2021

Annual Report

39%
Cloud subscription revenue growth

38%
Total Remaining Performance Obligation (RPO) growth

116%
Cloud subscription revenue retention

90%
Subscriptions gross margin

Appian Shareholders,

I remember the first time Appian did $1 million of business in a single quarter. We were a bootstrapped startup running out of my basement and crossing the million-dollar threshold felt great. It was a validation, but more importantly a promise of future potential. We'd found our feet and now we had time to grow. I had a glimpse of the same feeling when we finished last year with our first quarter above $100 million.

It seemed a good time to bring our investors up to date on the inner workings of the business. We opened the vault and presented a trove of data about our operations and usage. We showed our acceleration in critical revenue metrics. We were proud to note that in 2021 our customers ran 4.5 billion workflows and logged into our system 64 million times (a growth of 81% and 45% over the previous year, respectively).

Technology businesses spend their first years developing one feature and hoping that feature will prove valuable enough to build a market. If they're successful, then someday the market will be mature enough for the buyers to redefine it. When buyers take over, they prioritize the ends over the means, the effects over the features, and unity over the fragmentation that promoted experimentation and innovation. Buyers don't ask 'What does it do?', they ask 'What is it for?'.

In this way, our maturing industry is being redefined by our buyers. No longer can software companies compete as silo-champions, whether in workflow, RPA, or process mining. Buyers expect a unified answer to a pressing problem: keeping up with change.

The pandemic taught businesses the value of agility. Organizations that could rapidly create new processes fared better than those that could not. Buyers need software that makes change as easy as possible.

Appian responded by assembling a united suite of functionality that I call a 'change engine'. We added automation (including RPA) and process mining to our core workflow functionality. For each of these components, we maintained Appian's commitment to high performance, low-code ease-of-use, and tight integration. Now our customers can discover, design, and automate their processes, all in the same environment.

We've set a new standard for how easy it can be to create and change processes. This innovation will deliver benefits to all parties involved in low-code: customers will achieve greater agility, developers greater productivity, and non-developers greater empowerment. We are all developers, in that we all create instructions and cooperate with machines, and Appian continues to make development more accessible to nontechnical employees.

The end of the pandemic won't return us to old patterns but open a new set of challenges for buyers and vendors alike. Digital coordination is more essential than ever, to unite our dispersed employees and customers. There is less distinction now between employees and members of a corporate ecosystem (like partners and customers). Most of all, change will continue, and the ability to adapt to change will be as important as it has ever been. Appian's 'change engine' will serve a vital role in keeping organizations cohesive and modern.

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, 2021
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 **McLean, VA**	**22102**
(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 has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☒

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 30, 2021, 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 $3,295.8 million and $280.2 million, respectively, based on a closing price of $137.75 per share of the registrant's Class A common stock as reported on The Nasdaq Global Market on June 30, 2021. 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, 2022, there were 40,735,605 shares of the registrant's Class A common stock and 31,497,796 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 2022 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, forward-looking statements can be identified 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;
- The anticipated expansion of the usage of partners to perform professional services;
- Uncertain impacts the COVID-19 pandemic, including the emergence of new variant strains of COVID-19, may have on our business, financial condition, results of operations, and changes in the overall level of spending and volatility in the global economy;
- 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, research and development expenses, and general and administrative expenses will continue to increase in absolute dollar values;
- The fluctuation of subscriptions gross margin and professional services gross margin over time;
- 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.

Risk Factors Summary

The risk factors summarized below could materially harm our business, operating results, and/or financial condition, impair our future prospects, and/or cause the price of our common stock to decline. These risks are discussed more fully in the section titled “Risk Factors”. Material risks that may affect our business, financial condition, results of operations, and trading price of our Class A common stock include, but are not necessarily limited to, the following:

- 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.
- If we are unable to sustain our revenue growth rate, we may not achieve or maintain profitability in the future.
- 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.
- We are dependent on a single product, and the lack of continued market acceptance of our platform could cause our operating results to suffer.
- 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 currently face significant competition.
- If our security measures are actually or perceived to have been 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.
- 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.
- We rely on the performance of highly skilled personnel, including senior management and our engineering, professional services, sales, and technology professionals.
- 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.
- We are substantially dependent upon customer renewals, the addition of new customers, and the continued growth of our subscriptions revenue.
- 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 rely upon Amazon Web Services, or AWS, to operate our cloud offering; any disruption of or interference with our use of AWS would adversely affect our business, results of operations, and financial condition.
- 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.
- 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.
- 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.

- 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.
- We are subject to anti-corruption laws with respect to our domestic and international operations.
- 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.
- Any failure to protect our proprietary technology and intellectual property rights could substantially harm our business and operating results.
- 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.
- If our estimates or judgments relating to our critical accounting policies prove to be incorrect, our results of operations could be adversely affected.
- Our ability to use net operating losses to offset future taxable income may be subject to certain limitations.
- 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.
- 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.
- The effects of national and global epidemics, including the ongoing COVID-19 pandemic, could have an adverse impact on our business, operations, and the markets and communities in which we operate.
- Our stock price may be volatile, and you may lose some or all of your investment.

Item 1. Business.

Overview

Appian Corporation (together with its subsidiaries, “Appian,” “the Company,” “we,” or “our”) provides a low-code platform that accelerates the creation of high-impact business applications and workflows, 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.

The Appian Low-Code Platform unifies the key capabilities needed by enterprises to build mission-critical business applications: process mining, workflow, and automation. With our platform, organizations can rapidly and easily discover, design, and automate powerful, enterprise-grade workflows and custom applications through our intuitive, visual interface with little or no coding required. Our customers have used workflows and 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 by leveraging software to automate and optimize mission critical operations, enhance customer experiences, and drive competitive differentiation. Historically, organizations have principally relied on off-the-shelf packaged software and custom software solutions to operationalize and automate their businesses. Packaged software often fails to address unique use cases or to enable differentiation. It also requires organizations to adapt their business (processes, systems of record, etc.) to the software package, as opposed to adapting the software to their unique business needs. 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 that relies on scarce developer talent.

We enable organizations to differentiate themselves from their competition through software-enabled digital transformation. Our low-code 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, workflows, data structures, reports, user interfaces, and other software elements that would otherwise need to be manually coded. This functionality greatly reduces the iterative development process, allowing for real-time optimization and ultimately shortening the time it takes to design, build, and deploy applications. Our customers take advantage of our process mining, industry-leading workflow engine, dynamic case management, and complete automation capabilities, which include our rules engine, native Robotic Process Automation, or RPA, native Intelligent Document Processing, or IDP, artificial intelligence, or AI, and Smart Services. Our customers can leverage these technologies to apply the right automation approach for their specific use case.

We believe our unified low-code platform is a differentiator in the marketplace. We strive to deeply integrate our capabilities so that they are all interoperable and low-code. The result is a unified platform that makes it easier and faster to address complex use cases, particularly those that involve multiple departments within an organization. Process mining enables customers to discover processes and identify those that can be optimized. We expect this to expand customers’ use of our platform as they look to build, automate, and optimize such processes. We expect this new capability will allow us to upsell existing customers and accelerate deals.

Our go-to-market strategy consists of both direct sales and 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 our applications or increasing the number of applications developed on our platform. Strategic partners work with organizations undergoing digital transformations projects and, when these partners recognize an opportunity for our platform, they often introduce us to potential customers.

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 or through non-user based single application licenses. Every additional application an organization creates on our platform increases the value of our platform for that organization because it further integrates people, processes, and data across the organization and facilitates knowledge sharing. At the same time, our industry-leading Customer Success 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 $369.3 million, $304.6 million, and $260.4 million in 2021, 2020, and 2019, respectively. Our subscriptions revenue was $263.7 million, $198.7 million, and $151.3 million in 2021, 2020, and 2019, respectively, and includes sales of our software-as-a-service, or SaaS, subscriptions, on-premises term license subscriptions, and maintenance and support. SaaS subscription revenue, which is also referred to as cloud subscription revenue, was $179.4 million, $129.2 million, and $95.0 million in 2021, 2020, and 2019, respectively, representing year-over-year growth rates of 39% from 2020 to 2021 and 36% from 2019 to 2020. Our professional services revenue, which is generated by our Customer Success organization, was $105.5 million, $105.9 million, and $109.1 million in 2021, 2020, and 2019, respectively. Over time, as the need for implementation 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. Further, as the usage of partners expands, we expect the proportion of our total revenue from subscriptions to increase over time.

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 $88.6 million, $33.5 million, and $50.7 million in 2021, 2020, and 2019, respectively. We also used cash in operations of $53.9 million, $7.6 million, and $8.9 million in 2021, 2020, and 2019, respectively.

Recent Developments

COVID-19

Beginning in late 2019 and continuing into 2022, the outbreak of the novel coronavirus disease, or COVID-19, has resulted in the declaration of a global pandemic and adversely affected economic activity across virtually all sectors and industries on a local, national, and global scale. The impact of the COVID-19 pandemic on the economy and our business continues to be a dynamic situation.

Operationally, we remain focused on supporting our customers, employees, and communities during this time. We have responded quickly to adopt a virtual corporate strategy consisting of enabling most of our employees to work productively from home while continuing to guard the health and safety of our teams, support our customers, and mitigate risk. In the third quarter of 2021, we announced an option allowing for our employees to return to offices in select jurisdictions if they elect to do so. We remain focused on ensuring continuity for our customers, and we continue to conduct business as usual, with necessary or advisable modifications to employee travel, employee work locations, and marketing events. Refer to Part II, Item 7, “Management's Discussion and Analysis of Financial Condition and Results of Operations” of this Annual Report on Form 10-K for further discussion regarding the impact of the COVID-19 pandemic on our fiscal year 2021 financial results.

Through December 31, 2021, we have not seen a meaningful adverse impact to our financial position, results of operations, and cash flows and liquidity as a result of COVID-19. While the verticals from which we have historically generated the majority of our revenue have been less impacted by COVID-19 to date, there may be impacts to our financial condition and results of operations in 2022 and beyond as a result of reduced demand for our products and services and longer sales cycles. The ultimate impact of COVID-19 on our business is not estimable at this time and will be largely dependent upon a number of factors outside of our control including the extent and duration of the outbreak as well as any mitigating actions which may be undertaken by global governments and the general public.

Benefits of Our Platform

We enable organizations to stay ahead of change. We accelerate customers’ businesses by discovering, designing, and automating the workflows and processes to help them most differentiate their products and services from their competition. The combination of workflow, automation, and process mining in a unified platform enables us to take customers from insight to action quickly and efficiently. Our platform has always delivered speed and agility, and our words are backed by our commitments. The Appian Guarantee delivers a customer’s first application project in 8 weeks with a flat service fee, and the

Low-code Promise states customers can build apps at least 10x faster, reduce costs by 50%, and gain superior functionality as compared to traditional development. The result empowers organizations to stay ahead of change, outpace their competition, and drive meaningful digital transformation.

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, optimize supply chain logistics, 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, workflows, data structures, reports, user interfaces, 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 optimization and ultimately shortening the time it takes to design, build, and deploy applications. 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 cost or 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 all users benefit from the most up-to-date functionality.
- ***Integrated process mining.*** Other low-code platforms do not offer process mining integrated into their platform but rather provide a standalone acquired product or have process mining available through a partnership as a standalone tool. Integrating it into our platform alongside workflow and automation delivers significant additional value by reducing the number of steps and time from insight to action. It can be applied to discover processes as well as to optimize existing ones.
- ***Automate with one platform.*** Our complete automation capabilities allow companies to combine people, systems, and data in a seamless workflow to quickly deliver meaningful business impact. Our automation capabilities are not limited to one technology but to a set of unified, native technologies enabling customers to use the right one(s) for the job. Our low-code RPA automates the routine tasks across legacy and modern systems, increasing efficiency and providing even more value to the customer. Smart Services also automate common business activities, such as sending e-mail and generating documents. They are also drag-and-drop, more resilient than RPA, and do not require dedicated hardware. AI boosts business outcomes by making the applications intelligent, including intelligent document processing. Business rules allow for complex decision logic to free up people for other activities.
- ***Seamless integration with existing systems and data.*** In contrast to typical enterprise software, our platform does not require data to reside within it in order to enable robust data analysis or cross-department and cross-application insight. Customers can access and orchestrate data from internal and external sources without needing to migrate data. This reduces data migration complexity and time to value. 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. We also integrate data without coding; however, since accessing data is only as good as the associated performance, we take the extra step of automatically performance-tuning data, saving time and resources.

