,571)	(49,212)
Income tax expense	820	—	820	239
Net loss	$ (50,714)	$ (1,323)	$ (49,391)	$ (49,451)
Net loss per share attributable to common stockholders:				
Basic and diluted	$ (0.77)	$ (0.02)	$ (0.75)	$ (0.80)

The following summarizes the significant changes on the consolidated statement of operations for the year ended December 31, 2019 as a result of the adoption of ASC 606 on January 1, 2019 compared to if we had continued to recognize revenue under ASC 605:

- Subscriptions revenue decreased $8.8 million for the year ended December 31, 2019 under ASC 606 primarily due to the change in timing of when we recognize term license subscription revenue. Additionally, a significant amount of our unrecognized term license subscriptions revenue was recorded as an adjustment to accumulated deficit under ASC 606. Under ASC 606, our term license subscription revenue is recognized at the time of delivery, as opposed to ratably over the contract term under ASC 605.

- Professional services revenue increased $2.8 million for the year ended December 31, 2019 under ASC 606 primarily due to the fact that our professional services are sold together with SaaS or term licenses. Under ASC 606, the professional services represent distinct performance obligations and therefore are recognized as services are performed. Under ASC 605, professional services sold together with term licenses were recognized ratably over the contract period of maintenance and support.

- Sales and marketing expense decreased $4.6 million for the year ended December 31, 2019 under ASC 606 primarily due to the increase in the period over which we amortize our deferred sales commissions.

Consolidated Statements of Comprehensive Loss - Reconciliation of the Impacts from the Adoption of the New Revenue Recognition Standard

The following table summarizes the impacts from the adoption of the new revenue recognition standard on our consolidated statement of comprehensive loss for the year ended December 31, 2019 (in thousands):

	Year Ended December 31,			
	2019			2018
	As Reported (ASC 606)	Impacts from Adoption	Without Adoption (ASC 605)	As Reported (ASC 605)
Net loss	$ (50,714)	$ (1,323)	$ (49,391)	$ (49,451)
Comprehensive loss, net of income taxes:				
Foreign currency translation adjustment	(827)	115	(942)	103
Total other comprehensive loss, net of income taxes	$ (51,541)	$ (1,208)	$ (50,333)	$ (49,348)

Consolidated Statements of Cash Flows - Reconciliation of the Impacts from the Adoption of the New Revenue Recognition Standard

The following table summarizes the impacts from the adoption of the new revenue recognition standard on our consolidated statement of cash flows for the year ended December 31, 2019 (in thousands):

	Year Ended December 31,			
	2019			2018
	As Reported (ASC 606)	Impacts from Adoption	Without Adoption (ASC 605)	As Reported (ASC 605)
Net loss	$ (50,714)	$ (1,323)	$ (49,391)	$ (49,451)
Adjustments to reconcile net loss to net cash used in operating activities:				
Depreciation and amortization	4,742	—	4,742	2,021
Loss (gain) on disposal of equipment	146	—	146	(4)
Bad debt expense	99	—	99	211
Deferred income taxes	(334)	—	(334)	(218)
Stock-based compensation	16,443	—	16,443	16,054
Changes in assets and liabilities:				
Accounts receivable	7,432	—	7,432	(23,332)
Prepaid expenses and other assets	8,972	4,313	4,659	(1,025)
Deferred commissions	(9,319)	(4,625)	(4,694)	(7,615)
Accounts payable and accrued expenses	(4,039)	—	(4,039)	7,461
Accrued compensation and related benefits	(3,072)	—	(3,072)	(3)
Other current liabilities	1,318	—	1,318	1,823
Deferred revenue	12,573	1,717	10,856	23,023
Operating lease liabilities	6,827	—	6,827	—
Deferred rent, non-current	—	—	—	(266)
Net cash used in operating activities	(8,926)	82	(9,008)	(31,321)
Cash flows from investing activities:				
Purchases of property and equipment	(32,421)	—	(32,421)	(7,014)
Proceeds from sale of equipment	—	—	—	4
Net cash used in investing activities	(32,421)	—	(32,421)	(7,010)
Cash flows from financing activities:				
Proceeds from public offering, net of underwriting discounts	101,653	—	101,653	58,258
Payment of costs related to public offerings	(350)	—	(350)	(429)
Proceeds from exercise of common stock options	4,899	—	4,899	3,133
Principal payments on finance lease obligations	(653)	—	(653)	—
Net cash provided by financing activities	105,549	—	105,549	60,962
Effect of foreign exchange rate changes on cash and cash equivalents	623	(82)	705	(1,459)
Net increase in cash and cash equivalents	64,825	—	64,825	21,172
Cash and cash equivalents, beginning of period	94,930	—	94,930	73,758
Cash and cash equivalents, end of period	$ 159,755	—	$ 159,755	$ 94,930

Legacy Revenue Accounting Policy

For periods prior to January 1, 2019, revenue was recognized in accordance with ASC 605. Under ASC 605, we recognize revenue when all of the following conditions are met: (1) there is persuasive evidence of an arrangement; (2) the service or product has been provided to the customer; (3) the amount of fees to be paid by the customer is fixed or determinable; and (4) the collection of related fees is reasonably assured. If collection is not reasonably assured, we defer revenue recognition until collectability becomes reasonably assured. Our arrangements do not contain rights of return.

Subscriptions Revenue

Subscriptions revenue is primarily related to (1) SaaS subscriptions bundled with maintenance and support and hosting services and (2) term license subscriptions bundled with maintenance and support.

We generally charge subscription fees on a per-user basis, or alternatively, non-user based single application licenses. We bill customers and collect payment for subscriptions to our platform in advance on a monthly, quarterly or annual basis. In certain instances, our customers have paid their entire contract up front.

SaaS Subscriptions

Our SaaS subscription revenue is derived from customers accessing our cloud offering pursuant to contracts that are generally one to three years in length. We perform all required maintenance and support for our cloud offering and we do not separately charge customers for hosting costs. In these arrangements, our customers do not have the right to take the software on-premises and, as a result, such arrangements are not accounted for within the scope of the software revenue guidance. Revenue from SaaS subscriptions is recognized ratably over the term of the subscription, beginning with the date our service is made available to our customer.

Term License Subscriptions

Our term license subscription revenue is derived from customers with on-premises installations of our platform pursuant to contracts that were historically one to three years in length. The majority of recent contracts are one year in length. Customers with term license subscriptions have the right to use our software and receive maintenance and support. Since we do not sell maintenance and support separately from the subscription, revenue for the term license subscription and maintenance and support is recognized ratably over the term of the subscription, upon delivery of the platform to the customer when sold on a standalone basis.

Professional Services

Our professional services revenue is comprised of fees for consulting services, including application development and deployment assistance and training related to our platform. Our professional services are not essential to the functionality of our platform because the platform is ready for the customer’s use immediately upon delivery and is not modified or customized in any manner.

Consulting services are billed under both time-and-material and fixed-fee arrangements. For standalone time-and-material contracts, we recognize revenue at contractually agreed upon billing rates applied to hours performed. For standalone fixed-fee contracts, we also recognize revenue as the work is performed using the proportional performance method of accounting. Training revenue is recognized when the associated training services are delivered. Training is sold in the form of prepaid training credits that are redeemed based on a fixed rate per course.

We defer recognition of revenue from work performed on pending contract modifications until the period in which the modifications are accepted and funding is approved by the customer. Costs of work performed on pending contract modifications are expensed as incurred.

Multiple Element Arrangements

Our multiple element arrangements are from SaaS subscriptions and term license subscriptions that are generally sold in combination with maintenance and support service and frequently with professional services.

SaaS Subscriptions

For multiple element arrangements involving SaaS subscriptions that include professional services in addition to the subscription to our platform, we evaluate each element to determine whether it represents a separate unit of accounting.

Because there are third-party vendors who routinely sell and provide the same professional services to our customers, our professional services are deemed to have standalone value apart from the SaaS subscription. Additionally, we offer both SaaS subscriptions and professional services on a standalone basis. Professional services revenue is therefore accounted for separately from subscription fees and recognized as the professional services are performed. We allocate revenue to the elements based on the selling price hierarchy using vendor-specific objective evidence ("VSOE") of selling price, third-party evidence ("TPE") of selling price, or if neither exists, best estimated selling price ("BESP"). In cases where we do not have VSOE or TPE of the elements of our arrangements, we use BESP to allocate revenue. We determine BESP for a service by considering multiple factors including, but not limited to, evaluating the weighted average of actual sales prices and other factors such as gross margin objectives, pricing practices and growth strategy. Pricing practices taken into consideration include historic contractually stated prices, volume discounts where applicable and our price lists. While we believe we can make reliable estimates regarding these matters, these estimates are inherently subjective. Once the revenue is allocated to these elements, revenue is recognized as such services are provided.

Term License Subscriptions

For multiple element arrangements involving term license subscriptions, maintenance and support and professional services, we do not have VSOE of fair value for the maintenance and support. Our term license subscriptions are generally not sold on a standalone basis, and therefore, we have not established VSOE of fair value for the subscriptions. Consequently, for our bundled arrangements that include certain professional services, there are two undelivered elements for which VSOE of fair value has not been established and, therefore, we utilize the combined services approach and defer all revenue until the software has been delivered and the provision of all services has commenced. We then recognize the entire fee from the arrangement ratably over the remaining period of the arrangement, assuming all other software revenue recognition criteria have been met.

Cost of Revenue

Subscriptions

Cost of subscriptions revenue consists primarily of fees paid to our third-party managed hosting providers and other third-party service providers, personnel costs, including payroll and benefits for our technology operations and customer support teams, and allocated facility costs and overhead.

Professional Services

Cost of professional services revenue includes all direct and indirect costs to deliver our professional services and training, including employee compensation for our global professional services and training personnel, travel costs, third-party contractor costs and allocated facility costs and overhead, as well as the costs of billable expenses, such as travel and lodging. The unpredictability of the timing of entering into significant professional services agreements sold on a standalone basis may cause significant fluctuations in our quarterly financial results.

Concentration of Credit and Customer Risk

Our financial instruments that are exposed to concentration of credit and customer risk consist primarily of cash and cash equivalents and trade accounts receivable. Deposits held with banks may exceed the amount of insurance, if any, provided on such deposits. We believe that the financial institutions that hold our cash deposits are financially sound and, accordingly, minimal credit risk exists with respect to these balances.

With regard to our customers, credit evaluation and account monitoring procedures are used to minimize the risk of loss. We believe that no additional credit risk beyond amounts provided for collection loss are inherent in accounts receivable. Revenue generated from government agencies represented 17.1%, 15.7% and 15.4% of our revenue for the years ended December 31, 2019, 2018 and 2017, respectively, of which the top three U.S. federal government agencies generated 7.4%, 7.8% and 8.4% of our revenue for the years ended December 31, 2019, 2018 and 2017, respectively. Additionally, 32.3%, 28.7% and 27.0% of our revenue during the years ended December 31, 2019, 2018 and 2017, respectively, was generated from foreign customers.

Cash and Cash Equivalents

We consider all highly liquid investments with an original or remaining maturity of three months or less at the date of purchase, as well as overnight repurchase investments, to be cash equivalents.

Accounts Receivable and Allowance for Doubtful Accounts

Accounts receivable are stated at realizable value, net of an allowance for doubtful accounts. The allowance for doubtful accounts is based on our assessment of the collectability of accounts. We regularly review the composition of the accounts receivable aging, historical bad debts, changes in payment patterns, customer creditworthiness and current economic trends. If the financial condition of our customers were to deteriorate, resulting in their inability to make required payments, additional provisions for doubtful accounts would be required and would increase bad debt expense. To date, our allowance and related bad debt write-offs have been nominal. Activity within the allowance for doubtful accounts was as follows (in thousands):

	Year Ended December 31,		
	2019	2018	2017
Balance as of January 1	$ 600	$ 400	$ 400
Additions	99	211	62
Less write-offs, net of recoveries	(99)	(11)	(62)
Balance as of December 31	$ 600	$ 600	$ 400

Non-trade Receivables

We record non-trade receivables to reflect amounts due for activities other than sales of subscriptions to our platform and professional services. Our non-trade receivables related entirely to a receivable resulting from our tenant improvement allowance. The tenant improvement allowance receivable was $14.4 million as of December 31, 2018 and was classified within prepaid expenses and other current assets in the accompanying consolidated balance sheets. We recognized our initial tenant improvement allowance receivable of $15.8 million related to our new headquarters once we took initial possession of the space in October 2018. We recognized additional tenant improvement allowance receivable of $2.6 million when we took possession of adjacent office space in February 2019. We had received the entire tenant improvement allowance of $17.0 million as of December 31, 2019, and therefore, there was no receivable balance remaining as of such date.

Assets Recognized from the Costs to Obtain a Contract with a Customer

We capitalize the incremental costs of obtaining a contract with a customer, including, sales commissions paid to our direct sales force. These costs are recorded as deferred commissions in the consolidated balance sheets. Costs to obtain a contract for a new customer or up-sell are amortized on a straight-line basis over an estimated economic life of five years as sales commissions on initial sales are not commensurate with sales commissions on contract renewals. We determined the estimated economic life based on both qualitative and quantitative factors, such as expected renewals, product life cycles, contractual terms and customer attrition. We periodically review the carrying amount of deferred contract acquisition costs to determine whether events or changes in circumstances have occurred that could impact the estimated economic life. Commissions paid relating to contract renewals are deferred and amortized on a straight-line basis over the related renewal period. We also capitalize the incremental fringe benefits associated with commission expenses paid to our direct sales force. Costs to obtain a contract for professional services arrangements are expensed as incurred in accordance with the practical expedient as the contractual period of our professional services arrangements are one year or less.

Amortization expense associated with commission expense is recorded to sales and marketing costs in our consolidated statements of operations.

The following table summarizes the activity of costs to obtain a contract with a customer for the year ended December 31, 2019 (in thousands):

	Year Ended December 31, 2019	
Balance as of January 1	$	29,108
Adoption of ASC 606		5,094
Additional contract costs deferred		25,004
Amortization of deferred contract costs		(15,684)
Balance as of December 31	$	43,522

Commission expense was $15.7 million, $15.6 million and $11.8 million for the years ended December 31, 2019, 2018 and 2017, respectively.

For the periods prior to January 1, 2019, under ASC 605, deferred commissions are the incremental costs that are directly associated with subscription agreements with customers and consist of sales commissions paid to our direct sales force. Commissions are considered direct and incremental and as such are deferred and amortized over the terms of the related customer contracts consistent with the related revenue.

Property and Equipment

Property and equipment are stated at cost less accumulated depreciation and amortization. Depreciation is computed using the straight-line method over the estimated useful lives of the assets. Significant additions or improvements extending the useful life of an asset are capitalized, while repairs and maintenance costs which do not significantly improve the related assets or extend their useful lives are charged to expense as incurred.

Asset Category	Useful Life (in years)
Computer software	3
Computer hardware	3
Equipment	5
Office furniture and fixtures	10
Leasehold improvements	Shorter of useful life of assets or lease term

Impairment of Long-Lived Assets

Long-lived assets and certain intangible assets are reviewed for impairment whenever events or circumstances indicate that the carrying amount of an asset may not be recoverable through undiscounted cash flows from the use of the assets. If such assets are considered to be impaired, the assets are written down to their estimated fair value. No indicators of impairment were identified for the years ended December 31, 2019, 2018 and 2017.