- ***Deployment flexibility to serve customer needs.*** Our platform can be accessed from Appian Cloud or self-managed in any cloud or on-premises. 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 to achieve Federal Risk and Authorization Management Program, or FedRAMP, compliance. Further, we were among the first RPA vendors to have its RPA cloud components FedRAMP certified. Finally, our low-code platform is one of the first to receive a Provisional Authorization at Impact Level 5, allowing our Department of Defense customers to build, deploy, and manage complex workflows with the security they need. Our platform is also certified under the Payment Card Industry Data Security Standard, or PCI DSS, and meets all requirements under the HITRUST Common Security Framework, or CSF. To protect personal health information, our platform is U.S. Health Insurance Portability and Accountability Act, or HIPAA, compliant and enables General Data Protection Regulation, or GDPR, compliance. Our controls are documented through our SOC 2 Type II report and ISO 27001/27017/27018 certifications, in which independent audit firms provide detailed reviews of Appian Cloud's security, availability, and confidentiality controls. We also possess both a SOC 1 Type II report and a SOC 3 report, as well as regional certifications including UK G-Cloud, UK Cyber Essentials, and Spain's Esquema Nacional de Seguridad (ENS).
- ***Governance capabilities.*** We deliver the guardrails that CIOs of enterprise organizations need to have full visibility and control over their systems. Our strong governance capabilities enable us to excel in regulated markets such as financial services, public sector, and life sciences.
- ***Open platform giving customers choice.*** We respect the technology decisions organizations have made and empower them to leverage their existing investments with us. For example, customers can leverage Appian RPA or orchestrate any third-party bot from a major RPA vendor within our platform. Working with the customer's current information systems allows our customers to obtain value from their initial Appian deployments quickly before migrating additional workloads to our platform over time.
- ***Access to Appian's market.*** We host a robust AppMarket that partners and customers use and contribute to, enabling everyone to accelerate their application development. Organizations can select from hundreds of secure plug-ins, utilities, and more.

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.*** We continue to grow our customer base in a variety of industries, including financial services, government, life sciences, insurance, manufacturing, energy, healthcare, telecommunications, and transportation. We believe the market for our low-code platform is still in its early stages, and we have a significant opportunity to add additional large enterprise and government customers globally. We offer the Appian Community Edition, which is a free trial platform with guided learning for our prospects and customers to quickly access the Appian low-code platform for up to 25 users. Once prospects or customers decide to move forward from trial to transaction, they can transfer from Appian Community Edition over to a production environment with a seamless export, making it easy to do business and transact with Appian.
- ***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 or through non-user based single application licenses. Every additional application 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 a substantial incentive for customers to avoid the difficulties and costs associated with moving 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, government, and life sciences. In 2021, we generated over 71% of our subscriptions revenue from customers in these verticals. We believe 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 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 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 and our partners offer pre-built solutions in our key industries. Every Appian solution is built on our platform so they are fully standardized, upgradeable, and compatible.
- ***Expand our international footprint.*** Our platform is designed to be natively multilingual to facilitate collaboration and address challenges in multinational organizations. In 2021, approximately 34% of our total revenue was generated from customers outside of the United States. As of December 31, 2021, we operated in 13 countries and believe 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, Accenture, PwC, Infosys, Wipro, and Deloitte. These partners work with organizations undergoing digital transformation projects and, when these partners recognize an opportunity for our platform, they often introduce us to potential customers. Additionally, they also leverage pre-built solutions using our platform, delivering us software license revenue. We intend to further grow our base of partners to provide broader customer coverage and solution delivery capabilities.

Industry and 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, and International Data Corporation, or IDC. 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 we caution readers 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.

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Our Opportunity

We believe we have a significant market opportunity in helping organizations accelerate their digital transformation by leveraging our low-code platform. We believe our platform addresses several key core software markets, as follows:

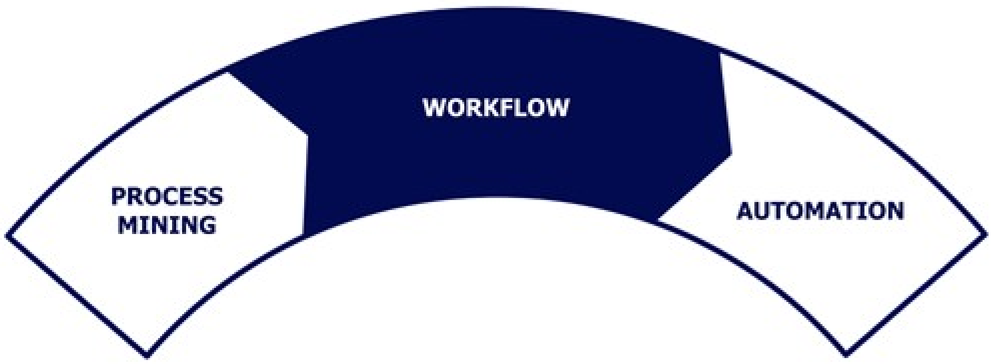
- ***Low-Code.*** According to Gartner, spending on low-code development technologies (excluding RPA) is expected to grow from $9.6 billion in 2020 to $24.7 billion by 2025, at a CAGR of 21%.[1]
- ***Intelligent Process Automation.*** According to IDC, the market for worldwide IPA software is forecasted to grow from $16.9 billion in 2020 to $42.4 billion by 2025, at a CAGR of 20%. The market for worldwide IPA software (excluding RPA and Process Mining) is forecasted to grow from $15.0 billion in 2020 to $31.6 billion by 2025, at a CAGR of 16%.[2]
- ***Artificial Intelligence Software.*** According to a report by Forrester, the Global AI Software market (excluding AI maker platforms) is forecasted to grow from $12.5 billion in 2020 to $23.3 billion by 2025, at a CAGR of 13%.[3]
- ***Robotic Process Automation.*** According to IDC, the market for RPA (Cloud) is expected to grow from $57 million in 2020 to $3.2 billion by 2025, at a CAGR of 123%.[4]
- ***Process Mining.*** According to Gartner, the market for Process Mining is expected to grow from $550 million in 2020 to $2.3 billion by 2025, at a CAGR of 33%.[5]

Taken together, the market opportunity of these current core software markets represents a combined $37.7 billion in 2020 and is expected to grow to $85 billion by 2025, at a CAGR of 18%.

- ***Traditional custom enterprise software market.*** In addition to our current core software markets, we believe our platform better addresses certain needs of enterprise companies that have historically used manually-developed custom software. According to Gartner, the worldwide enterprise application software market (in constant currency terms) will grow from $273.4 billion in 2021 to $424.0 billion by 2025, at a CAGR of 11.6%.[6]
- ***Our internal estimate.*** Based on approximately 195,000 global companies and government institutions in relevant industries and revenue-based size segments as well as our industry- and size-specific average annual recurring revenue for customers as of December 31, 2021, we internally estimate our market opportunity to have been approximately $49.3 billion in 2021. 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, 2021 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 Analysis: Low-Code Deployment Technologies, 22 January 2022
[2] Worldwide Intelligent Process Automation Software Forecast, 2021-2025, Maureen Fleming, July 2021
[3] The AI Software Market Will Grow to $37 Billion Globally by 2025, Forrester, December 10, 2020
[4] Worldwide Intelligent Process Automation Software Forecast, 2021-2025, Maureen Fleming, July 2021
[5] Gartner, Forecast Analysis: Process Mining, Worldwide, 26 October 2021
[6] Gartner, Forecast: Enterprise Application Software, Worldwide, 2019-2025, 4Q21 Update, 21 December 2021

Our Low-code Platform



With our low-code platform, organizations can rapidly and easily discover, design, and automate powerful, enterprise-grade 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 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 the key elements of our technology infrastructure are as follows:

Unified Offering

Our heritage as a BPM company provides us with a differentiated understanding and ability to discover, design, and automate complex processes. We have incorporated that expertise into our platform to enable the development of powerful business software.

Workflow

At the core of our platform is an advanced engine that enables the modeling, modification, and management of complex processes. Appian combines people, technologies, and data into a single workflow to maximize resources and improve business results. Workflow can include any worker (people or digital workers) or any resource (data and system). Workflow serves as the bridge between process mining and automation, and we believe starting with it at the core gives us an immediate competitive advantage.

Automation

Our complete automation capabilities allow companies to combine people, systems, and data in a seamless workflow to quickly deliver meaningful business impact. Our automation capabilities are not limited to one technology but to a set of unified, native technologies enabling customers to use the right one for the job.

- ***Robotic Process Automation.*** Appian includes native software robots which can be used to execute simple repetitive tasks, reducing the human burden of that work. These robots facilitate integration with legacy systems that do not offer modern APIs.
- ***Intelligent Document Processing.*** Appian includes native IDP, which automatically extracts structured and unstructured data from digital forms such as invoices and classifies it using AI. The out-of-the-box application does not require the use of time consuming templates and continuously improves accuracy with AI that learns from human corrections.

- ***Artificial Intelligence.*** Appian includes a range of native and third party AI capabilities. These capabilities include native intelligent document processing as well as sentiment analysis, translation, and document and image analysis. Appian also allows customers to integrate with their preferred AI provider using our zero-code connectors.
- ***Case Management.*** Appian dynamic case management enables automation of many of the most common patterns of collaborative human work such as service management, incident management, and investigations.
- ***Business Rules.*** Appian includes a declarative environment for defining and executing business logic or rules. These rules can be highly complex and applied within the Appian platform to many use cases, ranging from automated decision making to user experience personalization.

Process Mining

Appian Process Mining discovers how to reduce costs, increase efficiency, and optimize processes. Appian removes the single largest friction point in process mining, enabling customers to spend more time improving and automating workflows. Appian Process Mining features a no-code module that simplifies the preparation and transformation of enterprise data. Pre-built process packages with mapping and dashboards also accelerate process mining time-to-value.

Appian combines the power of process mining, workflow, and automation into a unified, low-code platform. Our platform has the complete automation capabilities to fuel enterprise-wide workflows and the ability to scale with an organization's growth through performance, governance, and security. Our complete automation offering is core to unlocking business results for organizations by bringing people, technologies, and data into a single workflow along with the development speed to keep organizations agile.

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 serves as an administration utility for managing people, processes, and data.

The Appian design repository incorporates design and DevOps 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.

Our platform guides developers through the necessary steps to create the foundation elements of reusable interfaces, records, and business processes, while providing all the power developers need to design, build, and implement enterprise systems at scale.

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, as well as 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 users expect. Updates to applications developed with SAIL are automatically disseminated across device types to ensure all users benefit from the most up-to-date functionality. This approach enables enterprise mobility without the extensive time and resources other development approaches require.

We believe 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.

User Interfaces for All

Our platform allows our customers to easily build the user experiences they need to serve their employees and customers best, including:

- ***Unified employee interface.*** 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.

- ***Customer experience.*** Appian Portals securely connects external users to apps without authentication. It allows users to quickly build public websites connected to their apps using low-code in a way that is easy to scale and manage.

- ***Mobile.*** Automatic mobile experiences, including dynamic offline capabilities, enable workers to continue using their mobile applications even when offline.

Low-Code Data

Appian Low-Code Data 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 data to 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 decide which existing data sources within the enterprise they want to capture. Appian Low-Code Data gives users an immediate snapshot of all centralized data relating to common business activities such as customer, product, employee, or service requests. Appian 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.

Technology

We designed our platform to support large global enterprises and government organizations at scale, in the cloud or self-hosted. We design, 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 62 availability zones in 21 geographic regions. 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 belonging to both our customers and us.

Customer Success

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

Our focus on customer success creates happy customers. Appian was named a Customers' Choice in the 2021 Gartner Peer Insights™ 'Voice of the Customer': Enterprise Low-Code Application Platforms. The report recognizes vendors that are highly rated by their customers through Gartner Peer Insights verified reviews. Appian was the sole Customers' Choice for the Global Enterprise ($10B+), Large Enterprise ($1-10B), North America, and Finance categories.

When we first acquire a new customer, our professional services experts or our partners' professional services experts start the implementation process. Specialists facilitate deployment of our platform, and training personnel provide comprehensive support throughout the implementation process. Customers have access to our Appian Academy, which trains analysts and developers of different skill sets on our platform. We also provide instructor-led courses globally, delivered either virtually or in-person.

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 teams also assist customers by building applications on our platform for them.

Over time, we expect professional services revenue as a percentage of total revenue to continue 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 e-mail and phone support via 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, life sciences, insurance, manufacturing, energy, healthcare, telecommunications, and transportation. As of December 31, 2021, we had 816 customers, of which 635 customers were commercial and 181 customers were government or non-commercial entities. Generally, our sales team 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 55 at the end of 2020 to 75 at the end of 2021. As of December 31, 2021, 25% of our commercial customers were Global 2000 organizations, and 68 of our customers were Fortune 500 companies. No single end-customer accounted for more than 10% of our total revenue in 2021, 2020, or 2019.

Human Capital Resources and Management

Employees, Culture, and Labor Relations

Our distinct culture of innovation is an important contributor to our success as a company. We promote an inclusive environment where our employees can thrive every day and contribute their unique, diverse perspectives to help create transformative solutions for our customers. Our culture was purposefully cultivated by our four founders, who are still heavily involved in operating our business, including recruiting, interviewing, and educating new employees at Appian. Led by Matt Calkins, one of our founders and our Chief Executive Officer, we have grown our business organically by employing a unified team to maximize the cohesion and simplicity of our platform and our company.

As of December 31, 2021, we had a total global workforce of 1,798 full-time employees, 1,334 of which were based in the United States. 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. Additionally, we are subject to, and comply with, local labor law requirements in all countries in which we operate.

Talent Acquisition and Development

We have a robust talent acquisition program to attract, recruit, and retain new talent. We utilize an extensive campus recruiting program, provide for an employee referral program, offer opportunities for internal transfers, and offer competitive compensation and benefits programs. We also provide a variety of resources to help our employees grow in their current roles and build new skills, including access to Appian University, a system that houses Appian's in-house learning and development solutions.

Inclusion and Diversity

We believe employee diversity and an inclusive environment are paramount to our continued success, as our individual styles of communication, management, and problem-solving enable us to learn from one another and discover creative solutions. We sponsor a number of affinity groups, initiated by employees, that aim to build stronger internal and external networks and partnerships, create a positive lasting impact through social and educational outreach and other activities, and create development opportunities for future leaders.

Our Competition

Our main competitors fall into three categories: (1) 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; (2) providers of low-code development platforms, such as Microsoft, Salesforce.com, ServiceNow, OutSystems, and Mendix; and (3) providers of one or more automation technologies, including business process management, case management, process mining, and robotic process automation. Such providers include Pegasystems, Celonis, UiPath, IBM, ServiceNow, Microsoft, SAP, Bizagi, Oracle, and Nintex.

As our market grows, we expect 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 peer group 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.

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 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. However, this decline will negatively affect our revenue in future periods. Accordingly, the effect of significant downturns in sales, 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, we may experience greater variability and reduced comparability of our quarterly revenue and results due to the upfront revenue recognition associated with our term license subscription agreements.

Sales and Marketing

Sales

Our sales organization is responsible for account acquisition and overall market development, which includes managing relationships with our customers. We also sell our software through our strategic partners. 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, government, and life sciences. We 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. We also intend to further grow our base of partners to provide broader customer coverage and solution delivery capabilities.

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 website and partner portal, press outreach, and customer relations. In response to the COVID-19 pandemic, we reduced the number of in-person marketing events, including shifting Appian World to virtual-only in 2020 and 2021.

Partner Strategy

We have a strong and growing ecosystem of partners that helps accelerate our customers' digital transformation initiatives and deliver customer value at scale. Our workflow, broader automation, and discovery capabilities paired with our partners' industry and functional domain experience help companies digitally transform their business. Partners also help us to offer industry-focused solutions as we help companies drive new approaches in engaging their end users and employees.

We have many strategic partnerships around the world including with companies such as KPMG, Accenture, PwC, Infosys, Wipro, and Deloitte. 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 we sell.

We are also growing our network of regional and channel partners to further expand our business into traditional and new markets. These partners provide delivery services, sales and marketing capabilities, and contract fulfillment.

Intellectual Property

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

As of December 31, 2021, we had six granted patents, two allowed patents, and four patents pending related to our platform and its technology. None of our issued patents expire before 2034. We cannot provide complete assurance 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 we may be issued 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

As of December 31, 2021, we leased our headquarters office in McLean, Virginia and offices in six cities outside the United States. In addition to our leased offices, we occupied three flexible workspaces outside of the United States. In 2021, as part of our response to the COVID-19 pandemic, we reduced the number of offices we occupied as we shifted to largely remote work. Our use of flexible workspaces is dependent upon our current business needs. We believe our facilities are adequate to meet our ongoing needs, including substantial rights to expand within certain properties we lease. If we require additional space in the future, we believe we will be able to obtain additional facilities on commercially reasonable terms.

Corporate Information

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, McLean, 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 exclude 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. We have also significantly increased the size of our customer base over the last several years. We anticipate 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.

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 $369.3 million, $304.6 million, and $260.4 million in 2021, 2020, and 2019, 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 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 we serve and expand into other industry verticals; and
- Continue to successfully expand our business domestically and internationally.

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. Our revenue for any prior quarterly or annual periods should not be relied upon 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 operations as well as grow our partner services systems, including our Customer Success 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, any of 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 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 we will be substantially dependent on our platform to generate revenue for the foreseeable future. As a result, our operating results or revenue growth rates could suffer due to:

- Any decline or lower than expected growth 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;
- The inability to further penetrate our existing industry verticals or expand our customer base; and
- Our inability to release enhanced versions of our platform on a timely basis.

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 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, and it is difficult to predict if or when we will make a sale to a potential customer. We may spend substantial time, effort, and money on our sales and marketing efforts without any assurance our efforts will result in revenue. 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 because a substantial portion of our expenses are relatively fixed in the short-term. 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.

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. 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 these 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 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 the following: 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.

Our main competitors fall into three categories: (1) 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; (2) providers of low-code development platforms such as Microsoft, Salesforce.com, ServiceNow, OutSystems, and Mendix; and (3) providers of one or more automation technologies, including BPM, case management, process mining, and RPA. Such providers include Pegasystems, Celonis, UiPath, IBM, ServiceNow, Microsoft, SAP, Bizagi, Oracle, and Nintex.

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.

If our security measures are actually or perceived to have been 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 incidents 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 these measures will be effective in protecting against malicious unauthorized access to our platform or our customers' information. Similarly, if cyber incidents such as phishing attacks, viruses, denial of service attacks, supply chain attacks, malware installation, ransomware attacks, 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, while security tested and techniques are in place and tested by third parties, 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 provide assurance 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, 2021, 2020, and 2019, revenue from U.S. federal government agencies represented 19.6%, 18.1%, and 17.1% of our total revenue, respectively, and the top three U.S. federal government customers generated 5.6%, 6.6%, and 7.4% of our total revenue for the years ended December 31, 2021, 2020, and 2019, respectively. Further, nearly 10% of our subscription customers spent more than $1 million on our software in 2021. 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.

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, insurance, life sciences, and healthcare 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 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 impose compliance requirements that are complicated, make pricing readily available subject continued business to unpredictable competitive processes, 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 $88.6 million, $33.5 million, and $50.7 million in 2021, 2020, and 2019, respectively. As of December 31, 2021, we had an accumulated deficit of $257.5 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 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 team;
- Unforeseen litigation and intellectual property infringement;
- Any changes in accounting principles generally accepted in the United States, or GAAP;
- 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 quarter-to-quarter comparisons of our revenue, results of operations, and cash flows may not necessarily be indicative of our future performance, may cause us to miss our guidance or 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 we recognize cloud subscription revenue over the term of the subscription agreement, which is generally one to three years. We expect 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 may fail to meet our publicly announced guidance or other expectations about our business and future operating results, which could cause our stock price to decline.

We have provided and may continue to provide guidance about our business, future operating results, and other business metrics. In developing this guidance, our management must make certain assumptions and judgments about our future performance. Some of those key assumptions relate to the impact of the COVID-19 pandemic and the associated economic uncertainty on our business and the timing and scope of economic recovery globally, which are inherently difficult to predict. Furthermore, analysts and investors may develop and publish their own projections of our business, which may form a consensus about our future performance. Our business results may vary significantly from such guidance or that consensus due to a number of factors, many of which are outside of our control, including due to the global economic uncertainty and financial market conditions caused by the COVID-19 pandemic, which could adversely affect our operations and operating results. Furthermore, if our publicly announced guidance of future operating results fails to meet our previously announced guidance or the expectations of securities analysts, investors, or other interested parties, the price of our common stock would decline.

If we are unable to successfully transition to new leadership in key departments, our results could suffer.

Appian has undergone change in departments directly responsible for substantially all of Appian's revenue. While Appian believes its new leaders in these departments are highly qualified and will perform well in their roles, there can be no assurances the transition to new leadership will be executed without any disruption or effect on performance. New leadership requires time to become familiar with Appian's product offerings and its customer base, and such transition could lead to delayed implementation of strategies, revision of key practices and policies, re-training of personnel, and other disruptions.

While we will make efforts to mitigate such risk through extensive collaboration at the executive level, the effects of this transition could have an impact on our ability to sustain our growth in revenue or our ability to retain existing talent within the organization.

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 they could terminate their employment with us at any time. On December 1, 2021, Mark Lynch, our Chief Financial Officer, notified us he plans to retire after he has successfully transitioned his responsibilities to his successor. We are in the process of identifying Mr. Lynch’s successor.

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 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 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. There is currently additional volatility in the job market known as the "great resignation," with a record number of employees choosing alternative career paths or companies, or leaving the job market altogether. 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.

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, 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. We must continue to invest significant resources in research and development in order to continually improve the speed 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 or through non-user based single application licenses. We have changed and expect 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.

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 we provide for our platform, and the professional services 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.

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 2021, 2020, and 2019, approximately 71.4%, 65.2%, and 58.1%, 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 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 provide assurance 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 we report in each quarter is derived from the recognition of previously unbilled or deferred 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.

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

We believe 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 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, security, or other conditions 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 or 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 we collect and manage, it is possible hardware failures or errors in our systems could result in data loss or corruption or cause the information we collect to be incomplete or contain inaccuracies 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, our customers' increased usage of our cloud offering, 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, or 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.

We rely upon AWS to operate our cloud offering; any disruption of or interference with our use of AWS 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 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 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 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 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.

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

In order to grow our business, we anticipate 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 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 2021, 2020, and 2019, revenue generated from customers outside the United States was 34.0%, 33.8%, and 32.3%, respectively, of our total revenue. We currently operate in Canada, Switzerland, the United Kingdom, France, Germany, the Netherlands, Italy, Australia, Spain, Singapore, Sweden, and Japan. 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 any potential future expansion efforts 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 revolving 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 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. 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 any solution will become the source of material revenue, and the investment in the solution may not produce a positive return. If unsuccessful, such solutions may adversely impact our financial results to the extent our expenses increase without any increase in sales or to the extent that attempted sales of such solutions reduce sales of our existing platform.

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 revenue 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 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 we will continue to rely on such third-party software and development tools from third parties in the future. Although we believe 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, or result in a failure of our platform, injuring 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 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 our customers use, we may not be able to offer the functionality our customers need, which would negatively impact our ability to generate revenue and adversely impact our business.

Catastrophic events may disrupt our business.

Our corporate headquarters are located in northern Virginia. The area around Washington, D.C. could be subjected to domestic or foreign 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 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.

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 uncertainties surrounding the future of the Euro zone and the United Kingdom's relationship with 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.

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 August 2021, we acquired Lana Labs GmbH, or Lana Labs, a developer of process mining software, 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 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 we negotiate. Any unforeseen liability greater than these warranty and indemnity limitations could have a negative impact on our financial condition.

Risks Related to Regulatory Compliance and Governmental Matters

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 and security concerns could result in additional costs and liabilities to us or inhibit sales of our software and subject us to complex and evolving federal, state, and foreign laws and regulations regarding privacy, data protection, and other related matters.

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, all of which may be imposed on us by our customers. This could increase our costs of doing business. Further, the California Privacy Rights Act, or CPRA, once it becomes effective, will significantly modify the CCPA, including by expanding consumers' rights with respect to certain sensitive personal information. The CPRA also creates a new state agency that will be vested with authority to implement and enforce the CCPA and the CPRA. New legislation proposed or enacted in various other states will continue to shape the data privacy environment nationally. For example, Virginia passed the Consumer Data Protection Act, and Colorado passed the Colorado Privacy Act, both of which differ from the CPRA and become effective in 2023. Some of these state laws may be more stringent or broader in scope, or offer greater individual rights, with respect to confidential, sensitive, and personal information than federal, international, or other state laws, and such laws may differ from each other, which may complicate compliance efforts.

Internationally, the European Union adopted a comprehensive general data protection regulation, or the GDPR, which contains numerous requirements and changes related to rights of data subjects in their personal data, including more robust obligations on data processors and heavier documentation requirements for data protection compliance programs by companies. In addition, absent appropriate safeguards or other circumstances, the EU GDPR generally restricts the transfer of personal data to countries outside of the European Economic Area, or EEA, such as the United States, which the European Commission does not consider to provide an adequate level of data privacy and security. The European Commission released a set of "Standard Contractual Clauses" in June 2021 that are designed to be a valid mechanism by which entities can transfer personal data out of the EEA to jurisdictions that the European Commission has not found to provide an adequate level of protection. Currently, these new Standard Contractual Clauses are a valid mechanism to transfer personal data outside of the EEA. The new Standard Contractual Clauses, however, require parties that rely upon that legal mechanism to comply with additional obligations, such as conducting transfer impact assessments to determine whether additional security measures are necessary to protect the at-issue personal data. Moreover, due to potential legal challenges, there exists some uncertainty regarding whether the new Standard Contractual Clauses will remain a valid mechanism for transfers of personal data out of the EEA.

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. The effects of any of this legislation could be potentially far-reaching and may require us to modify our data management practices and to incur substantial expense in an effort to comply.

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 these laws and other actual or alleged legal obligations such as contractual or self-regulatory obligations may be interpreted and applied in a manner 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 or cybersecurity 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 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.

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, or FedRAMP, compliance and HITRUST certification. It also meets the ISO 27001, Payment Card Industry Data Security Standard, or PCI DSS, and the various United States Health Insurance Portability and Accountability Act, or 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.

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, or 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.

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 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 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.

Risks Related to Our Intellectual Property

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, 2021, we had six issued patents, two allowed patents, and four pending patent applications related to our platform and its technology. 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. We cannot provide assurance that any current or future applications for registrations for patent or trademark applications will result in the grant of any valid, enforceable intellectual property rights. Further, we cannot provide assurance that any granted patent or trademark will provide the protection we seek, will be valid if challenged, or will be sufficiently broad in actions against alleged infringers. Moreover, any of our granted intellectual property rights may be rendered invalid by future changes in the law, defects in our prosecution processes, or preexisting technology, rights, or marks.