Fair Value of Financial Instruments

The carrying amounts of our cash and cash equivalents, accounts receivable, accounts payable and accrued expenses approximate fair value as of December 31, 2019 and December 31, 2018 because of the relatively short duration of these instruments.

We use a three-tier fair value hierarchy to classify and disclose all assets and liabilities measured at fair value on a recurring basis, as well as assets and liabilities measured at fair value on a non-recurring basis, in periods subsequent to their initial measurement. The hierarchy requires us to use observable inputs when available, and to minimize the use of unobservable inputs when determining fair value. The three tiers are defined as follows:

- **Level 1.** Observable inputs based on unadjusted quoted prices in active markets for identical assets or liabilities;

- **Level 2.** Inputs, other than quoted prices in active markets, that are observable either directly or indirectly; and
- **Level 3.** Unobservable inputs for which there is little or no market data, which require us to develop our own assumptions.

Assets and Liabilities Measured at Fair Value on a Recurring Basis Using Significant Unobservable Inputs

There were no instruments measured at fair value during the years ended December 31, 2019, 2018 and 2017.

Leases

Effective January 1, 2019, we adopted FASB ASU 2016-02 *Leases* (Topic 842), as amended ("ASC 842"). In accordance with ASC 842, at the inception of an arrangement, we determine whether the arrangement is or contains a lease based on the unique facts and circumstances present and the classification of the lease. Operating leases with a term greater than one year are recognized on the balance sheet as right-of-use ("ROU") assets, lease liabilities and, if applicable, long-term lease liabilities. ROU assets represent our right to use an underlying asset for the lease term and lease liabilities represent our obligation to make lease payments arising from the lease. We have elected not to recognize on the balance sheet leases with a term of one year or less. For contracts with lease and non-lease components, we have elected not to allocate the contract consideration and to account for the lease and non-lease components as a single lease component. Finance leases are included in property and equipment, net, finance lease liability, current and finance lease liability, net of current portion in our consolidated balance sheets.

Lease liabilities and their corresponding ROU assets are recorded based on the present value of lease payments over the expected lease term. The implicit rate within most of our leases are generally not determinable and therefore we use the incremental borrowing rate at the lease commencement date to determine the present value of lease payments. The determination of our incremental borrowing rate requires judgment and is estimated for each lease based on the rate we would have to pay for a collateralized loan with the same term and payments as the lease. We consider various factors, including our level of collateralization, estimated credit rating and currency of the lease. The operating lease ROU also includes any lease prepayments, offset by lease incentives. Certain of our leases include options to extend or terminate the lease. An option to extend the lease is considered in connection with determining the ROU asset and lease liability when it is reasonably certain we will exercise that option. An option to terminate is considered unless it is reasonably certain we will not exercise the option. For certain equipment leases, we apply a portfolio approach to effectively account for the operating lease ROU assets and liabilities.

Expense for operating leases is recognized on a straight-line basis over the lease term as an operating expense while the expense for finance leases is recognized as depreciation expense and interest expense. We have lease agreements which require payments for lease and non-lease components (i.e. common area maintenance) that are accounted for as a single lease component. Variable lease payment amounts that cannot be determined at the commencement of the lease, such as maintenance costs based on future obligations, are not included in the ROU assets or lease liabilities. These are expensed as incurred and recorded as variable lease expense.

For periods prior to ASC 842, we recorded rent expense on a straight-line basis over the term of the related lease. The difference between the straight-line rent expense and the payments made in accordance with the operating lease agreements were recognized as a deferred rent liability on the accompanying consolidated balance sheets.

Stock-Based Compensation

We account for stock-based compensation expense related to stock-based awards based on the estimated fair value of the award on the grant date. We calculate the fair value of stock options containing only a service condition using the Black-Scholes Option Pricing Model. The fair value of restricted stock units is based on the closing market price of our common stock on the Nasdaq Global Market on the date of grant. For service-based awards, stock-based compensation expense is recognized on a straight-line basis over the requisite service period. For performance-based awards, stock-based compensation expense is recognized using the accelerated attribution method, based on the probability of satisfying the performance condition. For awards that contain market conditions, compensation expense is measured using a Monte Carlo simulation and recognized using the accelerated attribution method over the derived service period based on the expected market performance as of the grant date. For restricted stock units, stock-based compensation expense is recognized on a straight-line basis over the requisite service period. We account for forfeitures as they occur, rather than estimating expected forfeitures.

Basic and Diluted Loss per Common Share

We compute net loss per common share using the two-class method required for multiple classes of common stock and participating securities. The rights, including the liquidation and dividend rights, of the Class A common stock and Class B common stock are substantially identical, other than voting and conversion rights. Accordingly, the Class A common stock and Class B common stock share equally in our net losses.

Basic net loss per common share is computed by dividing net loss by the weighted-average number of shares of common stock outstanding during the period. Diluted net loss per common share is computed by dividing net loss attributable to common stockholders by the weighted-average number of shares of common stock outstanding during the period increased by common shares that could be issued upon conversion or exercise of other outstanding securities to the extent those additional common shares would be dilutive. The dilutive effect of potentially dilutive securities is reflected in diluted net loss per share by application of the treasury stock method.

Due to net losses for the years ended December 31, 2019, 2018 and 2017, basic and diluted net loss per share were the same, as the effect of potentially dilutive securities would have been anti-dilutive.

Income Taxes

We use the asset and liability method of accounting for income taxes in which deferred tax assets and liabilities are recognized for the future tax consequences attributable to differences between the consolidated financial statement carrying amounts of existing assets and liabilities and their respective tax bases. We measure deferred tax assets and liabilities using enacted tax rates expected to apply to taxable income in the years in which those temporary differences are expected to be reversed. We recognize the effect on deferred tax assets and liabilities of a change in tax rates as income and expense in the period that includes the enactment date. A valuation allowance is established if it is more likely than not that all or a portion of the deferred tax asset will not be realized.

Our tax positions are subject to income tax audits by multiple tax jurisdictions throughout the world. We recognize the tax benefit of an uncertain tax position only if it is more likely than not the position is sustainable upon examination by the taxing authority. We measure the tax benefit recognized as the largest amount of benefit which is more likely than not to be realized upon settlement with the taxing authority. We recognize penalties and interest related to unrecognized tax benefits as income tax expense.

We calculate the current and deferred income tax provision based on estimates and assumptions that could differ from the actual results reflected in income tax returns filed in subsequent years and record adjustments based on filed income tax returns when identified. The amount of income taxes paid is subject to examination by U.S. federal, state and foreign tax authorities. The estimate of the potential outcome of any uncertain tax issue is subject to our assessment of relevant risks, facts and circumstances existing at that time. To the extent the assessment of such tax position changes, we record the change in estimate in the period in which we make that determination.

Segment Reporting

Operating segments are defined as components of an enterprise for which discrete financial information is available that is evaluated regularly by the chief operating decision maker (“CODM”) for purposes of allocating resources and evaluating financial performance. Our CODM is our chief executive officer, who reviews financial information presented on a companywide basis for purposes of allocating resources and evaluating financial performance. As such, our operations constitute a single operating segment and one reportable segment.

Foreign Currency

Our operations located outside of the United States where the local currency is the functional currency are translated into U.S. dollars using the current rate method. Results of operations are translated at the average rate of exchange for the period. Assets and liabilities are translated at the closing rates on the balance sheet date. Gains and losses on translation of these accounts are accumulated and reported as a separate component of stockholders’ equity and other comprehensive income.

Gains and losses on foreign currency transactions are recognized in the accompanying consolidated statements of operations as a component of other expense, net. Transaction gains and losses from transactions denominated in foreign currencies resulted in net transaction losses of $0.2 million and $3.0 million for the years ended December 31, 2019 and 2018, respectively and net transaction gains of $2.6 million for the year ended December 31, 2017.

Research and Development

Research and development expenses include payroll, employee benefits, and other headcount-related costs associated with product development. Our product utilizes a common codebase, whether accessed by customers via the cloud or via an on-premises installation. Since our software is sold and licensed externally, we consider our software as external-use software for purposes of applying the capitalized software development guidance. Product development costs are expensed as incurred until technological feasibility has been established, which we define as the completion of all planning, designing, coding and testing activities that are necessary to establish products that meet design specifications including functions, features and technical performance requirements. We have determined that technological feasibility for our software products is reached shortly before they are released for sale. Costs incurred after technological feasibility is established are not significant, and accordingly we expense all research and development costs when incurred.

Advertising

We expense advertising costs as they are incurred. Advertising expenses were $4.1 million, $3.9 million and $3.0 million for the years ended December 31, 2019, 2018 and 2017, respectively.

Recent Accounting Pronouncements

Adopted

In August 2016, the FASB issued ASU No. 2016-15, Statement of Cash Flows (Topic 230): *Classification of Certain Cash Receipts and Cash Payments* (“ASU 2016-15”), which aims to reduce the existing diversity in practice in how certain cash receipts and cash payments are presented and classified in the statement of cash flows. ASU 2016-15 will require adoption on a retrospective basis unless it is impracticable to apply, in which case we would be required to apply the amendments prospectively as of the earliest date practicable. ASU 2016-15 is effective for fiscal years beginning after December 15, 2018, and interim periods within fiscal years beginning after December 15, 2019. The adoption of ASU 2016-15 did not have an impact on our condensed consolidated financial statements for the year ended December 31, 2019.

In February 2018, the FASB issued ASU No. 2018-02, *Income Statement-Reporting Comprehensive Income (Topic 220): Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income* ("ASU 2018-02"), which provides entities the option to reclassify to retained earnings tax effects related to items in accumulated other comprehensive income ("OCI") that the FASB refers to as having been stranded in accumulated OCI as a result of tax reform. ASU 2018-02 is effective for fiscal years beginning after December 15, 2018. The adoption of ASU 2018-02 did not have an impact on our condensed consolidated financial statements for the year ended December 31, 2019.

In May 2014, the FASB issued ASU No. 2014-09, *Revenue from Contracts with Customers (Topic 606)*, which provides new guidance for revenue recognition. The new revenue standard provides that an entity should recognize revenue to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. ASC 606 also requires improved disclosures to help users of financial statements better understand the nature, amount, timing, and uncertainty of revenue that is recognized.

We adopted ASC 606 on January 1, 2019 using the modified retrospective method. Under this method of adoption, we applied the new revenue standard only to contracts that were not completed prior January 1, 2019. Upon adoption, we recorded an adjustment of $55.8 million to our accumulated deficit. The adjustment was offset by a $35.4 million reduction to deferred revenue and the addition of a $20.4 million contract asset, primarily due to our on-premises term license subscriptions.

ASC 606 materially impacts the timing of revenue recognition related to our term license subscriptions. Prior to our adoption of ASC 606, we have historically concluded that we did not have VSOE of fair value of the undelivered services related to on-premises term license contracts, and, accordingly, have recognized on-premises term license contracts and related services ratably over the contract term. Under the new revenue standard, the requirement to have VSOE for undelivered services is eliminated. Therefore, revenue allocable to the license portion of the contract is recognized upon delivery of the software. Maintenance and support sold with our term license subscriptions is distinct from the term license subscription and the revenue attributable to the maintenance and support continue to be recognized ratably over the contract term. Under ASC 606, we allocate the transaction to performance obligations based on SSP, which impacts the timing of revenue recognition depending on when each performance obligation is recognized. These changes to the timing of revenue recognition also affect our deferred revenue balances.

In addition, ASC 606 requires the capitalization of certain incremental costs of obtaining a contract, which impacts the period in which we record our commission expense. Prior to the adoption of ASC 606, we deferred the direct and incremental commission costs to obtain a contract with a customer and amortized those costs over the term of the related customer contract consistent with the related revenue. Under the new revenue standard, the direct and incremental costs to obtain contracts with customers, include sales commissions, are deferred and recognized over a period of benefit that we have determined to be five years. In addition, we capitalize the incremental fringe benefits associated with commission expenses paid to our direct sales force. Upon adoption of ASC 606, we reduced our accumulated deficit and increased our asset for deferred commissions by $5.1 million.

In February 2016, the FASB issued ASU No. 2016-2, *Leases (Topic 842)*, which requires companies to recognize on the balance sheet the assets and liabilities for the rights and obligations created by the leased asset. The standard is effective for fiscal years, and interim periods within those fiscal years, beginning after December 15, 2018. We adopted this standard effective January 1, 2019 using the modified retrospective approach for all leases entered into before the effective date. We also elected to implement the new standard at the adoption date with a cumulative-effect adjustment, if any, recognized to the opening balance sheet of accumulated deficit in the period of adoption.

For comparability purposes, we will continue to comply with the previous disclosure requirements in accordance with the existing lease guidance for all periods presented in the year of adoption. We elected the package of practical expedients as permitted under the transition guidance, which allowed us: (1) to carry forward the historical lease classification; (2) not to reassess whether expired or existing contracts are or contain leases; and (3) not to reassess the treatment of initial direct costs for existing leases. In addition, we elected an accounting policy to not recognize leases with an initial term of one year or less on the balance sheet. We did not elect the hindsight practical expedient to determine the lease term for our existing leases and assessing impairment of the ROU assets.

Upon the adoption of this standard on January 1, 2019, we recognized a total lease liability of $51.4 million, representing the present value of the minimum rental payments remaining as of the adoption date and ROU assets of $33.8 million. We did not have finance leases (formerly referred to as capital leases prior to the adoption of ASC 842), therefore there was no change in accounting treatment required.

Not Yet Adopted

In June 2016, the FASB issued ASU No. 2016-13, *Financial Instruments-Credit Losses (Topic 326)* ("ASU 2016-13"), which requires entities to measure all expected credit losses for financial assets held at the reporting date based on historical experience, current conditions, and reasonable and supportable forecasts. This replaces the existing incurred loss model and is applicable to the measurement of credit losses on financial assets measured at amortized cost. This guidance is effective for fiscal years, and interim periods within those fiscal years, beginning after December 15, 2019. Early application will be permitted for all entities for fiscal years, and interim periods within those fiscal years, beginning after December 15, 2018. We do not expect the standard to have a material impact on our consolidated financial statements.

In August 2018, the FASB issued ASU 2018-15, *Intangibles-Goodwill and Other-Internal-Use Software (Subtopic 350-40), Customer's Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement That is a Service Contract*, which aligns the requirements for capitalizing implementation costs in cloud computing arrangements with the requirements for capitalizing implementation costs incurred to develop or obtain internal-use software. This guidance is effective for fiscal years, and interim periods within those fiscal years, beginning after December 15, 2019. Entities can choose to adopt the new guidance prospectively or retrospectively. We do not expect the standard to have a material impact on our consolidated financial statements.

3. Property and Equipment

Property and equipment consisted of the following as of December 31 (in thousands):

	2019	2018
Leasehold improvements	$ 37,130	$ 9,958
Office furniture and fixtures	4,963	649
Computer hardware	3,365	2,535
Computer software	1,350	1,727
Equipment	72	138
	46,880	15,007
Less: accumulated depreciation	(7,326)	(7,468)
Property and equipment, net	$ 39,554	$ 7,539

Depreciation and amortization totaled $4.7 million, $2.0 million and $0.9 million for the years ended December 31, 2019, 2018 and 2017, respectively. During the year ended December 31, 2019, we retired $3.2 million of leasehold improvements, $0.9 million of computer hardware, $0.4 million of office furniture and fixtures, $0.4 million of software and $0.1 million of equipment associated with the relocation of our corporate headquarters. During the year ended December 31, 2019, we recorded a loss on disposal of $0.1 million. During the year ended December 31, 2018, we disposed of $0.1 million of fully depreciated computer hardware.

At December 31, 2019, office furniture and fixtures included $3.7 million acquired under finance lease agreements and computer hardware included $0.8 million acquired under finance lease agreements. There were no assets acquired under finance lease agreements as of December 31, 2018. Accumulated depreciation related to office furniture and fixtures and computer hardware acquired under finance leases totaled $0.7 million at December 31, 2019. Amortization of assets acquired under finance leases is included in depreciation and amortization expense.

4. Accrued Expenses

Accrued expenses consisted of the following as of December 31 (in thousands):

	2019	2018
Accrued contract labor costs	$ 1,921	$ 3,128
Accrued hosting costs	1,865	579
Accrued reimbursable employee expenses	1,353	459
Accrued legal costs	422	—
Accrued marketing and tradeshow expenses	365	229
Accrued audit and tax expenses	315	375
Accrued third party license fees	288	729
Other accrued expenses	959	1,965
Total	$ 7,488	$ 7,464

5. Debt

2017 Revolving Line of Credit

In November 2017, we entered into a $20.0 million revolving line of credit with a lender. The facility matures in November 2022. We may elect whether amounts drawn on the revolving line of credit bear interest at a floating rate per annum equal to either the LIBOR or the prime rate plus an additional interest rate margin that is determined by the availability of the borrowings under the revolving line of credit. The additional interest rate margin will range from 2.00% to 2.50% in the case of LIBOR advances and from 1.00% to 1.50% in the case of prime rate advances. The revolving line of credit contains an unused facility fee in an amount between 0.15% and 0.25% of the average unused portion of the revolving line of credit, which is payable quarterly. The agreement contains certain customary affirmative and negative covenants and requires us to maintain

(1) an adjusted quick ratio of at least 1.35 to 1.0 and (ii) minimum adjusted EBITDA in the amounts and for the periods set forth in the agreement. Any amounts borrowed under the credit facility are collateralized by substantially all of our assets. We were in compliance with all covenants as of December 31, 2019. As of December 31, 2019, we had not made any borrowings under this new revolving line of credit and we had outstanding letters of credit totaling $10.5 million under the 2017 line of credit in connection with securing our leased office space.

6. Income Taxes

For the years ended December 31, 2019, 2018 and 2017, our loss before income taxes was comprised of the following (in thousands):

	2019	2018	2017
Domestic	$ (32,091)	$ (30,663)	$ (23,093)
Foreign	(17,803)	(18,549)	(7,153)
Total	$ (49,894)	$ (49,212)	$ (30,246)

For the years ended December 31, 2019, 2018 and 2017, our income tax expense (benefit) was comprised of the following (in thousands):

	2019	2018	2017
Current:			
Federal	$ 3	$ —	$ (65)
State	60	25	68
Foreign	1,091	432	1,009
Total current expense	1,154	457	1,012
Deferred:			
Federal	—	—	(42)
State	—	—	—
Foreign	(334)	(218)	(209)
Total deferred benefit	(334)	(218)	(251)
Total income tax expense	$ 820	$ 239	$ 761

For the years ended December 31, 2019, 2018 and 2017, the provision for income taxes differs from the amount computed by applying the federal statutory income tax rates to our loss before the provision (benefit) for income taxes, as follows:

	2019	2018	2017
U.S. federal statutory tax rate	21.0 %	21.0 %	34.0 %
State tax expense	7.1	7.2	4.9
Foreign rate differential	(5.1)	(5.1)	(6.7)
Nondeductible expenses	(0.7)	(0.7)	(0.9)
Equity compensation	12.0	9.5	—
Tax credits	6.5	3.9	5.8
Unrecognized tax benefits	(1.1)	(0.8)	(0.7)
Other	(0.8)	0.6	(0.3)
Remeasurement of deferred taxes	(1.6)	—	(7.0)
Change in valuation allowance	(38.9)	(36.0)	(31.6)
Total	(1.6)%	(0.4)%	(0.4)%

The effective tax rate of (1.6)% in 2019 includes a net $10.2 million of tax expense attributable to the change in the valuation allowance in the United States and Switzerland, partially offset by favorable excess tax benefits for equity compensation and research credits.

Deferred tax assets and liabilities reflect the net tax effects of temporary differences between the carrying amount of the assets and liabilities for financial reporting purposes and the amounts used for income tax purposes.

As of December 31, 2019 and 2018, significant components of our deferred tax assets and liabilities were as follows (in thousands):

	2019	2018
Deferred tax assets:		
Net operating losses	$ 34,875	$ 21,059
Tax credits	8,648	5,945
Deferred revenue	1,291	4,179
Equity compensation	1,668	3,923
Lease liabilities	13,066	—
Accrued vacation	409	1,170
Deferred rent	—	373
Bad debt	164	164
Depreciation	—	151
Other	260	548
Gross deferred tax assets	60,381	37,512
Less: Valuation allowance	(35,607)	(30,039)
Total deferred tax assets	24,774	7,473
Deferred tax liabilities:		
Prepaid expenses	(9,562)	(6,640)
Right-of-use assets	(6,488)	—
Unbilled receivables	(3,849)	(419)
Depreciation	(4,377)	—
Other	(42)	(130)
Total deferred tax liabilities	(24,318)	(7,189)
Net deferred tax asset	$ 456	$ 284

As of December 31, 2019 and 2018, we had $99.3 million and $56.9 million of gross net operating loss (“NOL”) carryforwards for U.S. federal tax purposes, respectively. U.S. federal NOL carryforwards, in the amount of $24.4 million, generated prior to 2018 will expire, if unused, in 2037. Due to the Tax Cuts and Jobs Act of 2017 (the "TCJA"), U.S. federal NOL carryforwards, in the amount of $74.9 million, generated after 2017 have an indefinite carryforward period.

Section 382 of the Internal Revenue Code limits the utilization of the NOL carryforwards when ownership changes occur, as defined by that section. A number of states have similar state laws that limit utilization of the state NOL carryforwards when ownership changes occur. We have performed an analysis of our Section 382 ownership changes and have determined that all U.S. federal and state NOL carryforwards are available for use as of December 31, 2019.

As of December 31, 2019 and 2018, we had $7.5 million and $6.4 million, respectively, of U.S. federal tax credit carryforwards which will expire, if unused, in 2039.

As of December 31, 2019 and 2018, we had U.S. gross state NOL carryforwards of $100.9 million and $57.2 million, respectively. We had tax effected state NOL carryforwards of $6.5 million and $3.7 million as of December 31, 2019 and 2018, respectively. The majority of state NOL carryforwards generated prior to 2018 will expire, if unused, in 2037. Due to the TCJA, certain state NOL carryforwards generated after 2017 have an indefinite carryforward period.

As of December 31, 2019 and 2018, we had foreign gross NOL carryforwards of $62.8 million and $56.3 million, respectively, primarily attributable to our subsidiary in Switzerland. Those NOL carryforwards will begin to expire, if unused, between 2021 to 2026.

On May 19, 2019, Swiss voters approved the Federal Act on Tax Reform and AHV Financing (TRAF) which resulted in a change to the Swiss income tax rate, amongst other items. The tax law change is considered enacted in 2019 for U.S. GAAP purposes. We remeasured our Swiss deferred tax balances and offsetting valuation allowance using the enacted tax rates, resulting in an immaterial net tax impact.

The net change during the year in the total valuation allowance was $5.6 million, primarily driven by the valuation allowance recorded against the United States and Switzerland deferred tax assets.

As of December 31, 2019, we continued to maintain a full valuation allowance against U.S. deferred tax assets based on our cumulative operating results as of December 31, 2019, three-year cumulative loss and assessment of our expected future results of operations. We have evaluated all evidence, both positive and negative, in assessing the likelihood of realizability and the negative evidence outweighed the positive evidence.

As of December 31, 2019, we have a valuation allowance of $7.3 million against foreign deferred tax assets, primarily for deferred tax assets at our subsidiary in Switzerland. Based on our cumulative operating results as of December 31, 2019, and assessment of our expected future results of operations, we determined that it was not more likely than not that we would be able to realize the deferred tax assets prior to expiration.

We plan to distribute previously undistributed earnings of our foreign subsidiaries back to the United States in future years. Upon repatriation of those earnings, if any, we may be subject to taxes, including withholding taxes, net of any applicable foreign tax credits. Determination of the amount of unrecognized deferred U.S. income tax liability is not practicable.

As of December 31, 2019 and 2018, we had unrecognized tax benefits of $1.6 million and $1.0 million, respectively, of which the entire portion would affect our effective tax rate if recognized. The following table summarizes the activity related to our unrecognized tax benefit from January 1, 2017 to December 31, 2019 (in thousands):

Balance as of January 1, 2017	$	419
Additions for tax positions in current years		232
Additions for tax positions in prior years		—
Reductions due to lapse in statutes of limitations		—
Settlements		—
Balance as of December 31, 2017		651
Additions for tax positions in current years		388
Additions for tax positions in prior years		—
Reductions due to lapse in statutes of limitations		—
Settlements		—
Balance as of December 31, 2018		1,039
Additions for tax positions in current years		536
Additions for tax positions in prior years		—
Reductions due to lapse in statutes of limitations		—
Settlements		—
Balance as of December 31, 2019	$	1,575

We recognize interest and penalties related to uncertain tax positions in income tax expense. During the year ended December 31, 2019, we recognized approximately $3 thousand in interest. We did not recognize any interest during the year ended December 31, 2018. The cumulative balance of interest and penalties as of December 31, 2019 and 2018 was $36 thousand and $33 thousand, respectively. If recognized, approximately $1.6 million and $1.0 million of unrecognized tax benefits would impact the effective tax rate during the years ended December 31, 2019 and 2018, respectively.

We anticipate that total unrecognized tax benefits will not decrease over the next year.

We file income tax returns in the U.S. federal jurisdiction and in various state and foreign jurisdictions. The tax years 2015 through 2019 remain open to examination by the major taxing jurisdictions to which we are subject. There are no open examinations that would have a material impact to our consolidated financial statements.

On January 1, 2019, we adopted ASC 606 and recorded no net impact to retained earnings for the tax effects of the adoption because of the existence of valuation allowances in the United States and Switzerland.

On January 1, 2019, we adopted ASC 842. The most significant impact of ASC 842 was the recognition of ROU assets and lease liabilities for operating leases, which required corresponding deferred tax assets and liabilities. The net tax effects of the adoption of ASC 842 was immaterial.

7. Stock-Based Compensation

In May 2017, our board of directors adopted, and our stockholders approved, the 2017 Equity Incentive Plan (the “2017 Plan”), which became effective as of the date of the final prospectus for our IPO. The 2017 Plan provides for the grant of incentive stock options to employees, and for the grant of nonstatutory stock options, restricted stock awards, restricted stock unit awards, stock appreciation rights, performance-based stock awards and other forms of equity compensation to employees, including officers, and to non-employee directors and consultants. We initially reserved 6,421,442 shares of Class A common stock for issuance under the 2017 Plan, which included 421,442 shares that remained available for issuance under our 2007 Stock Option Plan (the “2007 Plan”) at the time that the 2017 Plan became effective. The number of shares reserved under the 2017 Plan increases for any shares subject to outstanding awards originally granted under the 2007 Plan that expire or are forfeited prior to exercise. As a result of the adoption of the 2017 Plan, no further grants may be made under the 2007 Plan. As of December 31, 2019, there were 7,108,049 shares of Class A common stock reserved for issuance under the 2017 Plan, of which 4,668,941 were available to be issued.

We estimate the fair value of stock options containing only a service condition using the Black-Scholes Option Pricing Model, which requires the use of subjective assumptions, including the expected term of the option, the current price of the underlying stock, the expected stock price volatility, expected dividend yield and the risk-free interest rate for the expected term of the option. The expected term represents the period of time the stock options are expected to be outstanding. Due to the lack of sufficient historical exercise data to provide a reasonable basis upon which to otherwise estimate the expected term of the stock options, we use the simplified method to estimate the expected term for our stock options. Under the simplified method, the expected term of an option is presumed to be the mid-point between the vesting date and the end of the contractual term. Expected volatility is based on historical volatilities for publicly traded stock of comparable companies over the estimated expected term of the stock options. We assume no dividend yield because dividends are not expected to be paid in the near future, which is consistent with our history of not paying dividends.

In May 2019, our board of directors granted a stock option to purchase 700,000 shares of our Class A common stock to our Chief Executive Officer (the "2019 CEO Grant") under the 2017 Plan with an exercise price of $33.98 per share. The 2019 CEO Grant is eligible to vest based on the achievement of a stock price appreciation target of our Class A common stock. Specifically, the 2019 CEO Grant will vest when shares of our Class A common stock closes at or above $84.63 per share for a period equal to or greater than 90 calendar days or upon the occurrence of a change in control in which the value of our Class A common stock is equal to or greater than $84.63 per share within five years of the grant date. The fair value of the 2019 CEO Grant was determined using a Monte Carlo simulation. The fair value of the award at the grant date was $9.5 million and will be amortized over the derived service period of 2.6 years.

The following table summarizes the assumptions used to estimate the fair value of stock options granted during the years ended December 31, 2019, 2018 and 2017:

	2019	2018	2017
Risk-free interest rate	2.1%	*	1.9% - 2.2%
Expected term (in years)	2.6	*	6.5
Expected volatility	55.0%	*	38.1% - 40.6%
Expected dividend yield	—%	*	—%

* Not applicable because no stock options were granted during the period.

Stock Options

The following table summarizes the stock option activity for the years ended December 31, 2019, 2018 and 2017:

	Number of Shares	Weighted Average Exercise Price	Weighted Average Remaining Contractual Term (Years)	Aggregate Intrinsic Value (in thousands)
Outstanding at January 1, 2017	6,784,448	$ 4.65	6.5	$ 44,259
Granted	1,256,200	11.92		
Exercised	(876,121)	1.27		14,807
Canceled	(153,640)	7.29		
Outstanding at December 31, 2017	7,010,887	6.36	6.6	176,122
Granted	—	—		
Exercised	(1,486,218)	2.10		41,606
Canceled	(503,601)	9.51		
Outstanding at December 31, 2018	5,021,068	7.30	6.4	97,440
Granted	700,000	33.98		
Exercised	(1,194,471)	4.11		44,081
Canceled	(67,986)	10.17		
Outstanding at December 31, 2019	4,458,611	12.30	5.8	115,501
Exercisable at December 31, 2019	2,818,731	7.51	5.7	86,536

The weighted average grant-date fair value of options granted during the years ended December 31, 2019 and 2017 was $13.57 and $5.05 per option, respectively. No stock options were granted during the year ended December 31, 2018. The total fair value of stock options that vested during the years ended December 31, 2019, 2018 and 2017 was $2.0 million, $10.5 million and $5.6 million, respectively. As of December 31, 2019, the total compensation cost related to unvested stock options not yet recognized was $8.4 million, which will be recognized over a weighted average period of 1.9 years.

Restricted Stock Units

The following table summarizes the restricted stock unit activity for the years ended December 31, 2019, 2018 and 2017:

	Number of Shares	Weighted Average Grant Date Fair Value
Non-vested outstanding at January 1, 2017	—	$ —
Granted	738,055	22.15
Vested	(4,930)	20.24
Canceled	(1,150)	21.40
Non-vested outstanding at December 31, 2017	731,975	22.16
Granted	622,166	29.60
Vested	(143,390)	22.19
Canceled	(35,702)	23.97
Non-vested outstanding at December 31, 2018	1,175,049	26.04
Granted	436,912	40.70
Vested	(521,460)	27.81
Canceled	(67,666)	26.38
Non-vested outstanding at December 31, 2019	1,022,835	31.39

As of December 31, 2019, total unrecognized compensation cost related to unvested restricted stock units was approximately $28.8 million and the weighted average remaining vesting period was 2.4 years.