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. 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 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 any such unauthorized use or disclosure.

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 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 the steps 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 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 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 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 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 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 our employees, contractors, or we ourselves have inadvertently or otherwise used or disclosed trade secrets or other proprietary information of our competitors or other parties. To the extent 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, expensive to settle or litigate, divert our management's attention and other resources, and 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. 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.

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 such open source software infringes the claimants' intellectual property rights. We could be subject to suits by parties claiming 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 source code for software programs 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 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 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.

Risks Related to Tax and Accounting Matters

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 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 as well as the amount of revenue and expenses. 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, impairment of goodwill and long-lived assets, and business combinations. 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.

Our operating results may be negatively affected by additional tax liabilities.

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 we owe such taxes, and therefore we currently do not collect and remit such taxes or record contingent tax liabilities in 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.

In addition, 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. Furthermore, the authorities in these jurisdictions could review our tax returns and impose additional tax, interest, and penalties, and the authorities could claim various withholding requirements apply to us or our subsidiaries or assert 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, 2021, we had gross U.S. federal and state net operating loss carryforwards, or NOLs, of $239.9 million and $249.8 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, as modified by the Coronavirus Aid, Relief, and Economic Security Act, or CARES Act, federal NOLs generated in tax years beginning after December 31, 2017 may be carried forward indefinitely but, in the case of tax years beginning after 2020, may only be used to offset 80% of our taxable income annually. 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, 2021, we have determined 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, 2021, we also had gross foreign NOLs of $126.6 million, primarily at our Swiss subsidiary, Appian Software International. These NOLs will begin to expire in 2022 to 2029, 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.

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 our internal control over financial reporting is effective. While we have established certain procedures and controls over our financial reporting processes, we cannot provide assurance 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 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.

Risks Related to 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 89% of the voting power of our outstanding capital stock as of December 31, 2021. 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, 2021. 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 25% 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 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 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.

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 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 a stockholder would receive a premium for its 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 the federal district courts of the United States of America will be the exclusive forum for resolving any complaint asserting a cause of action arising under the Securities Act. Our amended and restated certificate of incorporation further provides 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.

GENERAL RISK FACTORS

The effects of national and global epidemics, including the ongoing COVID-19 pandemic, could have an adverse impact on our business, operations, and the markets and communities in which we operate.

In March 2020, the World Health Organization declared the outbreak of COVID-19 a pandemic. Our business and operations could be adversely affected by national and global epidemics, including the ongoing COVID-19 pandemic, including the emergence of new variant strains, impacting the markets and communities in which we operate.

In response to the COVID-19 pandemic, many state, local, and foreign governments have put in place, and others in the future may put in place, quarantines, executive orders, shelter-in-place orders, and similar government orders and restrictions in order to control the spread of the disease. Such orders or restrictions, or the perception that such orders or restrictions could occur, have resulted in business closures, work stoppages, slowdowns and delays, work-from-home policies, and travel restrictions, among other effects that could negatively impact productivity and disrupt our operations. For example, we have implemented a flexible work-from-home policy for employees, and we may take further actions that alter our operations as may be required by federal, state, or local authorities or which we determine are in the best interests of our employees and stockholders.

In addition, while the potential impact and duration of the COVID-19 pandemic on the global economy and our business in particular may be difficult to assess or predict, the pandemic has resulted in, and may continue to result in, significant disruption of global financial markets, reducing our ability to access capital, which could in the future negatively affect our liquidity. The COVID-19 pandemic also could reduce the demand for our customers' products and services, which could negatively impact our customers' willingness to renew or enter into contracts with us or our ability to collect accounts receivable on a timely basis, which, if significant, could materially and adversely affect our business, results of operations, and financial condition.

The global pandemic of COVID-19 continues to rapidly evolve, and we will continue to monitor the COVID-19 situation closely. The ultimate impact of the COVID-19 pandemic or a similar health epidemic is highly uncertain and subject to change. We do not yet know the full extent of potential delays or impacts on our business, operations, or the global economy as a whole, which makes our future results difficult to predict. In addition, to the extent the ongoing COVID-19 pandemic adversely affects our business and results of operations, it may also have the effect of heightening many of the other risks and uncertainties described herein.

Unfavorable conditions in the global economy or the vertical markets we serve could limit our ability to grow our business and negatively affect our operating results.

General worldwide economic conditions have experienced significant instability due to the global economic uncertainty and financial market conditions caused by the COVID-19 pandemic. These conditions make it extremely difficult for customers and us to accurately forecast and plan future business activities and could cause customers to reduce or delay their software spending. For example, we believe there could be some short-term impact from the COVID-19 pandemic on spending by our customers. At this time, the potential impact on customer spend from the COVID-19 pandemic is difficult to predict and, therefore, it is not possible to fully determine the impact on our future results. Historically, economic downturns have resulted in overall reductions in software spending. If macroeconomic conditions deteriorate or are characterized by uncertainty or volatility, customers may curtail or freeze spending on software in general and for software such as ours specifically, which could have an adverse impact on our business, financial condition, and operating results.

We have historically generated a majority of our revenue from customers in the financial services, government, and life sciences verticals. While these verticals have not been affected as severely by weak economic conditions caused by COVID-19 as the retail, hospitality, and entertainment industries, we cannot provide assurance these verticals will not suffer more severe losses in the future. Furthermore, we cannot predict the timing, strength, or duration of any economic slowdown or recovery. In addition, even if the overall economy is robust, we cannot provide assurance the market for services such as ours will experience growth or that we will experience growth.

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 $260.00 through February 14, 2022. Factors that may affect the market price of our Class A common stock and our ability to raise capital through the sale of additional equity securities 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;
- Trading activity by one or both large stockholders who together owned approximately 29% of our publicly traded Class A common stock as of December 31, 2021;
- 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.

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 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.

Item 1B. Unresolved Staff Comments.

Not applicable.

Item 2. Properties.

As of December 31, 2021, our corporate headquarters occupies approximately 240,000 square feet in McLean, Virginia under an operating lease that expires in October 2031. We also lease space in the United Kingdom, Italy, Australia, and Spain under operating lease agreements with various expiration dates through 2026. In addition, we utilize flexible work spaces depending on the occupancy needs in each of the countries we operate in. We believe our facilities are suitable and adequate to meet our needs.

Item 3. Legal Proceedings.

Pegasystems Litigation

On May 29, 2020, we filed a civil complaint against Pegasystems, Inc. ("Pegasystems"), and Youyong Zou, a Virginia resident, in the Circuit Court for Fairfax County, Virginia, alleging claims for trade secret misappropriation, violation of the Virginia Computer Crimes Act ("VCCA"), tortious interference, and statutory business and common law conspiracy. *Appian Corp. v. Pegasystems Inc. & Youyong Zou,* No. 2020-07216 (Fairfax Cty. Ct.). As alleged in our complaint, the claims arose out of the efforts by Pegasystems to obtain and use our trade secrets through Zou, who worked on a federal program as an employee at Serco, Inc. ("Serco"), and had access to our software and documentation exclusively to work on Serco projects involving the federal government, as well as through Pegasystems' own employees representing themselves as potential customers or Appian partners rather than Pegasystems employees. The conspiracy claims were dismissed on January 13, 2022.

After fact discovery closed in early 2022, on January 31, 2022, the court held a seven-day plea in bar jury trial on Pegasystems' affirmative defense that we did not file our trade secret and VCCA claims within the relevant statute of limitation periods. At the conclusion of trial, the court ruled that, based on the evidence presented, there was no jury question and granted our motion to strike Pegasystems' plea in bar as to our trade secret misappropriation claim. The court granted Pegaystems' plea in bar only with respect to conduct relevant to the VCCA claim that occurred prior to May 29, 2015. As a result of the judge's order, we may proceed to a jury trial on the merits of our claims of trade secret misappropriation, violations of the VCCA after May 29, 2015, and tortious interference. The jury trial on our claims is set to commence on March 21, 2022. If Pegasystems is found liable on any of our claims, we may be entitled to an award of damages. Presently, we are seeking damages for unjust enrichment from Pegasystems over the period of 2012 through 2021, plus attorney's fees, interest, and other forms of monetary relief for Pegasystems' conduct. Litigation by its nature is highly uncertain, and we cannot predict the outcome of the trial. We believe we have a substantial chance of prevailing at trial and, if we did so, we could obtain a substantial award of damages from the jury, although a jury has a high degree of discretion to award an amount it deems just and appropriate. Any judgment in our favor would be subject to appeal, and therefore the timing and actual recovery of a damages award is subject to further uncertainty.

Separately, on July 3, 2019, Pegasystems filed a claim against us and BPM.com, Inc., a market analyst company, in U.S. District Court for the District of Massachusetts alleging, among other things, that we had engaged in false advertising by re-publishing a study by BPM.com comparing us favorably to Pegasystems and by failing to disclose we commissioned the study. *Pegasystems Inc. v. Appian Corp. & Business Process Management Inc.,* No. 1:19-cv-11461 (D. Mass). We have responded to Pegasystems' complaint denying Pegasystems' allegations and making certain affirmative defenses. We believe Pegasystems' claims are without merit, and we are engaged in vigorously defending against them. Our motion to dismiss Pegasystems' complaint was granted in part and denied in part on December 19, 2019. We have also filed counterclaims against Pegasystems for false advertising, alleging numerous marketing and advertising materials used by Pegasystems, including that a report purportedly authored by Jim Sinur, a former industry analyst, were false and/or misleading and, in the case of the Sinur report, Pegasystems failed to disclose that it had commissioned the report. We also made a claim for defamation against Pegasystems based on public statements by Pegasystems' executives. Pegasystems' motions to dismiss our counterclaims have been denied, except with respect to one marketing document.

At this point, no trial date has been scheduled in the Massachusetts case, expert discovery is ongoing, and the parties have not yet filed their motions for summary judgment. Pegasystems is seeking damages in the form of disgorgement of our profits related to the use of the BPM.com report. We do not believe we obtained any profits as a result of the BPM.com report. On our false advertising and defamation claims, we are seeking damages for both our own lost profits and disgorgement of Pegasystems' profits as measures of damages. Our claims for damages in this case exceed those of Pegasystems. Given the case is still in its preliminary stages and the inherent uncertainty of litigation, we are unable to assess the likelihood we will succeed in defending against Pegasystems' claims or prevailing on our own counterclaims or, further, the amount of damages either party might obtain if it receives a judgment in its favor. If we prevail on our counterclaims, and Pegasystems does not prevail on its claims, or we receive an award of damages in excess of the amount awarded to Pegasystems, Pegasystems could be liable to us for damages. Similarly, if Pegasystems prevails on its claims, and we do not prevail on our counterclaims, or we do not receive a substantial award of damages for our own counterclaims, we could be liable for damages to Pegasystems. Because the Massachusetts case is in an earlier stage, the Virginia case is likely to reach final judgment before the Massachusetts case.

Other Matters

From time to time, we may become involved in legal proceedings or be subject to claims arising in the ordinary course of our business. Other than as disclosed elsewhere in this Annual Report, 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, 2022, there were 17 holders of record of our Class A common stock and 35 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.

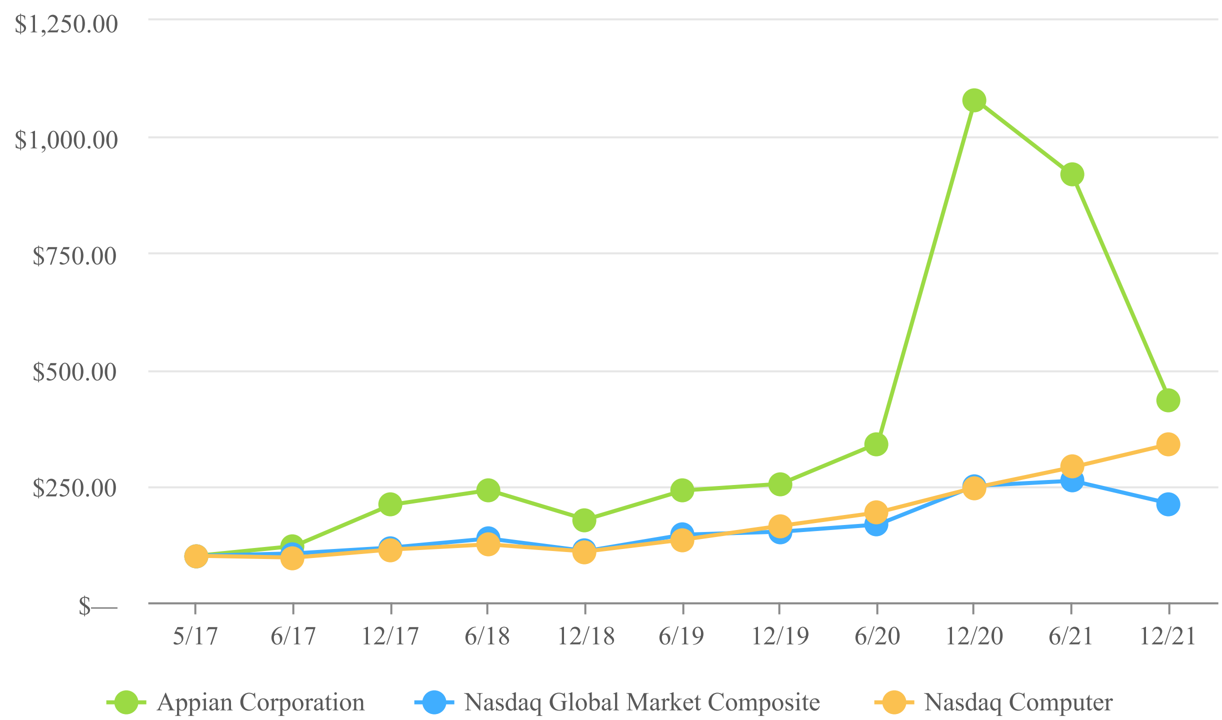
Stock Performance Graph

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, 2021, 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	December 31, 2017	June 30, 2018	December 31, 2018	June 30, 2019	December 31, 2019	June 30, 2020	December 31, 2020	June 30, 2021	December 31, 2021
Appian Corporation	$ 100.00	$ 120.92	$ 209.73	$ 240.91	$ 177.95	$ 240.31	$ 254.56	$ 341.44	$ 1,079.88	$ 917.72	$ 434.44
Nasdaq Global Market Composite	$ 100.00	$ 105.12	$ 117.68	$ 137.10	$ 110.09	$ 145.34	$ 151.77	$ 167.07	$ 250.25	$ 261.10	$ 212.30
Nasdaq Computer	$ 100.00	$ 96.18	$ 113.49	$ 124.53	$ 109.31	$ 134.76	$ 164.33	$ 193.05	$ 246.46	$ 290.25	$ 339.76

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

Period	Total number of shares purchased[1]	Average price paid per share	Total number of shares purchased as part of publicly announced plan	Maximum number of shares that may yet be purchased under the plan [2]
October 1 to October 31, 2021	3,234	$ 89.55	3,234	996,766
November 1 to November 30, 2021	4,943	$ 96.85	4,943	991,823
December 1 to December 31, 2021	5,423	$ 68.59	5,423	986,400
Total	13,600	$ 83.85	13,600	986,400

[1] Shares purchased represent shares purchased on the open market pursuant to the Appian Corporation Employee Stock Purchase Plan ("ESPP"), which was approved by the Company's stockholders on June 11, 2021. Shares purchased under the ESPP are deposited into the participants' accounts.

[2] Because the number of shares that may be purchased under the ESPP depends on each employee's voluntary election to participate and contribution elections and on the fair market value of our Class A Common Stock at various future dates, the actual number of shares that may be purchased under the plan cannot be determined in advance. We have filed a registration statement on S-8 that covers 1,000,000 shares.

Item 6. [Reserved]

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 platform that accelerates the creation of high-impact business applications and workflows, 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 discover, design, and automate powerful, enterprise-grade workflows and custom applications through our intuitive, visual interface with little or no coding required. Our customers have used workflows and 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 changes in our deferred revenue in a given period are directly correlated with our revenue growth.

Since inception, we have invested in our Customer Success organization to help ensure customers are able to build and deploy applications on our platform. We have several strategic partnerships, including with KPMG, Accenture, PwC, Infosys, Wipro, 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, 2021, we had 816 customers in a variety of industries, of which 635 customers were commercial and 181 customers were government or non-commercial entities. Our customers include financial services, government, life sciences, insurance, manufacturing, energy, healthcare, telecommunications, and transportation organizations. Generally, our sales team targets its efforts to organizations with over 2,000 employees and $2 billion in annual revenue. As of December 31, 2021, 25% of our commercial customers were Global 2000 organizations, and 68 of our customers were Fortune 500 companies. Revenue from government agencies represented 19.6%, 18.1%, and 17.1% of our total revenue in 2021, 2020, and 2019, respectively. No single end-customer accounted for more than 10% of our total revenue in 2021, 2020, and 2019.

Our platform supports multiple languages to facilitate collaboration and address challenges in multinational organizations. We offer our platform globally. In 2021, 2020, and 2019, 34.0%, 33.8%, and 32.3%, respectively, of our total revenue was generated from customers outside of the United States. As of December 31, 2021, we operated in 13 countries. We believe 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 $369.3 million, $304.6 million, and $260.4 million in 2021, 2020, and 2019, respectively. Our subscriptions revenue was $263.7 million, $198.7 million, and $151.3 million in 2021, 2020, and 2019, respectively, and includes sales of our SaaS subscriptions, on-premises term license subscriptions, and maintenance and support. Our cloud subscription revenue was $179.4 million, $129.2 million, and $95.0 million in 2021, 2020, and 2019, 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 $88.6 million, $33.5 million, and $50.7 million in 2021, 2020, and 2019, respectively. We also used cash in operations of $53.9 million, $7.6 million, and $8.9 million in 2021, 2020, and 2019, respectively.

Recent Developments

COVID-19

Beginning in late 2019 and continuing into 2022, the outbreak of the novel coronavirus disease, or COVID-19, has resulted in the declaration of a global pandemic and adversely affected economic activity across virtually all sectors and industries on a local, national, and global scale. The impact of COVID-19, including the emergence of new variant strains of COVID-19, on the economy and our business continues to be a fluid situation.

Operationally, we remain focused on supporting our customers, employees, and communities during this time. At the outset of the pandemic, we responded quickly to adopt a virtual corporate strategy consisting of enabling most of our employees to work productively from home while continuing to guard the health and safety of our teams, support our customers, and mitigate risk. In the third quarter of 2021, we announced an option allowing for our employees to return to offices in select jurisdictions if they elect to do so. We remain focused on ensuring continuity for our customers and we continue to conduct business as usual, with necessary or advisable modifications to employee travel, employee work locations, and marketing events.

Through December 31, 2021, we have not seen a meaningful adverse impact to our financial position, results of operations, and cash flows and liquidity as a result of COVID-19. While the verticals from which we have historically generated the majority of our revenue have been less impacted by COVID-19 to date, there may be impacts to our financial condition and results of operations in 2022 as a result of reduced demand for our products and services and longer sales cycles. The ultimate impact of COVID-19 and any variant strains thereof on our business is not estimable at this time and will be largely dependent upon a number of factors outside of our control including the extent and duration of the outbreak as well as any mitigating actions which may be undertaken by global governments and the general public.

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 our platform as well as the price and number of subscriptions of our platform that a customer purchases. We incur significant customer acquisition costs, including expenses associated with hiring new sales representatives, who can take anywhere from six months to a 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 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 98%. 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 subscription 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, 2021, we identified the amount of cloud subscription revenue in 2021 from cloud customers that were our cloud customers for all of 2020 and subtracted the amount of upsells to such cloud customers and new users from those cloud customers in 2021. We then divided the balance of 2021 cloud subscription revenue from such cloud customers by all cloud subscription revenue generated in 2020 from cloud customers that were cloud customers for the entirety of 2020. 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. 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, 2021.

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 our revenue growth will be primarily driven by the pace of adoption and penetration of our platform. We offer a leading custom software 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 or a legacy perpetual license as of the specified measurement date. Furthermore, we define a new customer as an entity that has entered into its first active subscription or maintenance and support contract within one calendar year of the specified measurement date while existing customers are defined as entities that have maintained an active subscription or maintenance and support contract for at least one calendar year from the specified measurement date. Legacy customers from entities acquired in business combinations are not counted as new customers until they enter into a new active subscription or maintenance and support contract with us subsequent to the completion of the business combination. Additionally, 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 team in order to drive sales to new customers. We continue to make investments to enhance the expertise of our sales and marketing organization within our key industry verticals of financial services, government, and life sciences. In addition, we have established relationships with strategic partners who work with organizations undergoing digital transformations. We had a total customer count of 816, 693, and 533 as of December 31, 2021, 2020, and 2019, respectively. Our number of customers with active software subscription agreements was 783, 654, and 487 as of December 31, 2021, 2020, and 2019, respectively. As of December 31, 2021, 25% of our commercial customers were Global 2000 organizations, and 68 of our customers were Fortune 500 companies. Our ability to continue to grow our customer base is dependent, in part, upon our ability to differentiate ourselves within the increasingly competitive markets in which we participate.

- ***Further Penetration of Existing Customers.*** Our sales team 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 or through non-user based single application licenses. 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 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 strategic partners and 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 continue to 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 originate. 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 2021, 2020, and 2019, 71.4%, 65.2%, and 58.1% of our revenue, respectively, was derived from sales of subscriptions, while the remaining 28.6%, 34.8%, and 41.9%, 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 investing in our platform and infrastructure to continuously maximize their power and speed, meet the evolving needs of our customers, and take advantage of our market opportunity. In addition, we continue to pursue strategic acquisitions that enhance our product offerings. We also 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. All dollar amounts are presented in thousands.

Cloud Subscription Revenue

	Year Ended December 31,		
	2021	2020	2019
Cloud subscription revenue	$ 179,415	$ 129,219	$ 95,028

Cloud subscription revenue includes SaaS subscriptions bundled with maintenance and support and hosting services. In 2021, 2020, and 2019, 68.0%, 65.0%, and 62.8%, respectively, of subscriptions revenue was cloud subscription revenue. As we generally sell our SaaS subscriptions on a per-user basis or through non-user based single application licenses, 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 or by the number of application licenses purchased, as well as the price paid. We believe 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 team and strategic relationships in growing our customer base, and our ability to further penetrate our existing customer base.

Cloud Subscription Revenue Retention Rate

	As of December 31,		
	2021	2020	2019
Cloud subscription revenue retention rate	116 %	119 %	115 %

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 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.

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. We define non-GAAP operating loss as operating loss before stock-based compensation expense and certain litigation-related expenses. We define non-GAAP net loss as net loss before stock-based compensation expense, certain litigation-related expenses, and gains or losses on disposals of property and equipment. In periods we report non-GAAP net income, we calculate non-GAAP weighted average shares outstanding as GAAP weighted average shares outstanding adjusted for the effect of potentially dilutive securities that would otherwise be antidilutive under GAAP. We define adjusted EBITDA as net loss before (1) other expense (income), net, (2) interest expense, (3) income tax expense, (4) depreciation and amortization expense, (5) stock-based compensation expense, and (6) certain litigation-related expenses.

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 exclude certain litigation-related expenses consisting of professional fees and other costs incurred in connection with two separate lawsuits, one involving reciprocal false advertising and related claims with a competitor and one involving an effort to enforce our intellectual property, because we believe such costs are outside of our ordinary course of business. We exclude gains or losses on disposals of property and equipment as these transactions are unrelated to current operations nor predictive of future results. We believe providing non-GAAP financial measures excluding the aforementioned items provides investors and management with greater visibility into the underlying performance of our business operations, aids to provide supplemental information and comparable financial results from period to period, and may also provide comparison with the results of other companies in our industry.

The presentation of non-GAAP financial measures is not intended to be considered in isolation from, as a substitute for, or superior to the financial information prepared and presented in accordance with GAAP. We use non-GAAP financial measures as a means to evaluate period-to-period comparisons. We also believe our 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. Reconciliations of our non-GAAP financial measures to the most directly comparable GAAP financial measures are included below for review. Reliance should not be placed on any single financial measure to evaluate our business.

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 with respect 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, non-GAAP financial measures exclude expenses that may have a material impact upon our reported financial results. Further, stock-based compensation expense will continue to be a significant recurring expense in our business and an important part of the compensation provided to our employees for the foreseeable future.

The table below reconciles GAAP operating loss to non-GAAP operating loss for the years ended December 31, 2021, 2020, and 2019 (in thousands):

	Year Ended December 31,		
	2021	2020	2019
GAAP operating loss	$ (83,907)	$ (37,902)	$ (50,468)
Add back:			
Stock-based compensation expense	23,844	15,279	16,443
Litigation expenses	16,400	—	—
Non-GAAP operating loss	$ (43,663)	$ (22,623)	$ (34,025)

The following table reconciles GAAP net loss to non-GAAP net loss for the years ended December 31, 2021, 2020, and 2019 (in thousands):

	Year Ended December 31,		
	2021	2020	2019
GAAP net loss	$ (88,641)	$ (33,477)	$ (50,714)
Add back:			
Stock-based compensation expense	23,844	15,279	16,443
Litigation expenses	16,400	—	—
Loss on disposal of property and equipment	79	22	146
Non-GAAP net loss	$ (48,318)	$ (18,176)	$ (34,125)

The following table sets forth non-GAAP net loss per share for the years ended December 31, 2021, 2020, and 2019 (in thousands except share and per share data):

	Year Ended December 31,		
	2021	2020	2019
Non-GAAP net loss	$ (48,318)	$ (18,176)	$ (34,125)
Non-GAAP weighted average shares used to compute net loss per share, basic and diluted	71,036,490	69,050,565	65,479,327
Non-GAAP net loss per share, basic and diluted	$ (0.68)	$ (0.26)	$ (0.52)

GAAP basic and diluted weighted average shares outstanding were equal to non-GAAP basic and diluted weighted average shares outstanding for each of the years ended December 31, 2021, 2020, and 2019.