In November 2018, our board of directors approved the grant of 255,930 restricted stock units under the 2017 Plan at a fair value of $30.06 per share to our three co-founders. The value of these awards at the grant date was $7.7 million and was amortized over the vesting periods. The restricted stock units vested during the three months ended March 31, 2019.

The following table summarizes the components of our stock-based compensation expense for the years ended December 31, 2019, 2018 and 2017 (in thousands):

	2019	2018	2017
Stock-based compensation expense related to stock options	$ 3,408	$ 7,947	$ 9,607
Stock-based compensation expense related to restricted stock units	12,667	7,714	753
Stock-based compensation expense related to the issuance of common stock to directors	368	393	222
Stock-based compensation expense related to stock option modifications	—	—	2,394
Total stock-based compensation expense	$ 16,443	$ 16,054	$ 12,976

Stock-based compensation expense for restricted stock units, stock options and issuances of common stock is included in the following line items in the accompanying consolidated statements of operations for the years ended December 31, 2019, 2018 and 2017 (in thousands):

	2019	2018	2017
Cost of revenue			
Subscriptions	$ 647	$ 514	$ 575
Professional services	2,748	1,717	1,295
Operating expenses			
Sales and marketing	4,742	3,473	3,233
Research and development	3,480	2,416	2,822
General and administrative	4,826	7,934	5,051
Total stock-based compensation expense	$ 16,443	$ 16,054	$ 12,976

8. Stockholders' Equity

Common Stock

As of December 31, 2019, we had authorized 500,000,000 shares of Class A common stock and 100,000,000 shares of Class B common stock, each with a par value of $0.0001 per share, of which 34,525,386 shares of Class A common stock and 32,942,636 shares of Class B common stock were issued and outstanding. The rights of the holders of Class A common stock and Class B common stock are identical, except with respect to voting and conversion rights. The holders of Class A common stock are entitled to one vote per share, and the holders of Class B common stock are entitled to ten votes per share, on all matters that are subject to stockholder vote. The holders of Class B common stock also have approval rights for certain corporate actions. Each share of Class B common stock may be converted into one share of Class A common stock at the option of its holder and will be automatically converted into one share of Class A common stock upon transfer thereof, subject to certain exceptions. In addition, upon the date on which the outstanding shares of Class B common stock represent less than 10% of the aggregate voting power of our capital stock, all outstanding shares of Class B common stock shall convert automatically into Class A common stock.

9. Basic and Diluted Loss per Common Share

The following table sets forth the computation of basic and diluted net loss per share for the years ended December 31 (in thousands, except per share data):

	Year Ended December 31,		
	2019	**2018**	**2017**
Numerator:			
Net loss	$ (50,714)	$ (49,451)	$ (31,007)
Accretion of dividends on convertible preferred stock	—	—	357
Net loss attributable to common stockholders	$ (50,714)	$ (49,451)	$ (31,364)
Denominator			
Weighted average common shares outstanding, basic and diluted	65,479,327	62,140,684	49,529,833
Net loss per share attributable to common stockholders, basic and diluted	$ (0.77)	$ (0.80)	$ (0.63)

The following securities have been excluded from the calculation of weighted average common shares outstanding because the effect is anti-dilutive or performance or market conditions had not been met at the end of the period:

	Year Ended December 31,		
	2019	**2018**	**2017**
Stock options	4,458,611	5,021,068	7,010,887
Restricted stock units	1,022,835	1,175,049	731,975

10. Leases and Other Commitments

We have operating and finance leases for corporate offices, office furniture and fixtures and computer hardware. Our leases have remaining lease terms of 1 year to 12 years, some of which include options to extend the leases for up to 5 years.

In April 2018, we entered into a lease agreement with respect to 176,222 square feet of office space in Tysons, Virginia for a new corporate headquarters. The term of the lease was 150 months. We took initial possession of the first phase of the new headquarters in October 2018 and began to recognize rent expense. We took possession of 28,805 square feet of adjacent office space in February 2019. We expect to start making recurring rental payments under the lease in the third quarter of 2020.

The following table sets forth the components of lease expense for the year ended December 31, 2019 (in thousands):

	Year Ended December 31, 2019
Operating lease cost	$ 9,733
Finance lease costs:	
Amortization of right-of-use assets	700
Interest on lease liabilities	108
Short-term lease cost	462
Variable lease cost	409
Total	$ 11,412

Supplemental balance sheet information related to leases as of December 31, 2019 was as follows (in thousands, except for lease term and discount rate):

	As of December 31, 2019
Operating Leases	
Operating ROU assets	$ 24,205
Operating lease liabilities, current	$ 3,836
Operating lease liabilities, net of current portion	44,416
Total operating lease liabilities	$ 48,252
Finance Leases	
Property and equipment, at cost	$ 4,475
Accumulated depreciation	(703)
Property and equipment, net	$ 3,772
Finance lease liabilities, current	$ 1,447
Finance lease liabilities, net of current portion	2,375
Total finance lease liabilities	$ 3,822
Weighted Average Remaining Lease Term	
Operating leases	11.4
Finance leases	2.5
Weighted Average Discount Rate	
Operating leases	9.8 %
Finance leases	5.5 %

Supplemental cash flow information related to leases for the year ended December 31, 2019 was as follows (in thousands):

	Year Ended December 31, 2019
Cash paid for amounts included in the measurement of lease liabilities:	
Operating cash outflows for operating leases	$ 6,413
Operating cash outflows for finance leases	108
Financing cash outflows for finance leases	653
ROU assets obtained in exchange for lease obligations:	
Operating leases	523
Finance leases	4,475

The maturities of lease liabilities under non-cancelable operating and finance leases as of December 31, 2019 was as follows (in thousands):

	Operating Leases	Finance Leases
2020	$ 3,781	$ 1,620
2021	6,896	1,620
2022	7,007	859
2023	7,050	—
2024	7,408	—
Thereafter	57,884	—
Total lease payments	90,026	4,099
Less: imputed interest	(41,774)	(277)
Total	$ 48,252	$ 3,822

A summary of our future minimum lease commitments and other commitments by year as of December 31, 2018 was as follows (in thousands):

	Office Leases	Equipment Leases	Lease Related Commitments
2019	$ 6,985	$ 216	$ 29,587
2020	6,371	22	—
2021	8,331	—	—
2022	6,939	—	—
2023	6,987	—	—
Thereafter	65,151	—	—
	100,764	238	29,587
Less: tenant improvement allowance	—	—	(14,441)
Total	$ 100,764	$ 238	$ 15,146

Other Commitments

We also have entered into a non-cancellable agreement for the use of technology that is integral in the development of our software and pay annual royalty fees of $0.3 million.

Letters of Credit

At each of December 31, 2019 and 2018, we had outstanding letters of credit totaling $10.5 million in connection with securing our leased office space. All letters of credit are secured by our borrowing arrangement as described in Note 5.

11. Contingencies

Legal

From time to time, we are subject to legal, regulatory and other proceedings and claims that arise in the ordinary course of business. There are no issues or resolutions of any matters that are expected to have a material adverse impact on our consolidated financial statements.

Contractual Warranty and Indemnification Obligations

We provide limited product warranties. Historically, any payments made under these provisions have been immaterial. We also agree to standard indemnification provisions in the ordinary course of business. Pursuant to these provisions, we agree to indemnify, hold harmless and reimburse the indemnified party for losses suffered or incurred by the indemnified party, generally our customers, in connection with certain intellectual property infringement claims by any third party arising from the use of our products or services in accordance with the agreement. The term of our contractual indemnity provisions often survives termination or expiration of the applicable agreement. We carry insurance that covers certain third-party claims relating to our services and limits our exposure. We have never incurred costs to defend lawsuits or settle claims related to these indemnification provisions.

12. Segment and Geographic Information

The following table summarizes revenue by geography for the years ended December 31 (in thousands):

	2019	2018	2017
Domestic	$ 176,187	$ 161,716	$ 128,997
International	84,165	65,027	47,740
Total	$ 260,352	$ 226,743	$ 176,737

With respect to geographic information, revenue is attributed to respective geographies based on the contracting address of the customer. Revenue from external customers attributed to the United Kingdom were 12.2% of our total revenue for the year ended December 31, 2019. There were no individual foreign countries from which more than 10% of our total revenue was attributable for the years ended December 31, 2018 and 2017. Substantially all of our long-lived assets were held in the United States as of December 31, 2019 and December 31, 2018.

13. Retirement Plans

We have a defined contribution 401(k) retirement and savings plan (the "401(k) Plan") to provide retirement benefits for all eligible employees. All employees who have completed forty-five days of service and are at least twenty-one years of age are eligible to participate in the 401(k) Plan. The 401(k) Plan allows eligible employees to make salary-deferred contributions up to 75% of their annual compensation, as defined, and subject to certain Internal Revenue Service limitations. Employer contributions vest at 25% per year, over four years. For the years ending December 31, 2019, 2018 and 2017, we incurred $5.5 million, $4.7 million and $3.3 million, respectively, in contribution expense related to the employer matching contributions.

We are obligated to make plan contributions for the employees of certain of our wholly-owned foreign subsidiaries. For the years ending December 31, 2019, 2018 and 2017, we incurred $1.5 million, $1.3 million and $0.9 million, respectively, in contribution expense related to our foreign subsidiaries.

14. Selected Quarterly Information (Unaudited)

The following table sets forth unaudited quarterly consolidated statement of operations data for each of the eight quarters in 2019 and 2018. The information for each of these quarters has been prepared on the same basis as the audited annual consolidated financial statements included in this Annual Report on Form 10-K. In our opinion, the quarterly financial data reflects all adjustments, which consist only of normal recurring adjustments that we consider necessary for a fair presentation of this data. The quarterly financial data should be read in conjunction with our consolidated financial statements and related notes included elsewhere in this Annual Report on Form 10-K. These quarterly results are not necessarily indicative of our operating results to be expected in the future.

	Three Months Ended							
	Dec 31, 2019	Sep 30, 2019	Jun 30, 2019	Mar 31, 2019	Dec 31, 2018	Sep 30, 2018	Jun 30, 2018	Mar 31, 2018
	(in thousands) (unaudited)							
Consolidated Statements of Operations Data:								
Revenue: (1)								
Subscriptions	$ 42,108	$ 37,774	$ 36,860	$ 34,557	$ 35,108	$ 30,905	$ 33,047	$ 26,952
Professional services	26,510	28,381	28,415	25,747	25,108	24,043	26,836	24,744
Total revenue	68,618	66,155	65,275	60,304	60,216	54,948	59,883	51,696
Cost of revenue:								
Subscriptions	4,993	4,484	4,036	3,585	3,284	3,261	2,824	2,628
Professional services	17,780	19,467	19,015	20,481	18,926	16,831	18,750	18,421
Total cost of revenue	22,773	23,951	23,051	24,066	22,210	20,092	21,574	21,049
Gross profit	45,845	42,204	42,224	36,238	38,006	34,856	38,309	30,647
Operating expenses:								
Sales and marketing	31,254	27,603	29,992	28,591	30,177	25,467	27,384	22,964
Research and development	15,625	15,697	12,765	13,956	12,332	11,737	10,785	9,870
General and administrative	12,028	11,191	9,261	9,016	8,799	12,537	8,425	8,060
Total operating expenses	58,907	54,491	52,018	51,563	51,308	49,741	46,594	40,894
Operating loss	(13,062)	(12,287)	(9,794)	(15,325)	(13,302)	(14,885)	(8,285)	(10,247)
Other (income) expense:								
Other (income) expense, net	(2,822)	2,262	(79)	(302)	510	110	2,593	(918)
Interest expense	131	96	69	71	64	67	54	13
Total other (income) expense	(2,691)	2,358	(10)	(231)	574	177	2,647	(905)
Loss before income taxes	(10,371)	(14,645)	(9,784)	(15,094)	(13,876)	(15,062)	(10,932)	(9,342)
Income tax expense (benefit)	426	5	267	122	27	(34)	35	211
Net loss (2)	$ (10,797)	$ (14,650)	$ (10,051)	$ (15,216)	$ (13,903)	$ (15,028)	$ (10,967)	$ (9,553)

(1) The revenue for the three months ended March 31, 2019, June 30, 2019 and September 30, 2019 have been adjusted from previously reported revenue as a result of the adoption of ASC 606. Refer to the tables below for a reconciliation of 2019 quarterly revenue.

(2) In the third quarter of 2018, we recorded $4.5 million of cumulative stock-based compensation expense upon the vesting of an option previously granted to our Chief Executive Officer in 2016. See Note 7 for further discussion of stock-based compensation expense.

	Quarter Ended March 31, 2019		
	As Reported (ASC 606)	Impacts from Adoption	Without Adoption (ASC 605)
		(in thousands) (unaudited)	
SaaS subscriptions	$ 21,278	$ 667	$ 20,611
Term license subscriptions	9,557	(3,417)	12,974
Maintenance and support	3,722	2,398	1,324
Professional services	25,747	1,077	24,670
Total revenue	$ 60,304	$ 725	$ 59,579

	Quarter Ended June 30, 2019		
	As Reported (ASC 606)	Impacts from Adoption	Without Adoption (ASC 605)
		(in thousands) (unaudited)	
SaaS subscriptions	$ 22,796	$ 782	$ 22,014
Term license subscriptions	10,103	(5,908)	16,011
Maintenance and support	3,961	2,727	1,234
Professional services	28,415	763	27,652
Total revenue	$ 65,275	$ (1,636)	$ 66,911

	Quarter Ended September 30, 2019		
	As Reported (ASC 606)	Impacts from Adoption	Without Adoption (ASC 605)
		(in thousands) (unaudited)	
SaaS subscriptions	$ 24,573	$ 914	$ 23,659
Term license subscriptions	9,199	(7,577)	16,776
Maintenance and support	4,002	2,838	1,164
Professional services	28,381	593	27,788
Total revenue	$ 66,155	$ (3,232)	$ 69,387

	Quarter Ended December 31, 2019		
	As Reported (ASC 606)	Impacts from Adoption	Without Adoption (ASC 605)
		(in thousands) (unaudited)	
SaaS subscriptions	$ 26,381	$ 559	$ 25,822
Term license subscriptions	11,569	(5,687)	17,256
Maintenance and support	4,158	2,918	1,240
Professional services	26,510	358	26,152
Total revenue	$ 68,618	$ (1,852)	$ 70,470

15. Subsequent Events

In January 2020, we acquired a developer of a robotic process automation platform for $7.0 million. The acquisition will be accounted for under the acquisition method of accounting with the operations of the newly acquired entity included in our operating results from the date of acquisition.

The Company entered into the Lease Second Amendment, effective as of January 1, 2020, which modified the Lease for the Company's headquarters in Tysons, Virginia. Under the Lease Second Amendment, the Company exercised an option to expand its lease to the Fourth Floor, adding approximately 34,158 square feet to the premises. The Company will commence occupancy of the Fourth Floor on the sooner of the completion of certain improvements to the Fourth Floor and October 14, 2020. The monthly base rent for the Fourth Floor will be $87,388 for the first 27 months of the lease term, subject to periodic increases thereafter.

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

We maintain “disclosure controls and procedures,” as defined in Rule 13a-15(e) and Rule 15d-15(e) under the Exchange Act that are designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the SEC’s rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is accumulated and communicated to its management, including its principal executive and principal financial officers, as appropriate to allow timely decisions regarding required disclosure.

Our management, with the participation of our Chief Executive Officer and our Chief Financial Officer, evaluated the effectiveness of our disclosure controls and procedures as of December 31, 2019. Based on the evaluation of our disclosure controls and procedures as of December 31, 2019, our Chief Executive Officer and Chief Financial Officer concluded that, as of such date, our disclosure controls and procedures were effective at the reasonable assurance level.

Management's Report on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Rules 13a-15(f) and 15(d)-15(f) of the Exchange Act. Our management assessed the effectiveness of our internal control over financial reporting as of December 31, 2019 based on the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) in Internal Control - Integrated Framework (2013). Based on this assessment, management concluded that, as of December 31, 2019, our internal control over financial reporting was effective.

The Annual Report on Form 10-K includes an attestation report of our independent registered public accounting firm regarding internal control over financial reporting, which appears in Part II, Item 8 of this Annual Report on Form 10-K.

Changes in Internal Control Over Financial Reporting

Except for the implementation of certain internal controls related to the adoption of ASC 606, there was no change in our internal control over financial reporting that occurred during the quarter ended December 31, 2019 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Inherent Limitations on Effectiveness of Controls

Our management, including our Chief Executive Officer and Chief Financial Officer, believes that our disclosure controls and procedures and internal control over financial reporting are designed to provide reasonable assurance of achieving their objectives and are effective at the reasonable assurance level. However, our management does not expect that our disclosure controls and procedures or our internal control over financial reporting will prevent all errors and all fraud. A control system, no matter how well conceived and operated, can provide only reasonable, not absolute, assurance that the objectives of the control system are met. Further, the design of a control system must reflect the fact that there are resource constraints, and the benefits of controls must be considered relative to their costs. Because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that all control issues and instances of fraud, if any, have been detected. These inherent limitations include the realities that judgments in decision making can be faulty, and that breakdowns can occur because of a simple error or mistake. Additionally, controls can be circumvented by the individual acts of some persons, by collusion of two or more people or by management override of the controls. The design of any system of controls also is based in part upon certain assumptions about the likelihood of future events, and there can be no assurance that any design will succeed in achieving its stated goals under all potential future conditions; over time, controls may become inadequate because of changes in conditions, or the degree of compliance with policies or procedures may deteriorate. Because of the inherent limitations in a cost-effective control system, misstatements due to error or fraud may occur and not be detected.

Item 9B. Other Information.

Entry into an Amendment of a Material Definitive Agreement

The Company entered into the Lease Second Amendment, effective as of January 1, 2020, which modified the Lease for the Company's headquarters in Tysons, Virginia. Under the Lease Second Amendment, the Company exercised an option to expand its lease to the Fourth Floor, adding approximately 34,158 square feet to the premises. The Company will commence occupancy of the Fourth Floor on the sooner of the completion of certain improvements to the Fourth Floor and October 14, 2020. The monthly base rent for the Fourth Floor will be $87,388 for the first 27 months of the lease term, subject to periodic increases thereafter.

Except as modified by the Second Amendment, the other terms of the Lease remain in full force and effect.
The foregoing description of the Second Amendment is not complete and is qualified in its entirety by reference to the Second Amendment, which is filed as an exhibit to this Annual Report on Form 10-K.

PART III

Item 10. Directors, Executive Officers and Corporate Governance.

The information required by this item is incorporated by reference to our Proxy Statement for our 2020 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the fiscal year ended December 31, 2019.

We have adopted a Code of Conduct, applicable to all of our employees, executive officers and directors. The Code of Conduct is available on our website at www.appian.com. We expect that any amendments to the Code of Conduct, or any waivers of its requirements, will be disclosed on our website (www.appian.com) as required by applicable law or the listing standards of the Nasdaq Stock Market.

Item 11. Executive Compensation.

The information required by this item is incorporated by reference to our Proxy Statement for our 2020 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the year ended December 31, 2019.

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

The information required by this item is incorporated by reference to our Proxy Statement for our 2020 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the year ended December 31, 2019.

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

The information required by this item is incorporated by reference to our Proxy Statement for our 2020 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the year ended December 31, 2019.

Item 14. Principal Accounting Fees and Services.

The information required by this item is incorporated by reference to our Proxy Statement for our 2020 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the year ended December 31, 2019.

PART IV

Item 15. Exhibits, Financial Statement Schedules.

(a) The following documents are filed as part of this Annual Report on Form 10-K:

(1) Consolidated Financial Statements and Report of Independent Registered Public Accounting Firm are shown in the Index to Financial Statements included in Part II, Item 8 of this Annual Report on Form 10-K.

(2) All financial statement schedules are omitted because they are not applicable or the required information is shown in the financial statements or notes thereto.

(3) Exhibits are incorporated herein by reference or are filed with this Annual Report on Form 10-K as indicated below.

(b) Exhibits

Exhibit Number	Description
3.1(1)	Amended and Restated Certificate of Incorporation of Appian Corporation.
3.2(2)	Amended and Restated Bylaws of Appian Corporation.
4.1(3)	Form of Class A common stock certificate of Appian Corporation.
4.2(4)	Amended and Restated Investors' Rights Agreement by and among Appian Corporation and certain of its stockholders, dated February 21, 2014.
4.3#	Description of Securities.
10.1+(5)	2007 Stock Option Plan and Form of Option Agreement and Exercise Notice thereunder, as amended to date.
10.2+(6)	2017 Equity Incentive Plan and Forms of Stock Option Agreement, Notice of Exercise and Stock Option Grant Notice thereunder.
10.3+(7)	Non-Employee Director Compensation Plan.
10.4+(8)	Form of Indemnification Agreement by and between Appian Corporation and each of its directors and executive officers.
10.5+(9)	Employment Agreement, dated as of September 7, 2012, by and between Appian Corporation and Matthew Calkins.
10.6+(10)	Employment Agreement, dated as of September 8, 2009, by and between Appian Corporation and Edward Hughes.
10.7+(11)	Form of Amended and Restated Employment Agreement, dated as of April 27, 2017, by and between Appian Corporation and each of Mark Lynch and Chris Winters.
10.8+(12)	Senior Executive Cash Incentive Bonus Plan.
10.9+(13)	Forms of Restricted Stock Unit Grant Notices and Restricted Stock Unit Award Agreements under 2017 Equity Incentive Plan.
10.10+(14)	Forms of Restricted Stock Award Grant Notice and Restricted Stock Award Agreement under 2017 Equity Incentive Plan.
10.11+(15)	2017 Equity Incentive Plan French Qualifying Sub-Plan, with Forms of Restricted Stock Unit Grant Notice and Restricted Stock Unit Award Agreement thereunder.

10.12+(16)	2017 Equity Incentive Plan CSOP Sub-Plan for UK Eligible Employees, with Forms of CSOP Stock Option Grant Notice and CSOP Option Agreement thereunder.
10.13+(17)	Stock Option Cancellation Agreement, dated December 7, 2018, between Appian Corporation and Matthew Calkins.
10.14(18)	Deed of Lease, dated April 17, 2018, between Appian Corporation and Tamares 7950 Owner LLC.
10.15#	First Amendment to Deed of Lease, dated December 23, 2019, between Appian Corporation and Tamares 7950 Owner LLC.
10.16#	Second Amendment to Deed of Lease, effective as of January 1, 2020, between Appian Corporation and Tamares 7950 Owner LLC.
10.17†(19)	Software Enterprise OEM License Agreement, dated as of June 15, 2016, by and between Appian Corporation and Kx Systems, Inc.
10.18(20)	Addendum No. 1 to Software Enterprise OEM License Agreement, dated as of August 20, 2019, by and between Appian Corporation and Kx Systems, Inc.
10.19†(21)	Third Amended and Restated Loan and Security Agreement, dated as of November 1, 2017, by and between Appian Corporation and Silicon Valley Bank.
21.1#	Subsidiaries of Appian Corporation.
23.1#	Consent of BDO USA, LLP, independent registered public accounting firm.
24.1#	Power of Attorney. Reference is made to the signature page hereto.
31.1#	Certification of Principal Executive Officer Pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of 1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
31.2#	Certification of Principal Financial Officer Pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of 1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
32.1#*	Certifications of Principal Executive Officer and Principal Financial Officer Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
101.INS	XBRL Instance Document - The instance document does not appear in the interactive data file because its XBRL tags are embedded within the inliune XBRL document.
101.SCH	Inline XBRL Taxonomy Extension Schema Document
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase Document
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document
104	Cover page interactive data file (formatted as Inline XBRL and contained in Exhibit 101)

5. Previously filed as Exhibit 3.2 to Amendment No. 3 to the Company's Registration Statement on Form S-1 (File No. 333-217510), filed with the Securities and Exchange Commission on May 12, 2017, and incorporated herein by reference.
6. Previously filed as Exhibit 3.4 to Amendment No. 2 to the Company's Registration Statement on Form S-1 (File No. 333-217510), filed with the Securities and Exchange Commission on May 10, 2017, and incorporated herein by reference.
7. Previously filed as Exhibit 4.1 to Amendment No. 3 to the Registrant's Registration Statement on Form S-1 (File No. 333-217510), filed with the Securities and Exchange Commission on May 12, 2017, and incorporated herein by reference.
8. Previously filed as Exhibit 4.2 to the Company's Registration Statement on Form S-1 (File No. 333-217510), filed with the Securities and Exchange Commission on April 27, 2017, and incorporated herein by reference.
9. Previously filed as Exhibit 10.1 to the Company's Registration Statement on Form S-1 (File No. 333-217510), filed with the Securities and Exchange Commission on April 27, 2017, and incorporated herein by reference.
10. Previously filed as Exhibit 10.2 to Amendment No. 2 to the Company's Registration Statement on Form S-1 (File No. 333-217510), filed with the Securities and Exchange Commission on May 10, 2017, and incorporated herein by reference.
11. Previously filed as Exhibit 10.3 to Amendment No. 3 to the Company's Registration Statement on Form S-1 (File No. 333-217510), filed with the Securities and Exchange Commission on May 12, 2017, and incorporated herein by reference.
12. Previously filed as Exhibit 10.4 to Amendment No. 2 to the Company's Registration Statement on Form S-1 (File No. 333-217510), filed with the Securities and Exchange Commission on May 10, 2017, and incorporated herein by reference.
13. Previously filed as Exhibit 10.5 to the Company's Registration Statement on Form S-1 (File No. 333-217510), filed with the Securities and Exchange Commission on April 27, 2017, and incorporated herein by reference.
14. Previously filed as Exhibit 10.6 to the Company's Registration Statement on Form S-1 (File No. 333-217510), filed with the Securities and Exchange Commission on April 27, 2017, and incorporated herein by reference.
15. Previously filed as Exhibit 10.7 to the Company's Registration Statement on Form S-1 (File No. 333-217510), filed with the Securities and Exchange Commission on April 27, 2017, and incorporated herein by reference.
16. Previously filed as Exhibit 10.11 to the Company's Annual Report on Form 10-K (File No. 001-38098), filed with the Securities and Exchange Commission on February 23, 2018, and incorporated herein by reference.
17. Previously filed as Exhibit 10.12 to the Company's Annual Report on Form 10-K (File No. 001-38098), filed with the Securities and Exchange Commission on February 23, 2018, and incorporated herein by reference.
18. Previously filed as Exhibit 10.13 to the Company's Annual Report on Form 10-K (File No. 001-38098), filed with the Securities and Exchange Commission on February 23, 2018, and incorporated herein by reference.
19. Previously filed as Exhibit 10.14 to the Company's Annual Report on Form 10-K (File No. 001-38098), filed with the Securities and Exchange Commission on February 23, 2018, and incorporated herein by reference.
20. Previously filed as Exhibit 10.15 to the Company's Annual Report on Form 10-K (File No. 001-38098), filed with the Securities and Exchange Commission on February 23, 2018, and incorporated herein by reference.
21. Previously filed as Exhibit 10.1 to the Company's Current Report on Form 8-K (File No. 001-38098), filed with the Securities and Exchange Commission on December 10, 2018, and incorporated herein by reference.
22. Previously filed as Exhibit 10.1 to the Company's Current Report on Form 8-K (File No. 001-38098), filed with the Securities and Exchange Commission on April 23, 2018, and incorporated herein by reference.
23. Previously filed as Exhibit 10.11 to the Company's Registration Statement on Form S-1 (File No. 333-217510), filed with the Securities and Exchange Commission on April 27, 2017, and incorporated herein by reference.
24. Previously filed as Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q (File No. 001-38098) filed with the Securities and Exchange Commission on October 31, 2019, and incorporated herein by reference.
25. Previously filed as Exhibit 10.1 to the Company's Current Report on Form 8-K (File No. 001-38098), filed with the Securities and Exchange Commission on November 2, 2017, and incorporated herein by reference.

+ Indicates management contract or compensatory plan.

† Confidential treatment has been granted as to certain portions of this exhibit, which portions have been omitted and filed separately with the Securities and Exchange Commission.

Filed herewith.

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

Item 16. Form 10-K Summary.

Not applicable.

SIGNATURE

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned thereunto duly authorized.

APPIAN CORPORATION

Date: February 20, 2020	By:	/s/ Matthew Calkins
		Name: Matthew Calkins
		Title: Chief Executive Officer and Chairman of the Board *(On behalf of the Registrant and as Principal Executive Officer)*

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below hereby constitutes and appoints Matthew Calkins, Mark Lynch and Christopher Winters, and each of them acting individually, as his or her true and lawful attorneys-in-fact and agents, with full power of each to act alone, with full powers of substitution and resubstitution, for him or her and in his or her name, place and stead, in any and all capacities, to sign any and all amendments to this Annual Report on Form 10-K with all exhibits thereto and all documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, with full power of each to act alone, full power and authority to do and perform each and every act and thing requisite and necessary to be done in connection therewith, as fully for all intents and purposes as he or she might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents, or his, her or their substitutes, may lawfully do or cause to be done by virtue hereof.

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

Signature	Title	Date
/s/ Matthew Calkins **Matthew Calkins**	Chief Executive Officer and Chairman of the Board *(Principal Executive Officer)*	February 20, 2020
/s/ Mark Lynch **Mark Lynch**	Chief Financial Officer *(Principal Financial Officer and Principal Accounting Officer)*	February 20, 2020
/s/ Robert C. Kramer **Robert C. Kramer**	General Manager and Director	February 20, 2020
/s/ A.G.W. "Jack" Biddle, III **A.G.W. "Jack" Biddle, III**	Director	February 20, 2020
/s/ Prashanth “PV” Boccassam **Prashanth “PV” Boccassam**	Director	February 20, 2020
/s/ Michael G. Devine **Michael G. Devine**	Director	February 20, 2020
/s/ Barbara “Bobbie” Kilberg **Barbara “Bobbie” Kilberg**	Director	February 20, 2020
/s/ Michael J. Mulligan **Michael J. Mulligan**	Director	February 20, 2020

Exhibit 4.3

DESCRIPTION OF THE REGISTRANT'S SECURITIES REGISTERED PURSUANT TO SECTION 12 OF THE SECURITIES EXCHANGE ACT OF 1934

As of December 31, 2019, Appian Corporation ("we," "us" and "our") had one class of securities registered under Section 12 of the Securities Exchange Act of 1934, as amended: our Class A common stock, par value $0.0001 per share. The following summary description of our Class A common stock is not complete and is qualified in its entirety by reference to our Amended and Restated Certificate of Incorporation, our Amended and Restated Bylaws, each of which are incorporated by reference as an exhibit to the Annual Report on Form 10-K of which this Exhibit 4.3 is a part, and applicable provisions of the Delaware General Corporation Law.