The following table reconciles GAAP net loss per share to non-GAAP net loss per share for the years ended December 31, 2021, 2020, and 2019:

	Year Ended December 31,		
	2021	2020	2019
GAAP net loss per share, basic and diluted	$ (1.25)	$ (0.48)	$ (0.77)
Add back:			
Non-GAAP adjustments to net loss per share	0.57	0.22	0.25
Non-GAAP net loss per share, basic and diluted	$ (0.68)	$ (0.26)	$ (0.52)

The following table reconciles GAAP net loss to adjusted EBITDA for the years ended December 31, 2021, 2020, and 2019 (in thousands):

	Year Ended December 31,		
	2021	2020	2019
GAAP net loss	$ (88,641)	$ (33,477)	$ (50,714)
Other expense (income), net	3,584	(5,786)	(941)
Interest expense	372	478	367
Income tax expense	778	883	820
Depreciation and amortization	5,743	5,851	4,742
Stock-based compensation expense	23,844	15,279	16,443
Litigation expenses	16,400	—	—
Adjusted EBITDA	$ (37,920)	$ (16,772)	$ (29,283)

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 or through 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. On-premises term license subscriptions are offered when the customer prefers to self-manage the deployment of our platform within their own infrastructure. When our platform is delivered as a SaaS subscription, we manage their operational needs in third-party hosted data centers.

Professional Services

Our professional services revenue is comprised of fees for consulting services, including application development, 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 a percentage of total revenue to decrease. Additionally, professional services revenue may be negatively impacted if there is a decline in our procurement of new customers as a result of the COVID-19 pandemic.

We have several strategic partnerships, including with KPMG, Accenture, PwC, Infosys, Wipro, and Deloitte. 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. 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. 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 we sell. Professional services revenue may also decline in absolute dollars if we increasingly rely on our network to procure new customers.

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, third-party contractor costs, allocated facility costs and overhead, and 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 cost of professional services which, in turn, may impact our quarterly financial results and allocated facility costs and overhead.

Gross Margin

Gross profit and gross margin, or gross profit as a percentage of total revenue, have been, and will continue to be, affected by various factors, including the mix of SaaS subscriptions and on-premises term license subscriptions, the mix of total 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. 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 customer support and SaaS operations to support growth in our business, and the timing of those investments is expected to cause subscriptions gross margin to fluctuate on a quarterly basis.

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 Customer Success organization as we continue to invest in the growth of our business. Professional services gross margin is also impacted by the amount of services performed by subcontractors and partners as opposed to internal resources. Beginning in 2020, we lowered our usage of subcontractors, and the COVID-19 pandemic resulted in fewer in-person professional services engagements and deployments, both of which reduced certain classes of expenses and improved professional services margins. In 2021, these margins began to normalize but remain subject to fluctuation based on the factors discussed above and uncertainties related to the COVID-19 pandemic outside of our control.

Operating Expenses

Operating expenses consist of sales and marketing, research and development, and general and administrative expenses. Personnel-related costs such as salaries, bonuses, commissions, payroll tax payments, and stock-based compensation expense are the most significant components of each of these expense categories. Other components of each category include professional fees for third-party services such as contract labor, legal, development resources, and consulting as well as allocated facility and overhead, which can include, among other types of costs, travel and entertainment expenditures, human resources costs such as placement fees, referral bonuses, training costs, and employee relations spending, office-related expenditures, and information technology costs for such items as infrastructure, software, and cloud computing services.

In general, our operating expenses are expected to continue to increase in absolute dollars as we invest resources in growing our various teams. We grew from 1,460 employees at December 31, 2020 to 1,798 employees at December 31, 2021, 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 major expenses in this category include travel and entertainment, marketing activities and promotional events, subcontracting fees, and allocated facility costs and overhead.

The number of employees in sales and marketing functions grew from 445 at December 31, 2020 to 552 at December 31, 2021. 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, and overhead.

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 381 at December 31, 2020 to 488 at December 31, 2021. We expect research and development expense to continue to increase in absolute dollars as such costs are critical to maintain and improve the 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, as well as our executives. Additional expenses included in this category are non-personnel costs such as travel-related expenses, contracting and professional fees for such services as audits, taxation, and legal, insurance and other corporate expenses, allocated facility costs and overhead, bad debt expenses, and depreciation and amortization costs.

The number of employees in general and administrative functions grew from 206 at December 31, 2020 to 224 at December 31, 2021. We expect our general and administrative expense to increase in absolute dollars as we continue to support our growth.

Other Expense (Income)

Other Expense (Income), Net

Other expense (income), net, 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 and investments, gains or losses on the disposal of property and equipment, and other sources of income or expense not related to our core business operations.

Interest Expense

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

Results of Operations

The following table sets forth our consolidated statements of operations data (in thousands):

	Year Ended December 31,		
	2021	2020	2019
Consolidated Statements of Operations Data:			
Revenue			
Subscriptions	$ 263,738	$ 198,710	$ 151,299
Professional services	105,521	105,863	109,053
Total revenue	369,259	304,573	260,352
Cost of revenue			
Subscriptions	27,330	20,826	17,098
Professional services	76,763	67,940	76,743
Total cost of revenue	104,093	88,766	93,841
Gross profit	265,166	215,807	166,511
Operating expenses			
Sales and marketing	167,852	130,316	117,440
Research and development	97,517	70,241	58,043
General and administrative	83,704	53,152	41,496
Total operating expenses	349,073	253,709	216,979
Operating loss	(83,907)	(37,902)	(50,468)
Other expense (income)			
Other expense (income), net	3,584	(5,786)	(941)
Interest expense	372	478	367
Total other expense (income)	3,956	(5,308)	(574)
Loss before income taxes	(87,863)	(32,594)	(49,894)
Income tax expense	778	883	820
Net loss	$ (88,641)	$ (33,477)	$ (50,714)

(1) Stock-based compensation as a component of these line items is as follows:

	Year Ended December 31,		
	2021	2020	2019
		(in thousands)	
Cost of revenue			
Subscriptions	$ 1,199	$ 943	$ 647
Professional services	3,131	1,477	2,748
Operating expenses			
Sales and marketing	5,426	2,821	4,742
Research and development	5,224	2,718	3,480
General and administrative	8,864	7,320	4,826
Total stock-based compensation expense	$ 23,844	$ 15,279	$ 16,443

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

	Year Ended December 31,		
	2021	2020	2019
Consolidated Statements of Operations Data:			
Revenue			
Subscriptions	71.4 %	65.2 %	58.1 %
Professional services	28.6	34.8	41.9
Total revenue	100.0	100.0	100.0
Cost of revenue			
Subscriptions	7.4	6.8	6.6
Professional services	20.8	22.3	29.5
Total cost of revenue	28.2	29.1	36.1
Gross profit	71.8	70.9	63.9
Operating expenses			
Sales and marketing	45.5	42.8	45.1
Research and development	26.4	23.1	22.3
General and administrative	22.7	17.5	15.9
Total operating expenses	94.6	83.4	83.3
Operating loss	(22.8)	(12.5)	(19.4)
Other expense (income)			
Other expense (income), net	1.0	(1.9)	(0.4)
Interest expense	0.1	0.2	0.1
Total other expense (income)	1.1	(1.7)	(0.3)
Loss before income taxes	(23.9)	(10.8)	(19.1)
Income tax expense	0.2	0.3	0.3
Net loss	(24.1)%	(11.1)%	(19.4)%

Year Ended December 31, 2021 Compared to the Year Ended December 31, 2020

Revenue

	Year Ended December 31,		% Change
	2021	2020	
	(dollars in thousands)		
Revenue:			
Subscriptions	$ 263,738	$ 198,710	32.7%
Professional services	105,521	105,863	(0.3)%
Total revenue	$ 369,259	$ 304,573	21.2%

Total revenue increased $64.7 million, or 21.2%, in 2021 compared to 2020 due to an increase in our subscriptions revenue of $65.0 million, which was partially offset by a decrease in our professional services revenue of $0.3 million. The increase in subscriptions revenue was driven largely by a $50.2 million increase in cloud subscription revenue, an $11.8 million increase in on-premises software revenue, and a $3.0 million increase in maintenance and support revenue. With respect to new versus existing customers, $48.1 million of the increase in subscriptions revenue stemmed from expanded deployments and corresponding sales of additional subscriptions to existing customers while $16.6 million stemmed from sales of subscriptions to new customers. The remainder of the increase is attributable to revenue recognized from Lana Labs GmbH, or Lana Labs, subsequent to the acquisition. The decrease in professional services revenue was due primarily to a $19.7 million decrease in revenue from existing customers which was largely offset by $19.3 million in sales to new customers. Further impacting the decrease in professional services revenue were increased contributions of partners performing professional services on our behalf in 2021 as compared to 2020, which has resulted in increases to our subscriptions revenue without any change to our professional services revenue.

Cost of Revenue

	Year Ended December 31,		% Change
	2021	2020	
	(dollars in thousands)		
Cost of revenue:			
Subscriptions	$ 27,330	$ 20,826	31.2%
Professional services	76,763	67,940	13.0%
Total cost of revenue	$ 104,093	$ 88,766	17.3%
Subscriptions gross margin	89.6 %	89.5 %	
Professional services gross margin	27.3 %	35.8 %	
Total gross margin	71.8 %	70.9 %	

Cost of revenue increased $15.3 million, or 17.3%, in 2021 compared to 2020, primarily due to a $15.2 million increase in professional services and product support personnel costs, a $4.4 million increase in other cost of revenue, and a $1.5 million increase in facility and overhead costs. These increases were partially offset by a $4.8 million decrease in contractor costs and a $1.0 million decrease in billable expenses. Personnel costs increased due to an increase in professional services and product support personnel headcount of 24.8% from December 31, 2020 to December 31, 2021, coupled with a $1.9 million increase in stock-based compensation. The increase in other cost of revenue was due to increased hosting costs as sales of our cloud offering grew in 2021, while the increase in facility and overhead costs was due largely to an increase in certain allocated costs tied to our growth such as spending for offices, human resources costs, and information technology expenses. Contractor costs decreased in 2021 compared to 2020 due to a decrease in the usage of subcontractors for professional service engagements, which is in line with our strategic shift towards increasing professional services headcounts and utilizing more internal resources to complete engagements. Billable expenses decreased primarily as a result of lower travel and entertainment costs pursuant to a shift to remote work that began in the second quarter of 2020 and continued into 2021.

Subscriptions gross margin slightly increased to 89.6% in 2021 compared to 89.5% in 2020 due to an increase in subscriptions revenue in 2021, which was largely offset by increased hosting costs as sales of our cloud offering increased and became a larger proportion of our overall subscriptions revenue. Professional services gross margin decreased to 27.3% in 2021 compared to 35.8% in 2020 due to higher personnel costs in 2021 as well as a decrease in professional services revenue. Additionally, fewer in-person professional services engagements and deployments in 2020 led to temporarily improved margins in the prior year. These impacts were partially offset by a decrease in the usage of subcontractors for professional services engagements. Given the higher percentage of subscriptions revenue for the comparable periods and the aforementioned decline in professional services revenue, gross margin rose to 71.8% in 2021 as compared to 70.9% in 2020.

Sales and Marketing Expense

	Year Ended December 31,		% Change
	2021	2020	
	(dollars in thousands)		
Sales and marketing	$ 167,852	$ 130,316	28.8%
% of revenue	45.5 %	42.8 %	

Sales and marketing expense increased $37.5 million, or 28.8%, in 2021 compared to 2020, primarily due to a $28.8 million increase in sales and marketing personnel costs, a $5.1 million increase in marketing costs, a $3.0 million increase in facility and overhead costs, and a $0.6 million increase in professional fees. Personnel costs increased due to an increase in sales and marketing personnel headcount of 24.0% from December 31, 2020 to December 31, 2021, increased sales commissions driven by our subscriptions revenue growth, and a $2.6 million increase in stock-based compensation expense. Marketing costs increased due to an increase in the number of marketing events held during 2021 as compared to 2020 as well as increased spending on marketing materials, slightly offset by a decrease in advertising expense. Facility and overhead costs increased due to higher allocated costs tied to our growth, such as information technology spending and human resources costs. Professional fees increased due to higher fees paid to third-party marketing consultants pursuant to new marketing campaigns and initiatives.

Research and Development Expense

	Year Ended December 31,		% Change
	2021	2020	
	(dollars in thousands)		
Research and development	$ 97,517	$ 70,241	38.8%
% of revenue	26.4 %	23.1 %	

Research and development expense increased $27.3 million, or 38.8%, in 2021 compared to 2020, primarily due to a $22.9 million increase in research and development personnel costs, a $3.2 million increase in facility and overhead costs, and a $1.1 million increase in professional fees. Personnel costs increased due to an increase in research and development personnel headcount of 28.1% from December 31, 2020 to December 31, 2021, coupled with a $2.5 million increase in stock-based compensation expense. Facility and overhead costs increased due largely to higher allocated costs tied to our growth, such as information technology spending, human resources costs, and office spending. Professional fees increased due to an increase in consulting services fees stemming from higher usage of external resources to assist in our platform development efforts.