Authorized Capital Stock

Our certificate of incorporation provides for two classes of common stock: Class A common stock and Class B common stock.

Our authorized capital stock consists of 600,000,000 shares, all with a par value of $0.0001 per share, of which:

- 500,000,000 shares are designated as Class A common stock; and
- 100,000,000 shares are designated as Class B common stock.

Voting Rights

Holders of our Class A common stock and Class B common stock have identical rights, provided that, except as otherwise expressly provided in our certificate of incorporation or required by applicable law, on any matter that is submitted to a vote of our stockholders, holders of our Class A common stock are entitled to one vote per share of Class A common stock and holders of our Class B common stock are entitled to ten votes per share of Class B common stock. Holders of shares of Class A common stock and Class B common stock will vote together as a single class on all matters (including the election of directors) submitted to a vote of stockholders. In addition, each class of our common stock may have the right to vote separately in certain instances as listed below under "Economic Rights."

A separate vote of our Class B common stock will also be required in order for us to, directly or indirectly, take action in the following circumstances:

- if we propose to amend, alter or repeal any provision of our certificate of incorporation or our bylaws that modifies the voting, conversion or other powers, preferences or other special rights or privileges or restrictions of the Class B common stock; or

- if we reclassify any outstanding shares of Class A common stock into shares having rights as to dividends or liquidation that are senior to the Class B common stock or the right to more than one vote for each share thereof.

Our certificate of incorporation provides that the authorized number of shares of Class A common stock or Class B common stock may be increased or decreased (but not below the number of shares then outstanding) by the affirmative vote of the holders of a majority of the combined voting power of the outstanding shares of Class A common stock and Class B common stock, voting together as a single class. In addition, except as expressly permitted by the certificate of incorporation we may not issue any shares of Class B common stock, unless that issuance is approved by the affirmative vote of the holders of a majority of the outstanding shares of Class B common stock.

We have not provided for cumulative voting for the election of directors in our certificate of incorporation.

Economic Rights

Except as otherwise expressly provided in our certificate of incorporation or required by applicable law, shares of Class A common stock and Class B common stock have the same rights and privileges and rank equally, share ratably and are identical in all respects as to all matters, including, without limitation, those described below.

Dividends. Any dividend or distribution paid or payable to the holders of shares of Class A common stock and Class B common stock shall be paid pro rata, on an equal priority, pari passu basis, unless different treatment of the shares of any such class is approved by the affirmative vote of the holders of a majority of the outstanding shares of the applicable class of common stock treated adversely, voting separately as a class; provided, however, that if a dividend or distribution is paid in the form of Class A common stock or Class B common stock (or rights to acquire shares of Class A common stock or Class B common stock), then the holders of the Class A common stock may receive Class A common stock (or rights to acquire shares of Class A common stock) and holders of Class B common stock may receive Class B common stock (or rights to acquire shares of Class B common stock).

Liquidation. In the event of our liquidation, dissolution or winding-up, upon the completion of the distributions required with respect to any series of preferred stock that may then be outstanding, our remaining assets legally available for distribution to stockholders shall be distributed on an equal priority, pro rata basis to the holders of Class A common stock and Class B common stock unless different treatment is approved by the affirmative vote of the holders of a majority of the outstanding shares of each of the Class A common stock and Class B common stock, voting separately as a class.

Subdivisions and Combinations. If we subdivide or combine in any manner outstanding shares of Class A common stock or Class B common stock, then the outstanding shares of all common stock will be subdivided or combined in the same proportion and manner unless different treatment of the shares of such class is approved by the affirmative vote of the holders of a majority of the outstanding shares of the applicable class of common stock treated adversely, voting separately as a class.

Change of Control Transaction. The holders of Class A common stock and Class B common stock will be treated equally and identically with respect to shares of Class A common stock or Class B common stock owned by them unless different treatment is approved by the affirmative vote of the holders of a majority of the outstanding shares of each of the Class A common stock and Class B common stock, voting separately as a class, on (a) the closing of the sale, lease, exclusive license or other disposition of all or substantially all of our assets, (b) the consummation of a merger, reorganization, consolidation, or share transfer which results in our capital stock outstanding immediately before the transaction representing less than a majority of the combined voting power of the voting securities of the company or the surviving or acquiring entity, or (c) the closing of the transfer (whether by merger, consolidation, or otherwise but excluding a *bona fide* equity financing), in one transaction or a series of related transactions, to a person or group of affiliated persons of securities of the company if, after closing, the transferee person or group would hold 50% or more of the outstanding voting power of the company (or the surviving or acquiring entity). However, consideration to be paid or received by a holder of common stock in connection with any such asset sale, merger, reorganization, consolidation, or share transfer under any employment, consulting, severance, or other arrangement will be disregarded for the purposes of determining whether holders of common stock are treated equally and identically.

Anti-Takeover Provisions

Anti-Takeover Statute

We are subject to Section 203 of the Delaware General Corporation Law, which generally prohibits a publicly held Delaware corporation from engaging in any business combination with any interested stockholder for a period of three years after the date that such stockholder became an interested stockholder, with the following exceptions:

- before such date, the board of directors of the corporation approved either the business combination or the transaction that resulted in the stockholder becoming an interested stockholder;

- upon completion of the transaction that resulted in the stockholder becoming an interested stockholder, the interested stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction began, excluding for purposes of determining the voting stock outstanding, but not the outstanding voting stock owned by the interested stockholder, those shares owned (1) by persons who are directors and also officers and (2) employee stock plans in which employee participants do not have the right to determine confidentially whether shares held subject to the plan will be tendered in a tender or exchange offer; or

- on or after such date, the business combination is approved by the board of directors and authorized at an annual or special meeting of the stockholders, and not by written consent, by the affirmative vote of at least 66 2⁄3% of the outstanding voting stock that is not owned by the interested stockholder.

In general, Section 203 defines a “business combination” to include the following:

- any merger or consolidation involving the corporation and the interested stockholder;

- any sale, transfer, pledge or other disposition of 10% or more of the assets of the corporation involving the interested stockholder;

- subject to certain exceptions, any transaction that results in the issuance or transfer by the corporation of any stock of the corporation to the interested stockholder;

- any transaction involving the corporation that has the effect of increasing the proportionate share of the stock or any class or series of the corporation beneficially owned by the interested stockholder; or

- the receipt by the interested stockholder of the benefit of any loans, advances, guarantees, pledges or other financial benefits by or through the corporation.

In general, Section 203 defines an “interested stockholder” as an entity or person who, together with the person’s affiliates and associates, beneficially owns, or within three years prior to the time of determination of interested stockholder status did own, 15% or more of the outstanding voting stock of the corporation.

Anti-Takeover Effects of Certain Provisions of our Certificate of Incorporation and Bylaws

Because our stockholders do not have cumulative voting rights, stockholders holding a majority of the voting power of the Class A common stock and Class B common stock outstanding will be able to elect all of our directors. Our certificate of incorporation provides for a two-class common stock structure, which provides our founders, current stockholders, executives and employees with significant influence over all matters requiring stockholder approval, including the election of directors and significant corporate transactions, such as a merger or other sale of our company or its assets.

Our certificate of incorporation and bylaws also provide that:

- the authorized number of directors may be changed by resolution of the board of directors or, prior to the date on which all shares of common stock convert into a single class, by resolution of the stockholders;
- vacancies and newly created directorships on the board of directors may be filled (1) by a majority vote of the directors then serving on the board, even though less than a quorum, except as otherwise required by law or determined by the board, or (2) by the stockholders;
- stockholder action may be taken at a duly called meeting of stockholders or, prior to the date on which all shares of common stock convert into a single class, by written consent;
- a special meeting of stockholders may be called by a majority of our whole board of directors, the chair of our board of directors, our chief executive officer or, prior to the date on which all shares of common stock convert into a single class, the holders of at least 10% of the total voting power of our Class B common stock; and
- stockholders seeking to present proposals before any meeting of stockholders or to nominate candidates for election as directors at a meeting of stockholders must provide timely advance notice in writing, and, subject to applicable law, specify requirements as to the form and content of a stockholder's notice.

The combination of these provisions will make it more difficult for another party to obtain control of us by replacing our board of directors. Since our board of directors has the power to retain and discharge our officers, these provisions could also make it more difficult for another party to effect a change in management.

These provisions are intended to enhance the likelihood of continued stability in the composition of our board of directors and its policies and to discourage coercive takeover practices and inadequate takeover bids. These provisions are also designed to reduce our vulnerability to hostile takeovers and to discourage certain tactics that may be used in proxy fights. However, such provisions could have the effect of discouraging others from making tender offers for our shares and may have the effect of delaying changes in our control or management. As a consequence, these provisions may also inhibit fluctuations in the market price of our stock that could result from actual or rumored takeover attempts. We believe that the benefits of these provisions, including increased protection of our potential ability to negotiate with the proponent of an unfriendly or unsolicited proposal to acquire or restructure our company, outweigh the disadvantages of discouraging takeover proposals, because negotiation of takeover proposals could result in an improvement of their terms.

Other Rights and Preferences

Our shares of Class A common stock are not redeemable and have no preemptive rights.

Listing

Our outstanding shares of Class A common stock are listed on The Nasdaq Global Select Market under the symbol "APPN."

FIRST AMENDMENT TO DEED OF LEASE

This FIRST amendment TO DEED OF lease (this "**Amendment**") is entered into as of the 23rd day of December, 2019 (the "**Effective Date**") by and between **TAMARES 7950 OWNER LLC**, a Delaware limited liability company, having an office c/o Tamares Real Estate Holdings, Inc., 1500 Broadway, 24th Floor, New York, New York 10036 ("**Landlord**"), and **APPIAN CORPORATION**, a Delaware corporation, having an office at Valo Park, 7950 Jones Branch Drive, Tysons, Virginia 22102 ("**Tenant**").

W I T N E S S E T H:

WHEREAS, Landlord and Tenant entered into that certain Deed of Lease dated as of April 17, 2018 (the "**Lease**"), pursuant to which Tenant leased from Landlord certain premises (collectively, the "**Premises**") in the Building located at 7950 Jones Branch Drive, McLean, Virginia, all as more particularly described in the Lease;

WHEREAS, pursuant to the Lease, the Tenant has the exclusive right to use the Storage Space (as such term is defined in the Lease); and

WHEREAS, since Tenant no longer requires the Storage Space and the Storage Space is beneficial to Landlord, Tenant and Landlord agreed to amend the Lease to remove from the Lease Tenant's right to use the Storage Space, subject to them terms and conditions set forth herein;

NOW, THEREFORE, Landlord and Tenant agree as follows:

1. **DEFINITIONS**.

(a) All capitalized terms used and not defined herein shall have the respective meanings set forth in the Lease.

2. **AMENDMENTS.**

(a) the Lease is hereby amended and modified as follows:

(i) Article 38 of the Lease titled "Storage Space" is hereby deleted in its entirety, the last sentence of Paragraph 9 in the Summary of Basic Lease Information is hereby deleted, and any other reference to the term "Storage Space" is hereby deleted from the Lease.

(ii) Exhibit A-18 of the Lease titled "Storage Space" is hereby deleted in its entirety.

3. **REFERENCE TO AND EFFECT ON THE LEASE.**

(a) Construction. On and after the Effective Date, each reference in the Lease to “this Lease,” “hereunder,” “hereof,” “herein,” and words of like import shall mean and be a reference to the Lease as amended hereby.

(b) No Waiver. The execution, delivery and effectiveness of this Amendment shall not operate as a waiver of any right, power or remedy of the Landlord or Tenant under the Lease, or constitute a waiver of any provision of the Lease.

4. **MISCELLANEOUS**.

(a) Ratification and Confirmation of the Lease. Except as specifically modified and amended by this Amendment, all of the terms, covenants and conditions of the Lease are hereby ratified and confirmed and shall continue to be and remain in full force and effect throughout the remainder of the term thereof, and the Lease as amended hereby shall, from and after the Effective Date, be read as a single, integrated document incorporating the changes effected by this Amendment.

(b) Not a Binding Offer. This Amendment shall not be binding upon or enforceable against Landlord or Tenant unless and until both parties shall have executed and unconditionally delivered a fully executed copy of this Amendment to the other party.

(c) Modifications Must Be in Writing. This Amendment may not be modified, amended or terminated nor may any of its provisions be waived except by an agreement in writing signed by the parties hereto.

(d) Successors and Assigns. The covenants, agreements, terms, provisions and conditions contained in this Amendment shall be binding upon and inure to the benefit of the parties hereto and their respective successors and assigns.

(e) No Prior Agreements. This Amendment constitutes the entire agreement between the parties with respect to the subject matter hereof and supersedes all other prior agreements and understandings, both written and oral, between the parties with respect to the subject matter of this Amendment.

(f) Broker. Each of Tenant and Landlord represents to the other that it has dealt with no broker in connection with this Amendment. Each of Landlord and Tenant agrees to indemnify, defend and hold harmless the other from and against any claims based or alleged to be based upon the acts or omissions of the indemnifying party, for any brokerage commission or finder’s fee with respect to this Amendment by persons other than Broker, and for all costs, expenses and liabilities incurred in connection with such claims, including reasonable attorney’s fees and disbursements arising out of a breach of the foregoing representation.

(g) Due Authorization. Each of Landlord and Tenant represents and warrants that (i) its execution and delivery of this Amendment, and its performance of its obligations hereunder, have been duly authorized, (ii) the person(s) executing this Amendment on its behalf have full authority to enter into this Amendment, and (iii) no further action is necessary for it to be obligated to fulfill it's obligations under the Lease, as amended hereby.

[*remainder of page intentionally blank; signature pages follow*]

Exhibit 10.15

IN WITNESS WHEREOF, Landlord and Tenant have executed this Amendment as of the day and year first above written.

LANDLORD:
TAMARES 7950 OWNER LLC

By: /s/ Itrat Sayeed
Name: Itrat Sayeed
Title: Vice President

TENANT:
APPIAN CORPORATION

By: /s/ Mark Lynch
Name: Mark Lynch
Title: CFO

SECOND AMENDMENT TO DEED OF LEASE

This SECOND amendment TO DEED OF lease (this "Amendment") is entered into as of the 1st day of January, 2020 (the "Effective Date") by and between TAMARES 7950 OWNER LLC, a Delaware limited liability company, having an office c/o Tamares Real Estate Holdings, Inc., 1500 Broadway, 24th Floor, New York, New York 10036 ("Landlord"), and APPIAN CORPORATION, a Delaware corporation, having an office at Valo Park, 7950 Jones Branch Drive, Tysons, Virginia 22102 ("Tenant").

W I T N E S S E T H:

WHEREAS, Landlord and Tenant entered into that certain Deed of Lease dated as of April 17, 2018 (the "Original Lease"), pursuant to which Tenant leased from Landlord certain premises in the Building located at 7950 Jones Branch Drive, McLean, Virginia, as more particularly described in the Lease;

WHEREAS, on December 23rd, 2019, the parties executed that certain First Amendment to Deed of Lease (the "First Amendment") pursuant to which Tenant surrendered the Storage Space. The Original Lease as amended by the First Amendment is referred to herein collectively as the "Lease".

WHEREAS, Tenant exercised the Unilateral Expansion Option with respect to the Fourth Floor North Premises (defined below) by Tenant's delivery to Landlord of a Unilateral Expansion Right Exercise Notice on November 27, 2019 in accordance with Section 1.17 of the Lease;

WHEREAS, Landlord and Tenant desire to enter into this Amendment to memorialize the terms, conditions and provisions applicable to the Fourth Floor North Premises;

WHEREAS, Tenant has requested that Landlord delay delivering possession of the Fourth Floor North Premises (and accordingly to delay the actual Delivery Date therefor), and Landlord has agreed to do so subject to the terms and conditions set forth in this Amendment provided, however, that the determinations of (i) the Unilateral Expansion Space Abated Rent Period, (ii) the Unilateral Expansion Space Rent Commencement Date and (iii) the Unilateral Expansion Space Tenant Improvement Allowance shall each be made as if the Delivery Date for the Fourth Floor North Premises was deemed to be January 1, 2020 and otherwise in accordance with the provisions set forth in the Lease.

NOW, THEREFORE, Landlord and Tenant agree as follows:

1. **DEFINITIONS**.

(a) All capitalized terms used and not defined herein shall have the respective meanings set forth in the Lease.

2. **AMENDMENTS.**

(a) As of the Effective Date, the Lease is hereby amended and modified as follows:

(i) Premises. The fourth (4th) floor of North Tower containing approximately 34,158 rentable square feet and as more particularly described on Exhibit A (the "Fourth Floor North Premises") shall be added to the Premises as of the actual Delivery Date for the Fourth Floor North Premises. From and after the actual Delivery Date of the Fourth Floor North Premises the capitalized term "Premises" means the (1) Original Premises, the Fifth Floor Must-Take Space and the Fourth Floor North Premises, comprising a total of 239,185 rentable square feet, and, (2) except as specifically set forth in Section 2(b) of this Amendment, the Balcony (as hereinafter defined).

(ii) Delivery Date.

(1) Notwithstanding anything set forth in the Lease to the contrary, the actual Delivery Date for the Fourth Floor North Premises only shall be the date that is the later of (A) the date Landlord delivers the Fourth Floor North Premises to Tenant with Landlord's Delivery Conditions satisfied, and (B) the date that is two (2) business days after Tenant notifies Landlord that Tenant is ready to receive possession of the Fourth Floor North Premises ("Tenant's Possession Notice"), which Tenant anticipates to occur on or around July 1, 2020. Notwithstanding the foregoing, if Tenant has not delivered Tenant's Possession Notice by the Fourth Floor Rent Commencement Date, then the actual Delivery Date shall occur on the first date on or after the Fourth Floor Rent Commencement Date upon which Landlord delivers possession of the Fourth Floor North Premises to Tenant with Landlord's Delivery Conditions satisfied regardless of whether Tenant has delivered Tenant's Possession Notice to Landlord. Landlord may not deliver physical possession of the Fourth Floor North Premises until the actual Delivery Date as set forth above. Tenant's acceptance of the Fourth Floor North Premises on the actual Delivery Date shall be subject to the terms of Section 1.1 of the Work Letter. Tenant shall have the right to construct the Unilateral Expansion Space Tenant Improvements in the Fourth Floor North Premises and, if applicable, the Alterations on the Balcony without the payment or triggering of Rent obligations from and after the actual Delivery Date through and including the Fourth Floor North Premises Commencement Date (as defined in Section 2(a)(iii) below) subject to and in accordance with the terms and conditions of the Work Letter, including without limitation Section 5.3 thereof (Early Access); provided, however, Tenant may elect for the review and approval process set forth in Section 4 of the Work Letter to commence any time after the Effective Date with respect to the Unilateral Expansion Space Tenant Improvements in the Fourth Floor North Premises and, if applicable, the Alterations on the Balcony.

(2) Landlord and Tenant acknowledge and agree that following Tenant's further exercise of the Unilateral Expansion Option with respect to any remaining Unilateral Expansion Space:

(a) the actual Delivery Date for such Unilateral Expansion Space shall be the date that is the later of (A) the date Landlord delivers the Unilateral Expansion

Space to Tenant with Landlord's Delivery Conditions satisfied, and (B) the date that is two (2) business days after Landlord's receipt of Tenant's Possession Notice for the Unilateral Expansion Space. Notwithstanding the foregoing, if Tenant has not delivered Tenant's Possession Notice by the Unilateral Expansion Space Rent Commencement Date as set forth in Section 2(a)(ii)(b) below, then the actual Delivery Date shall occur on the first date on or after the Unilateral Expansion Space Rent Commencement Date upon which Landlord delivers possession of the Unilateral Expansion Space to Tenant with Landlord's Delivery Conditions satisfied regardless of whether Tenant has delivered Tenant's Possession Notice to Landlord. Landlord may not deliver physical possession of the Unilateral Expansion Space until the actual Delivery Date as set forth above. As of the actual Delivery Date, Tenant shall have the right to access the Unilateral Expansion Space for the purposes of preparing for and constructing Unilateral Expansion Space Tenant Improvements, installing furniture, fixtures, equipment, and cabling, and otherwise readying the Unilateral Expansion Space for beneficial occupancy but such use and access shall not be deemed to be beneficial occupancy of the Unilateral Expansion Space.

(b) the deemed Delivery Date for such Unilateral Expansion Space Unilateral Expansion Space for the purpose of calculating the Unilateral Expansion Space Abated Rent Period, Unilateral Expansion Space Rent Commencement Date, and Unilateral Expansion Space Tenant Improvement Allowance shall be the later of (x) the date that Landlord's Delivery Conditions with respect to the Unilateral Expansion Space have been satisfied, and (y) the date that Landlord delivers to Tenant a draft of the confirmatory lease amendment contemplated in Section 1.17.9 that addresses all of the Key Terms (as hereinafter defined) governing the addition of the applicable Unilateral Expansion Space to the Premises. Such draft shall not include any revisions or changes to the Lease other than providing for the Key Terms. The applicable Unilateral Expansion Space shall be automatically added to the Premises as of the actual Delivery Date for such Unilateral Expansion Space regardless of whether an amendment is executed by the parties evidencing the same. Without derogating from the foregoing, Landlord and Tenant shall work diligently and in good faith to finalize, execute and deliver the confirmatory lease amendment contemplated in Section 1.17.9 as soon as is reasonably possible.

(c) The "Key Terms" are as follows: (1) Unilateral Expansion Space; (2) Unilateral Expansion Space Term; (3) Base Rent and chart similar to that set forth in Section 2(a)(vi) below; (4) Tenant's Share after the Unilateral Expansion Space Rent Commencement Date; (5) Unilateral Expansion Space Abated Rent; (6) Unilateral Expansion Space Abated Rent Period; (7) Unilateral Expansion Space Commencement Date; (8) Unilateral Expansion Space Rent Commencement Date; (9) updated amounts of the Security Deposit, First Reduced LC Amount, Second Reduced LC Amount, Third Reduced LC Amount, and Fourth Reduced LC Amount; (10) Unilateral Expansion Space Tenant Improvement Allowance; (11) number of Parking Permits (total, unreserved, and exclusive) and location of new exclusive parking spaces; and (12) and Parking Permit Fees and chart similar to that set forth in Section 2(a)(viii)(b).

(iii) Fourth Floor North Premises Commencement Date.

(1) Notwithstanding anything set forth in the Lease to the contrary, the Unilateral Expansion Space Commencement Date for the Fourth Floor North Premises shall be the sooner of (x) the date that Tenant has completed the Unilateral Expansion Space Tenant Improvements in, and commenced legal occupancy of, the Fourth Floor North Premises, and (y) October 14, 2020 ("Fourth Floor North Premises Commencement Date").

(2) On or prior to the Fourth Floor North Premises Commencement Date, Landlord shall deliver to Tenant, at Landlord's sole cost and expense, one hundred seventy-one (171) key cards permitting access to the Common Areas, Building, and the Premises.

(3) The words "Fixed Date Expansion Space" in the second sentence of Section 1.17.4 in the Original Lease are hereby deleted and replaced with "Unilateral Expansion Space".

(iv) Fourth Floor North Premises Abated Rent Period. Notwithstanding anything set forth in the Lease to the contrary, the Unilateral Expansion Space Abated Rent Period for the Fourth Floor North Premises shall be from the Fourth Floor North Premises Commencement Date through June 10, 2021.

(v) Fourth Floor North Premises Rent Commencement Date. Notwithstanding anything set forth in the Lease to the contrary, the Unilateral Expansion Space Rent Commencement Date for the Fourth Floor North Premises is June 11, 2021 ("Fourth Floor North Premises Rent Commencement Date").

(vi) Fourth Floor North Premises Base Rent. The following is inserted into the Summary as new Section 9.3 thereof:

"9.3	Base Rent for the Fourth Floor North Premises:	The following table sets forth the annual Base Rent and Monthly Base Rent for the Fourth Floor North Premises.

Months of Lease Term	Annualized Base Rent**	Monthly Installment of Base Rent	$/RSF/Year
1-27	$1,048,650.60	$87,387.55	$30.70
28-39	$1,080,110.12	$90,009.18	$31.62
40-51	$1,112,513.42	$92,709.45	$32.57
52-63	$1,145,888.82	$95,490.74	$33.55
64-75	$1,180,265.49	$98,355.46	$34.55
76-87	$1,215,673.45	$101,306.12	$35.59
88-99	$1,252,143.66	$104,345.30	$36.66
100-111	$1,289,707.97	$107,475.66	$37.76
112-123	$1,328,399.21	$110,699.93	$38.89
124-135	$1,368,251.18	$114,020.93	$40.06
136-147	$1,409,298.72	$117,441.56	$41.26
148-150	$1,451,577.68	$120,964.81	$42.50

** Subject to abatement through June 10, 2021, which occurs in the 26th Month of the Lease Term in the foregoing table.

(vii) Tenant's Share. From and after the Unilateral Expansion Space Rent Commencement Date for the Fourth Floor North Premises, Tenant's Share shall be thirty-three and ninety-two hundredths percent (33.92%) computed as follows: (176,222 rentable square feet within the Original Premises plus 28,805 within the Fifth Floor Must-Take Space plus 34,158 rentable square feet within the Fourth Floor North Premises)/705,092 rentable square feet within the Building). Tenant's share shall remain subject to further adjustment in accordance with the express terms of the Lease. For purposes of clarity, Tenant shall not be obligated to pay for Operating Expenses or Real Estate Taxes in connection with the Fourth Floor North Premises until the Fourth Floor North Premises Rent Commencement Date.

(viii) Fourth Floor North Premises Parking Rights. (a) Section 11.1 of the Summary is deleted in its entirety. The following is inserted in its place and stead:

"11.1 Parking Rights: Tenant shall receive three (3.0) parking permits (each, a "Parking Permit" per 1,000 square feet of the Premises, yielding parking permits for 718 parking spaces based on the rentable square footage of the Premises (i.e., (176,222 RSF + 28,805 RSF + 34,158 RSF / 1,000) x 3.0), of which: (i) 691 parking spaces shall be unreserved parking spaces and (ii) 27 of which parking spaces shall be exclusive parking spaces as identified by signage or paint. As the Premises are expanded, Tenant shall continue to receive parking spaces based on the same ratio as provided in this Section 11.1 of the Summary."

The four (4) additional exclusive parking spaces due to Tenant in connection with the Fourth Floor North Premises shall be contiguous to Tenant's existing exclusive parking spaces and are located as shown on Exhibit B attached hereto. Such additional exclusive parking spaces shall be made available to Tenant for Tenant's exclusive use beginning on April 15, 2020.

(b) Section 11.2 of the Summary is deleted in its entirety. The following is inserted in its place and stead:

"11.2 Parking Permit Fees for Original Premises, Fifth Floor Must-Take Space and Fourth Floor North Premises: Commencing on the 73rd month of the Term, Tenant shall pay to Landlord as Additional Rent on the first (1st) day of each month occurring during the Term a fee of $86.98 per Parking Permit per month ("Parking Permit Fees"). On the 85th month during the Lease Term, and annually thereafter, Parking Permit Fees shall be increased by 2.5%. The following table sets forth the annual Parking Permit Fees and monthly parking permit fees for the Original Premises, the Fifth Floor Must-Take Space and the Fourth Floor North Premises during the Initial Term (calculated on the basis of 718 parking permits).

Months of Lease Term	Annual Installment of Parking Permit Fees	Monthly Installment of Parking Permit Fees	$/Parking Permit/Month
1-72	$0	$0	$0
73-84**	$749,419.68	$62,451.64	$86.98
85-96	$768,155.17	$64,012.93	$89.15
97-108	$787,359.05	$65,613.25	$91.38
109-120	$807,043.03	$67,253.86	$93.67
121-132	$827,219.10	$68,934.93	$96.01
133-144	$847,899.58	$70,658.30	$98.41
145-150	$869,097.07	$72,424.76	$100.87

*All Parking shall be free of charge for the first seventy-two (72) months of the initial Lease Term pursuant to Section 1.12 of the Lease. **In addition, the Parking Permit Fees for the one hundred three (103) parking spaces allocated for the Fourth Floor North Premises shall be abated until October 31, 2025. The numbers in the chart do not reflect the abated Parking Permit Fees described in the foregoing sentence. Landlord and Tenant shall enter into an amendment to this Lease upon Tenant's exercise of any of Tenant's Expansion Rights to restate the above table based upon the number of Parking Permits allocated to Tenant based upon the rentable square feet of Premises then demised to Tenant under this Lease based on three (3.0) Parking Permits per 1,000 square feet of the Premises (provided that the failure of Landlord and Tenant to enter into such an amendment shall have no effect on the Parking Permit Fees payable by Tenant in accordance with the terms of this Lease)."

(ix) Fourth Floor North Premises Security Deposit. On or prior to the earlier of (A) thirty (30) days following the date hereof and (B) commencing the Unilateral Expansion Space Tenant Improvements in the Fourth Floor North Premises (such date, the "Fourth Floor North Premises Security Deposit Date"), Tenant shall deliver to Landlord a supplemental Letter of Credit in the amount of $1,560,337.44 (or replacement Letter of Credit in the Security Deposit Amount), all in accordance with and as provided for in Article 2 of the Lease. Effective as of the Fourth Floor North Premises Security Deposit Date, the Security Deposit Amount as defined in Section 2.1 of the Lease shall mean $10,925,970.80.

(a) The following definitions in Section 2.2.2 of the Lease shall be amended as follows:

(I) The "First Reduced LC Amount" shall mean $8,194,478.10.

(II) The "Second Reduced LC Amount" shall mean $5,462,985.40.

(III) The "Third Reduced LC Amount" shall mean $2,731,492.70.

(IV) The "Fourth Reduced LC Amount" shall mean $910,497.57.

(b) Reference to "Two Million Three Hundred Forty One Thousand Four Hundred Eight and 34/100 Dollars ($2,341,408.34)" in the fourth sentence in Section 2.2.1 of the Original Lease shall be replaced with "Two Million Seven Hundred Thirty-One Thousand Four Hundred Ninety-Two and 70/100 Dollars ($2,731,492.70)".

a. Fourth Floor North Premises Tenant Improvement Allowance. Notwithstanding anything set forth in the Lease to the contrary, the Unilateral Expansion Space Tenant Improvement Allowance for the Fourth Floor North Premises is Two Million Eight Hundred Thirty-Eight Thousand Five Hundred Twenty-Nine and 80/100 Dollars ($2,838,529.80).

i. Balcony and Walkway.

b. As of the actual Delivery Date of the Fourth Floor North Premises, Tenant shall have exclusive use of the balcony shown on Exhibit A ("Balcony") and shared use of and access to the walkway shown on Exhibit A that connects the South Tower and North Tower of the fourth (4^{th}) floor of the Building and included as a Common Area.

c. As of the actual Delivery Date determined in accordance with Section 2(a)(ii), the Balcony shall be part of the Premises and all provisions applying to the Premises shall apply to the Balcony except as set forth below.