General and Administrative Expense

	Year Ended December 31,		% Change
	2021	2020	
	(dollars in thousands)		
General and administrative expense	$ 83,704	$ 53,152	57.5%
% of revenue	22.7 %	17.5 %	

General and administrative expense increased $30.6 million, or 57.5%, in 2021 compared to 2020, primarily due to a $15.8 million increase in professional fees, an $11.7 million increase in general and administrative personnel costs, and a $2.4 million increase in facility and overhead costs. Professional fees increased due largely to higher legal fees. Personnel costs increased due to the acceleration of $3.3 million in stock-based compensation expense stemming from the vesting of the 2019 CEO grant, coupled with an increase in general and administrative personnel headcount of 8.7% from December 31, 2020 to December 31, 2021. Facility and overhead costs increased primarily due to higher allocated costs tied to our growth, such as information technology spending, human resources costs, and office spending as well as higher withholding taxes at certain of our foreign subsidiaries.

Other Expense (Income), Net

	Year Ended December 31,		% Change
	2021	2020	
	(dollars in thousands)		
Other expense (income), net	$ 3,584	$ (5,786)	***
% of revenue	1.0 %	(1.9)%	

*** - Indicates a percentage that is not meaningful

Other expense was $3.6 million in 2021 compared to other income of $5.8 million in 2020. This change was primarily due to $3.7 million in foreign exchange losses in 2021 compared to $4.3 million in foreign exchange gains in 2020. Additionally, we recognized $1.0 million in other income in 2020 due to a payment received from a state government as a result of our achievement of certain job creation and capital investment goals.

Interest Expense

	Year Ended December 31,		% Change
	2021	2020	
	(dollars in thousands)		
Interest expense	$ 372	$ 478	(22.2)%
% of revenue	0.1 %	0.2 %	

Interest expense decreased by a nominal amount in 2021 compared to the same period in 2020, primarily due to lower commitment fees on the letter of credit outstanding.

Year Ended December 31, 2020 Compared to the Year Ended December 31, 2019

For a discussion and analysis of changes in financial condition and results of operations for the year ended December 31, 2020 as compared to the year ended December 31, 2019, refer to our Annual Report on Form 10-K for the fiscal year ended December 31, 2020, filed with the SEC on February 18, 2021.

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 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. Such a 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, 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 and is representative of our remaining performance obligations. As of December 31, 2021 and 2020, we had backlog of $285.5 million and $206.2 million, respectively. Approximately 34% of our backlog as of December 31, 2021 is not expected to be recognized in 2022.

We expect backlog to continue to increase in absolute dollars as we continue to increase the number of SaaS agreements we enter into. However, the amount of backlog relative to the total value of our contracts can 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 resulting 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 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

The following table presents selected financial information and statistics as of and for the years ended December 31, 2021, 2020, and 2019 (in thousands):

	As of December 31,		
	2021	2020	2019
Cash and cash equivalents	$ 100,796	$ 112,462	$ 159,755
Short-term investments and marketable securities	55,179	109,826	—
Property and equipment, net	36,913	35,404	39,554
Long-term investments	12,044	36,120	—
Working capital*	121,752	209,532	165,381

	Year Ended December 31,		
	2021	2020	2019
Net cash used in operating activities	$ (53,918)	$ (7,620)	$ (8,926)
Net cash provided by (used in) investing activities	41,936	(153,357)	(32,421)
Net cash provided by financing activities	2,786	110,468	105,549

* Exclusive of the current portion of restricted cash

As of December 31, 2021, we had $100.8 million of cash and cash equivalents and $55.2 million of short-term investments and marketable securities. We believe our existing cash and cash equivalents and short-term investments and marketable securities, 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. We expect future sources of funds to consist primarily of cash generated from sales of subscriptions and the related professional services. We may also elect to raise additional sources of funding through draws on our existing line of credit, entering into new debt financing arrangements, or conducting additional public offerings. 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, the introduction of new and enhanced products and functions as well as platform enhancements and professional services offerings, the level of market acceptance of our applications, spending we may incur on our headquarters, and the global economic uncertainty and financial market conditions caused by the COVID-19 pandemic and its impact on our business.

In the event 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, short-term 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. We have no present binding agreements or commitments to enter into any such acquisitions. If we are unable to raise additional capital when desired, our business, operating results, and financial condition could be adversely affected.

Sources of Funds

We have financed our operations in large part with equity and debt financing arrangements, specifically proceeds raised from our initial public offering in 2017 and subsequent underwritten public offerings as summarized in the table below (in thousands except share and per share information):

	Shares Sold by Us	Price per Share	Proceeds to Us*
May 2017 initial public offering	7,187,500	$ 12.00	$ 77,789
August 2018 public offering	1,675,000	35.15	57,829
September 2019 public offering	1,825,000	55.70	101,303
June 2020 public offering	1,931,206	56.50	107,914
Total	12,618,706		$ 344,835

* Net of underwriting discounts and commissions and offering expenses

We also have the ability to draw upon a $20.0 million revolving line of credit with a lender with an original maturity date of November 2022. In December 2021, we executed the first loan modification agreement which extended the revolving line of credit's maturity date to November 2025 and amended certain borrowing terms and financial covenants. Under the amended agreement, we may elect whether amounts drawn on the revolving line of credit bear interest on the outstanding principal amount at a rate per annum equal to either a) the Prime rate plus an additional interest rate margin or b) secured overnight financing rate (“SOFR”) 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 0.75% to 1.25% in the case of Prime rate advances and from 1.75% to 2.25% in the case of SOFR rate advances. The revolving line of credit contains an unused facility fee up to 0.20% 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 1.00 subject to a net cash threshold as set forth in the agreement 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, 2021. As of December 31, 2021, we had no outstanding borrowings under this revolving line of credit, and we had outstanding letters of credit totaling $11.2 million in connection with securing our leased office space.

Uses of Funds

Our current principal uses of cash are funding operations and other working capital requirements. Historically, we have also utilized cash to pay for the acquisition of entities we believe to be complementary to our business, and we may pursue similar opportunities in the future. 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. Outside of cash used to fund operations, our uses of cash in 2021 included the acquisition of Lana Labs, purchases of investments, and capital expenditures. Cash uses in 2020 included the acquisition of Novayre Solutions SL, or Novayre, and modest capital expenditures.

With respect to future uses of funds, we expect to incur annual royalty fees of $0.3 million for the foreseeable future related to a non-cancellable agreement for the use of technology that is integral in the development of our software. Additionally, we expect to incur capital expenditures in relation to the expanded occupancy of our headquarters, although such expenditures do not represent capital commitments. Furthermore, we are contractually obligated to make cash payments on our various operating leases through October 2031. As of December 31, 2021, the amount of funds we expect to utilize over this time period for our lease commitments is approximately $92.9 million.

In 2021, we executed a non-cancellable cloud hosting arrangement with Amazon Web Services, or AWS, that contains provisions for minimum purchase commitments. Purchase commitments under the agreement total $131.0 million over five years, including $22.0 million in the first year, $25.0 million in the second year, and $28.0 million in each of the third, fourth, and fifth years. The timing of payments under the agreement may vary, and the total amount of payments may exceed the minimum depending on the volume of services utilized. Spending under this agreement for the year ended December 31, 2021 totaled $11.8 million.

Furthermore, we have other non-cancellable agreements for subscription software products that contain provisions stipulating minimum purchase commitments. However, the annual purchase commitments under these contracts are, individually and in the aggregate, immaterial to our consolidated statements of operations.

Historical Cash Flows

Operating Activities

For the year ended December 31, 2021, net cash used in operating activities of $53.9 million consisted of a net loss of $88.6 million, offset by $29.6 million in adjustments for non-cash items and $5.1 million of cash provided by changes in working capital. Adjustments for non-cash items consisted primarily of stock-based compensation of $23.8 million, depreciation and amortization expense of $5.7 million, bad debt expense of $0.4 million, and losses on the disposal of property and equipment of $0.1 million. These adjustments were partially offset by deferred income tax adjustments of $0.5 million. The increase in cash, cash equivalents, and restricted cash resulting from changes in working capital primarily consisted of a $33.4 million increase in deferred revenue as a result of increased subscription sales, a $12.6 million increase in accrued compensation and related benefits as a result of the timing around and increase in employee benefit accruals for such costs as commissions and bonuses stemming from increased headcounts, an $11.5 million increase in accounts payable and accrued expenses due to larger accruals related to legal costs, AWS hosting costs, and marketing costs as well as timing differences between billings and payments, a $2.1 million decrease in prepaid expenses and other assets primarily due to the timing of payments, and a $1.5 million net decrease in right-of-use lease assets. These increases to working capital were offset by a $33.9 million increase in accounts receivable stemming from increased sales and the timing of billings and collections in the fourth quarter, a $21.6 million increase in deferred commissions due to increased sales activity combined with the timing of order completions, and a $0.4 million decrease in other current and non-current liabilities.

For the year ended December 31, 2020, net cash used in operating activities of $7.6 million consisted of a net loss of $33.5 million, offset by $22.0 million in adjustments for non-cash items and $3.9 million of cash provided by changes in working capital. Adjustments for non-cash items consisted primarily of stock-based compensation of $15.3 million, depreciation and amortization expense of $5.9 million, and bad debt expense of $1.0 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 $27.6 million increase in deferred revenue as a result of increased subscription sales, an $11.8 million increase in accrued compensation and related benefits as a result of higher employee benefit accruals such as vacation and bonuses, a $3.7 million increase in other liabilities due to the deferral of social security tax payments pursuant to the provisions of the CARES Act and a contract liability arising from a three year deal that included a termination for convenience clause, a $3.7 million decrease in prepaid expenses and other assets attributable to timing, and a $3.4 million increase in operating lease liabilities as a result of recognizing a new right-of-use liability related to the expanded occupancy of our headquarters building. The increase to working capital was partially offset by a $33.6 million increase in accounts receivable stemming from increased sales as well as the timing of billings and collections, an $8.6 million increase in deferred commissions due to increased sales activity, and a $4.2 million decrease in accounts payable and accrued expenses due to the timing of payments.

Investing Activities

For the year ended December 31, 2021, net cash provided by investing activities was $41.9 million, which was primarily the result of $120.6 million in proceeds from investments, partially offset by $41.9 million in purchases of investments, $30.7 million in payments, net of cash acquired, related to the acquisition of Lana Labs, and $6.1 million in purchases of property and equipment stemming from spending related to the expanded occupancy of our headquarters.

For the year ended December 31, 2020, net cash used in investing activities was $153.4 million which was primarily the result of $146.0 million in purchases of investments and $6.1 million in payments, net of cash acquired, related to the acquisition of Novayre. In addition there were approximately $1.3 million in purchases of property and equipment.

Financing Activities

For the year ended December 31, 2021, net cash provided by financing activities was $2.8 million, consisting entirely of proceeds received from stock option exercises.

For the year ended December 31, 2020, net cash provided by financing activities was $110.5 million, consisting of $108.3 million in proceeds from our underwritten public offering, net of underwriting discounts and commissions, and $6.4 million in proceeds received from stock option exercises. These increases were offset by principal payments on finance lease obligations of $3.8 million and payment of public offering costs of $0.3 million.

For a discussion and analysis of net cash used in or provided by operating, investing, and financing activities for the year ended December 31, 2019, refer to our Annual Report on Form 10-K for the fiscal year ended December 31, 2020, filed with the SEC on February 18, 2021.

Critical Accounting Estimates

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 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.

We believe the following accounting estimates involve a high degree of judgment and complexity. Accordingly, these are the estimates 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 and estimates.

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. Significant judgments and estimates inherent in our revenue recognition are as follows:

Determining the Transaction Price

The transaction price, or the amount of consideration we expect to be entitled to receive in exchange for transferring services to our customers, includes both fixed and variable components. The variable components of our contracts, which have been nominal to date, include performance penalties, extended payment terms or implied price concessions, and warranty refunds. If necessary, we estimate these components using the expected value method, which estimates variable consideration as the sum of probability-weighted amounts in a range of possible consideration amounts. We believe this method is the most appropriate to utilize because our variable components could vary by contract, leading to multiple potential outcomes.

Our variable consideration estimates are subject to subsequent true-up adjustments which may result in changes to transaction prices, but such true-up adjustments are not expected to be material. Variable consideration is also included in the transaction price only to the extent it is probable a significant reversal will not occur. Factors considered when determining to incorporate variable consideration in the transaction price include, but are not limited to, whether the variable consideration is highly susceptible to factors outside of the company's influence, the length of time the uncertainty surrounding reversal is expected to last, our experience levels with similar types of contracts, our historical practices for similar contracts in similar circumstances, and the number and range of possible consideration amounts. The amount of variable consideration excluded from the transaction price for the years ended December 31, 2021, 2020, and 2019 was insignificant.

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.
2. Term license subscriptions - Given the highly variable selling price of our term license subscriptions, we have established the 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 and within a narrow range of the net license fee, resulting in a defined economic relationship existing between the license and maintenance and support.
3. Maintenance and support - We establish the 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 - The 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.