(1) Calculations. For the purposes of calculating the size of the Premises, Base Rent, Tenant's Share, the amount of Parking Permits, and the amount of any tenant improvement allowance, the Balcony shall be excluded.

(2) Delivery Condition. The Balcony shall be delivered to Tenant in the conditioned required by Section 1.17.7.

(3) Compliance with Applicable Laws. Tenant shall not be responsible for the failure of the Balcony to comply with Applicable Laws or to perform any work or Alterations to the Balcony to cause such compliance at any time during the Term or any renewal or extension thereof, except to the extent such failure to comply is due to (i) Tenant's manner of use of the Balcony, (ii) any Alterations to the Balcony performed by Tenant, or (iii) willful acts, omissions, or gross negligence of Tenant or its employees, agents, contractors, or visitors.

(4) Repair and Maintenance. Landlord and Tenant agree that the Balcony shall not be considered part of the Premises for the purposes of Section 6.2 of the Lease unless Tenant performs Alterations to Balcony. So long as no Alterations to the Balcony are performed by Tenant, Landlord's obligations with respect to the Common Areas and Building shall apply to the Balcony. Tenant shall promptly report in writing to Landlord any defective condition in the Balcony actually known to Tenant which Landlord is required to repair. Notwithstanding the foregoing, Tenant shall be responsible for the actual, reasonable cost incurred by Landlord for any repairs and/or maintenance required to the Balcony due to the acts or negligence of Tenant or its employees, agents, contractors, or visitors. If Tenant performs Alterations to the Balcony, the Balcony shall be considered a part of the Premises for the purposes of Section 6.2.

(5) Insurance. Landlord shall carry property insurance against loss or damage with respect to the Balcony in accordance with Section 11.4(i) of the Lease. The Balcony shall be considered a part of the Premises for the purposes of Section 11.1.

(6) Damage or Destruction. "Balcony," shall be inserted after "Unilateral Expansion Space," and before "Identified ROFR Space" in Section 13.1.1(ii) of the Lease.

(7) Tenant shall have the right to make Alterations to the Balcony subject to Landlord's approval, which shall be granted or withheld in Landlord's sole but reasonable discretion. Without limiting other reasons Landlord may disapprove proposed Alterations to the Balcony, Tenant acknowledges that is shall be reasonable for Landlord to disapprove proposed Alterations to the Balcony if Landlord determines that such proposed Alterations are not in keeping with the architectural aesthetic or design intent of the Project or the Building. If Tenant elects for such Alterations to be performed at the same time as the Unilateral Expansion Space Tenant Improvements, such Alterations will be treated the same as Unilateral Expansion Space Tenant Improvements and shall be subject to and performed in accordance with the terms and conditions of the Work Letter, including without limitation <u>Section 5.3</u> thereof (Early Access). If Tenant elects for such Alterations to be performed at a later date, then the same shall be subject to and performed in accordance with the terms of <u>Sections 14.3</u> and <u>14.4</u> of the Lease. Any Alterations made by Tenant to the Balcony shall be deemed to be Specialty Alterations.

(8) Condemnation. The Balcony shall not be deemed part of the Premises for purposes of determining termination rights or calculating the percentages in <u>Section 26.2</u> of the Lease.

3. **<u>REFERENCE TO AND EFFECT ON THE LEASE.</u>**

ii. <u>Construction.</u> On and after the Effective Date, each reference in the Lease to "this Lease," "hereunder," "hereof," "herein," and words of like import shall mean and be a reference to the Lease as amended hereby.

iii. <u>No Waiver.</u> The execution, delivery and effectiveness of this Amendment shall not operate as a waiver of any right, power or remedy of the Landlord or Tenant under the Lease, or constitute a waiver of any provision of the Lease.

4. **<u>MISCELLANEOUS</u>**.

iv. <u>Ratification and Confirmation of the Lease</u>. Except as specifically modified and amended by this Amendment, all of the terms, covenants and conditions of the Lease are hereby ratified and confirmed and shall continue to be and remain in full force and effect throughout the remainder of the term thereof, and the Lease as amended hereby shall, from and after the Effective Date, be read as a single, integrated document incorporating the changes effected by this Amendment.

v. <u>Not a Binding Offer.</u> This Amendment shall not be binding upon or enforceable against Landlord or Tenant unless and until both parties shall have executed and unconditionally delivered a fully executed copy of this Amendment to the other party.

vi. Modifications Must Be in Writing. This Amendment may not be modified, amended or terminated nor may any of its provisions be waived except by an agreement in writing signed by the parties hereto.

vii. Successors and Assigns. The covenants, agreements, terms, provisions and conditions contained in this Amendment shall be binding upon and inure to the benefit of the parties hereto and their respective successors and assigns.

viii. No Prior Agreements. This Amendment constitutes the entire agreement between the parties with respect to the subject matter hereof and supersedes all other prior agreements and understandings, both written and oral, between the parties with respect to the subject matter of this Amendment.

ix. Brokers.

d. Tenant represents and warrants to Landlord that neither it nor its officers or agents nor anyone acting on its behalf has dealt with any real estate broker other than CBRE, Inc. (on behalf of Landlord) or Cushman & Wakefield, U.S., Inc. (on behalf of Tenant) in the negotiating or making of this Amendment. Tenant agrees to indemnify and hold Landlord, its agents, employees, partners, directors, shareholders and independent contractors harmless from all liabilities, costs, demands, judgments, settlements, claims and losses, including reasonable attorney's fees and costs, incurred by Landlord in conjunction with any such claim or claims of any other broker or brokers claiming to have interested Tenant in the Fourth Floor North Premises or claiming to have caused Tenant to enter into this Amendment.

e. Landlord represents and warrants to Tenant that neither it nor its officers or agents nor anyone acting on its behalf has dealt with any real estate broker other than CBRE, Inc. (on behalf of Landlord) or Cushman & Wakefield, U.S., Inc. (on behalf of Tenant) in the negotiating or making of this Amendment. Landlord agrees to indemnify and hold Tenant, its agents, employees, partners, directors, shareholders and independent contractors harmless from all liabilities, costs, demands, judgments, settlements, claims and losses, including reasonable attorney's fees and costs, incurred by Tenant in conjunction with any such claim or claims of any other broker or brokers claiming to have interested Landlord in leasing the Fourth Floor North Premises to Tenant or to have caused Landlord to enter into this Amendment. Landlord further agrees to pay the commissions accruing to each identified broker above pursuant to certain outside agreement(s).

x. Due Authorization. Each of Landlord and Tenant represents and warrants that (i) its execution and delivery of this Amendment, and its performance of its obligations hereunder, have been duly authorized, (ii) the person(s) executing this Amendment on its behalf have full authority to enter into this Amendment, and (iii) no further action is necessary for it to be obligated to fulfill its obligations under the Lease, as amended hereby.

[*remainder of page intentionally blank; signature pages follow*]

IN WITNESS WHEREOF, Landlord and Tenant have executed this Second Amendment as of the day and year first above written.

LANDLORD:
TAMARES 7950 OWNER LLC

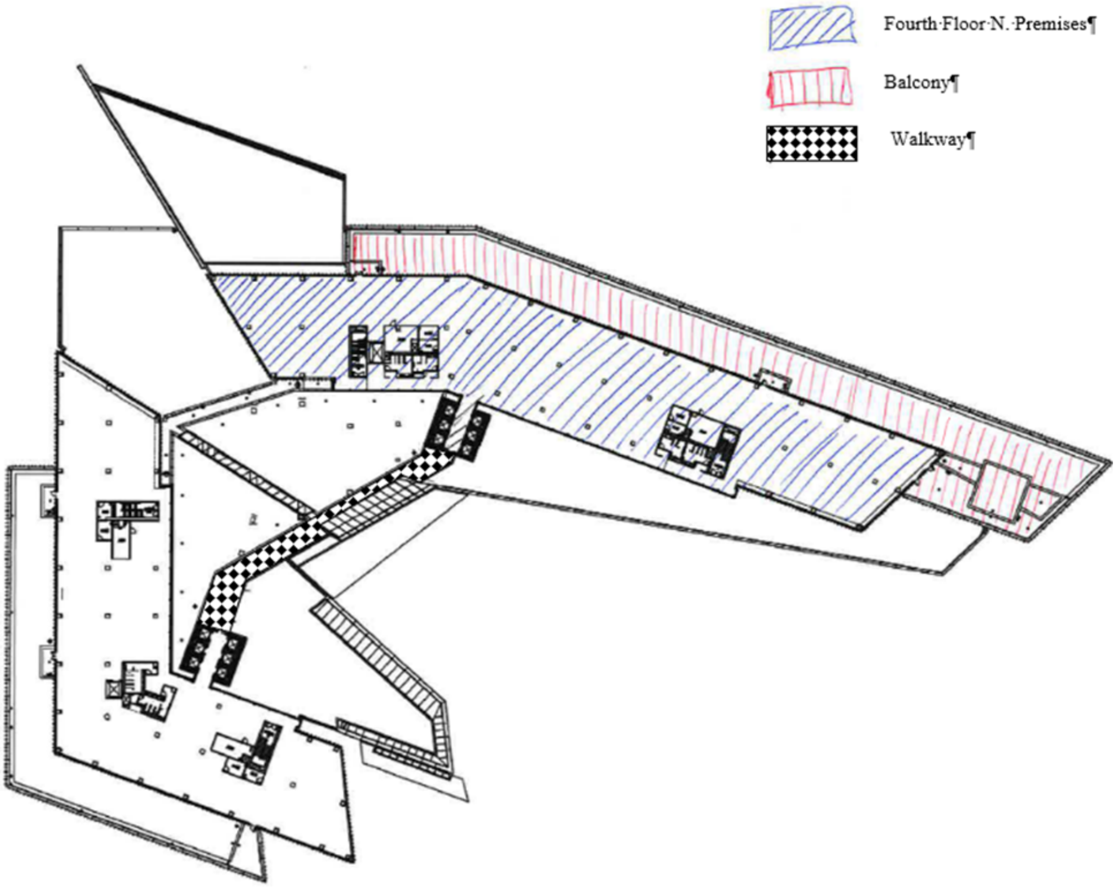
By: /s/ Itrat Sayeed
Name: Itrat Sayeed
Title: Vice President

TENANT:
APPIAN CORPORATION

By: /s/ Matthew Calkins
Name: Matthew Calkins
Title: CEO

<u>Exhibit A</u>

FOURTH FLOOR NORTH PREMISES



<u>Exhibit B</u>

LOCATION OF
FOUR FLOOR NORTH PREMISES EXCLUSIVE PARKING SPACES

Exhibit 21.1

Subsidiaries of Appian Corporation

Name of Subsidiary	Jurisdiction of Organization
Appian Europe Ltd.	England and Wales
Appian Software International LLC	Switzerland (Zug Canton)
Appian Netherlands BV	Netherlands
Appian Software Australia PTY Ltd	Australia
Appian France SARL	France
Appian Software Italy SRL	Italy
Appian Software Germany GmbH	Germany
Appian Singapore Pte. Ltd.	Singapore
Appian Spain, S.L.	Spain
Novayre Solutions, S.L.	Spain
Appian Sweden AB	Sweden

Exhibit 23.1

Consent of Independent Registered Public Accounting Firm

Appian Corporation
Tysons, Virginia

We hereby consent to the incorporation by reference in the Registration Statements on Form S-3 (No. 333-226941) and Form S-8 (No. 333-218342) of Appian Corporation of our reports dated February 20, 2020, relating to the consolidated financial statements, and the effectiveness of Appian Corporation's internal control over financial reporting, which appear in this Form 10-K.

/s/ BDO USA, LLP
McLean, Virginia

February 20, 2020

Exhibit 31.1

CERTIFICATION OF PRINCIPAL EXECUTIVE OFFICER
PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Matthew Calkins, certify that:

1. I have reviewed this Annual Report on Form 10-K for the period ended December 31, 2019 of Appian Corporation (the “registrant”);

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant’s other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   (c) Evaluated the effectiveness of the registrant’s disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   (d) Disclosed in this report any change in the registrant’s internal control over financial reporting that occurred during the registrant’s most recent fiscal quarter (the registrant’s fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant’s internal control over financial reporting; and

5. The registrant’s other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant’s auditors and the audit committee of the registrant’s board of directors (or persons performing the equivalent functions):

   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant’s ability to record, process, summarize and report financial information; and

   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant’s internal control over financial reporting.

Date: February 20, 2020

/s/ Matthew Calkins

Matthew Calkins
Chief Executive Officer
(principal executive officer)

Exhibit 31.2

CERTIFICATION OF PRINCIPAL FINANCIAL OFFICER
PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Mark Lynch, certify that:

1. I have reviewed this Annual Report on Form 10-K for the period ended December 31, 2019 of Appian Corporation (the “registrant”);

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant’s other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   (c) Evaluated the effectiveness of the registrant’s disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   (d) Disclosed in this report any change in the registrant’s internal control over financial reporting that occurred during the registrant’s most recent fiscal quarter (the registrant’s fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant’s internal control over financial reporting; and

5. The registrant’s other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant’s auditors and the audit committee of the registrant’s board of directors (or persons performing the equivalent functions):

   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant’s ability to record, process, summarize and report financial information; and

   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant’s internal control over financial reporting.

Date: February 20, 2020

/s/ Mark Lynch
Mark Lynch
Chief Financial Officer
(principal financial officer)

Exhibit 32.1

**CERTIFICATIONS OF
PRINCIPAL EXECUTIVE OFFICER AND PRINCIPAL FINANCIAL OFFICER
PURSUANT TO 18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

Pursuant to the requirement set forth in Rule 13a-14(b) of the Securities Exchange Act of 1934, as amended, (the “Exchange Act”) and Section 1350 of Chapter 63 of Title 18 of the United States Code (18 U.S.C. §1350), Matthew Calkins, Chief Executive Officer of Appian Corporation (the “Company”), and Mark Lynch, Chief Financial Officer of the Company, each hereby certifies that, to the best of his knowledge:

1. The Company’s Annual Report on Form 10-K for the period ended December 31, 2019, to which this Certification is attached as Exhibit 32.1 (the “Periodic Report”), fully complies with the requirements of Section 13(a) or Section 15(d) of the Exchange Act; and

2. The information contained in the Periodic Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

IN WITNESS WHEREOF, the undersigned have set their hands hereto as of the 20th day of February, 2020.

/s/ Matthew Calkins	/s/ Mark Lynch
Matthew Calkins	Mark Lynch
Chief Executive Officer (principal executive officer)	Chief Financial Officer (principal financial officer)

* This certification accompanies the Form 10-K to which it relates, is not deemed filed with the Securities and Exchange Commission and is not to be incorporated by reference into any filing of the Company under the Securities Act of 1933, as amended, or the Exchange Act (whether made before or after the date of the Form 10-K), irrespective of any general incorporation language contained in such filing.