Stock-Based Compensation

We measure and recognize compensation expense for all instrument types, including stock options, awards with market conditions, and restricted stock units, or RSUs, based on the estimated fair value of the award on the grant date. The methods for determining fair value vary by instrument type.

Options

For the vast majority of our stock options, we estimate fair value using the Black-Scholes Option Pricing Model. For the option to purchase 700,000 shares of our Class A common stock granted to our Chief Executive Officer in May 2019, we estimated fair value using a Monte Carlo simulation because the award contains a market condition. Both valuation methods require the use of subjective assumptions, including but not limited to, the following:

1. 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. 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.
2. Current trading price - The current price of our stock is based on the closing market price of our Class A common stock as quoted on the Nasdaq Global Market on the date of grant.
3. The expected stock price volatility - Expected volatility is based on the historical volatilities of our publicly traded stock as well as the publicly traded stock of comparable companies within our industry over the estimated expected term of the stock options. Expected volatility is sensitive to market- and company-specific conditions which may cause our stock price or the stock prices of our peers to fluctuate. Furthermore, expected volatility can be impacted by the companies we select as peers for inclusion in the analysis.
4. Expected dividend yield - 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.
5. The risk-free interest rate - We utilize the yields of U.S. government securities, typically U.S. Treasury bonds, that have maturities commensurate with the expected term of the options.

RSUs

The fair value of RSUs is based on the closing market price of our Class A common stock as quoted 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.

Income Taxes

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 establish a valuation allowance against our deferred tax assets to the extent it is more likely than not that some or all of the deferred tax assets will not be realized. This requires us to make judgments and estimates regarding future reversals of existing taxable temporary differences, future taxable income, and the impact of tax planning strategies.

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 that 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. This determination involves significant judgment in estimating the impact of uncertainties in the application of GAAP and complex tax laws.

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.

Business Combinations

We account for business combinations using the acquisition method of accounting as of the business combination date. Under this method, we allocate the fair value of purchase consideration to identifiable tangible and intangible assets acquired and liabilities assumed at their estimated fair values on the acquisition date. The excess of the fair value of purchase consideration over the fair values of these identifiable assets and liabilities is allocated to goodwill. Determining the fair value of assets acquired and liabilities assumed requires us to use significant estimates and assumptions that may vary between transactions. Examples include, but are not limited to:

- Selection of valuation methodologies;
- Estimated fair values of intangible assets and liabilities;
- Estimated fair values of contractual obligations assumed from the acquiree under existing contractual obligations at the date of acquisition;
- Estimated fair value of pre-acquisition contingent considerations;
- Future expected cash flows from subscription and support contracts, professional services contracts, other customer contracts and acquired developed technologies and patents;
- Discount rates;
- Fair value of any assumed equity awards; and
- Estimated fair value of any trade names and non-compete agreements.

While we use our best estimates and assumptions to determine the fair values of assets acquired and liabilities assumed at the date of acquisition, our estimates and assumptions are inherently uncertain and subject to refinement. As a result, during the measurement period, which can be up to one year from the acquisition date, these estimates may be refined, as necessary, and we may record adjustments to the fair value of tangible and intangible assets acquired and liabilities assumed, with the corresponding offset to goodwill. Upon the conclusion of the measurement period or the final determination of the fair value of assets acquired or liabilities assumed, whichever comes first, any subsequent adjustments are recorded to our consolidated statements of operations.

Impairment of Goodwill and Long-Lived Assets

We review goodwill, long-lived assets, and certain intangible assets for impairment at least annually and whenever events or changes in circumstances indicate the carrying value of an asset may not be recoverable.

Goodwill

With respect to our goodwill impairment assessment, we first perform a qualitative assessment, which requires us to consider events or circumstances including but not limited to, macroeconomic conditions, industry and market considerations, cost factors, overall financial performance, changes in management or key personnel, changes in strategy, changes in customers, litigation, changes in the composition or carrying amount of a reporting unit's net assets, and changes in our stock price.

The events and factors listed above are examples and not all-inclusive. None of these events or circumstances by themselves would indicate it is more likely than not that goodwill associated with a reporting unit is impaired. As part of our analysis, we also weigh any positive or mitigating factors identified and holistically evaluate all events since the most recent quantitative impairment test to determine whether it is more likely than not the goodwill associated with the reporting unit is impaired. If, after assessing the totality of events or circumstances, we determine it is more likely than not the fair value of a reporting unit is greater than the carrying amount, then the quantitative goodwill impairment test is not performed.

Because we operate under one reporting unit, the fair value of our reporting unit is based on our enterprise value. Additionally, because our enterprise value is significantly in excess of carrying value, any sensitivity in the underlying assumptions and estimates is not likely to trigger an impairment. No indicators of goodwill impairment were identified for the years ended December 31, 2021 and 2020.

Long-Lived Assets

Our long-lived assets, excluding goodwill, consist of property, leasehold improvements, hardware, software, equipment, and intangible assets. Such assets are reviewed for impairment at least annually or more frequently whenever events or changes in circumstances indicate the carrying amount of an asset may not be recoverable. Recoverability of these assets is measured by a comparison of the carrying amounts to the future undiscounted cash flows the assets are expected to generate. If such review indicates the carrying amount of our long-lived assets is not recoverable, the carrying amount of such assets is reduced to fair value. There were no indicators of impairment of our long-lived assets noted for the years ended December 31, 2021, 2020, and 2019.

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 $100.8 million as of December 31, 2021, which consisted of investments in a money market fund, cash in readily available checking accounts, and overnight repurchase investments. These securities, which are not dependent on interest rate fluctuations that may cause principal amounts to fluctuate, are held for reinvestment and working capital purchases or, in the case of restricted cash, to settle an escrow liability established pursuant to a business combination.

In addition, as of December 31, 2021, we held $67.2 million of fixed income securities such as U.S. treasury bonds, commercial paper, corporate bonds, and asset-backed securities. These securities are subject to market risk due to fluctuations in interest rates, which may affect our interest income and the fair value of our investments. We classify investments as available-for-sale, including those with stated maturities beyond 12 months. As such, no gains or losses due to changes in interest rates are recognized in our consolidated statements of operations unless such securities are sold prior to maturity or due to expected credit losses. A hypothetical 100 basis point change in interest rates would not have had a material effect on the fair market value of our investment portfolio as of December 31, 2021. To date, fluctuations in interest income have also not been significant. Our investments are made for the purpose of preserving capital, fulfilling liquidity needs, and maximizing total return. We do not enter into investments for trading or speculative purposes.

At December 31, 2021, we had no outstanding borrowings.

Inflation Risk

We do not believe 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, portions 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 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 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

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Report of Independent Registered Public Accounting Firm

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McLean, Virginia

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated balance sheets of Appian Corporation (the "Company") as of December 31, 2021 and 2020, the related consolidated statements of operations, comprehensive loss, changes in stockholders' equity, and cash flows for each of the three years in the period ended December 31, 2021, 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, 2021 and 2020, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2021, 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, 2021, 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 17, 2022 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 Matter

The critical audit matter communicated below is a matter arising from the current period audit of the consolidated financial statements that was communicated or required to be communicated to the audit committee and that: (1) relates 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 a separate opinion on the critical audit matter or on the accounts or disclosures to which it relates.

Revenue Recognition for Multiple Performance Obligations

As discussed in Note 3 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 are 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 identification of distinct performance obligations and the determination of standalone selling prices as a critical audit matter. Auditing these elements of revenue recognition was especially challenging due to the significant judgment involved in assessing the completeness of the distinct performance obligations in arrangements containing multiple performance obligations. In addition, the evaluation of the reasonableness of the range of prices used to establish the standalone selling price for maintenance and support and professional services was complex, which directly affects the amount of SaaS and term license subscriptions revenue recognized using the residual approach.

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.

/s/ BDO USA, LLP

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

McLean, Virginia
February 17, 2022

Report of Independent Registered Public Accounting Firm

The Board of Directors and Shareholders
Appian Corporation
McLean, Virginia

Opinion on Internal Control over Financial Reporting

We have audited Appian Corporation's (the "Company's") internal control over financial reporting as of December 31, 2021, 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, 2021, 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, 2021 and 2020, the related consolidated statements of operations, comprehensive loss, changes in stockholders' equity, and cash flows for each of the three years in the period ended December 31, 2021, and the related notes and our report dated February 17, 2022 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.

As indicated in the accompanying Item 9A, Management's Report on Internal Control over Financial Reporting, management's assessment of and conclusion on the effectiveness of internal control over financial reporting did not include the internal controls of Lana Labs GmbH ("Lana Labs"), which was acquired on August 11, 2021, and which is included in the consolidated balance sheet of the Company as of December 31, 2021, and the related consolidated statement of operations, comprehensive loss, changes in stockholders' equity, and cash flows for the year then ended. Lana Labs constituted 6% of total assets as of December 31, 2021, and 0.1% of revenues for the year then ended. Management did not assess the effectiveness of internal control over financial reporting of Lana Labs because of the timing of the acquisition which was completed on August 11, 2021. Our audit of internal control over financial reporting of the Company also did not include an evaluation of the internal control over financial reporting of Lana Labs.

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 17, 2022

APPIAN CORPORATION AND SUBSIDIARIES
CONSOLIDATED BALANCE SHEETS
(in thousands, except share and per share data)

	As of December 31,	
	2021	**2020**
Assets		
Current assets		
Cash and cash equivalents	$ 100,796	$ 112,462
Short-term investments and marketable securities	55,179	109,826
Accounts receivable, net of allowance of $1,400 as of each of December 31, 2021 and December 31, 2020	130,049	97,278
Deferred commissions, current	24,668	17,899
Prepaid expenses and other current assets	26,781	27,955
Restricted cash, current	791	—
Total current assets	338,264	365,420
Property and equipment, net	36,913	35,404
Long-term investments	12,044	36,120
Goodwill	27,795	4,862
Intangible assets, net of accumulated amortization of $1,260 and $429 as of December 31, 2021 and December 31, 2020, respectively	7,144	1,744
Operating right-of-use assets	27,897	30,659
Deferred commissions, net of current portion	49,017	34,198
Deferred tax assets	1,025	489
Restricted cash, net of current portion	2,373	—
Other assets	2,047	3,625
Total assets	$ 504,519	$ 512,521
Liabilities and Stockholders' Equity		
Current liabilities		
Accounts payable	$ 5,766	$ 2,967
Accrued expenses	15,483	5,821
Accrued compensation and related benefits	35,126	22,981
Deferred revenue, current	150,169	116,256
Operating lease liabilities, current	8,110	6,923
Other current liabilities	1,067	940
Total current liabilities	215,721	155,888
Operating lease liabilities, net of current portion	48,784	51,194
Deferred revenue, net of current portion	2,430	3,886
Deferred tax liabilities	209	70
Other non-current liabilities	3,458	4,878
Total liabilities	270,602	215,916
Commitments and contingent liabilities (see Note 4 and Note 14)		
Stockholders' equity		
Class A common stock—par value $0.0001; 500,000,000 shares authorized and 39,964,298 shares issued and outstanding as of December 31, 2021; 500,000,000 shares authorized and 38,971,324 shares issued and outstanding as of December 31, 2020	4	4
Class B common stock—par value $0.0001; 100,000,000 shares authorized and 31,497,796 shares issued and outstanding as of December 31, 2021; 100,000,000 shares authorized and 31,707,866 shares issued and outstanding as of December 31, 2020	3	3
Additional paid-in capital	497,128	470,498
Accumulated other comprehensive loss	(5,687)	(5,010)
Accumulated deficit	(257,531)	(168,890)
Total stockholders' equity	233,917	296,605
Total liabilities and stockholders' equity	$ 504,519	$ 512,521

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,		
	2021	2020	2019
Revenue			
Subscriptions	$ 263,738	$ 198,710	$ 151,299
Professional services	105,521	105,863	109,053
Total revenue	369,259	304,573	260,352
Cost of revenue			
Subscriptions	27,330	20,826	17,098
Professional services	76,763	67,940	76,743
Total cost of revenue	104,093	88,766	93,841
Gross profit	265,166	215,807	166,511
Operating expenses			
Sales and marketing	167,852	130,316	117,440
Research and development	97,517	70,241	58,043
General and administrative	83,704	53,152	41,496
Total operating expenses	349,073	253,709	216,979
Operating loss	(83,907)	(37,902)	(50,468)
Other expense (income)			
Other expense (income), net	3,584	(5,786)	(941)
Interest expense	372	478	367
Total other expense (income)	3,956	(5,308)	(574)
Loss before income taxes	(87,863)	(32,594)	(49,894)
Income tax expense	778	883	820
Net loss	$ (88,641)	$ (33,477)	$ (50,714)
Net loss per share:			
Basic and diluted	$ (1.25)	$ (0.48)	$ (0.77)
Weighted average common shares outstanding:			
Basic and diluted	71,036,490	69,050,565	65,479,327

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,		
	2021	2020	2019
Net loss	$ (88,641)	$ (33,477)	$ (50,714)
Comprehensive loss, net of income taxes			
Foreign currency translation adjustment	(677)	(4,703)	(827)
Unrealized losses on available-for-sale securities	—	(22)	—
Total other comprehensive loss, net of income taxes	$ (89,318)	$ (38,202)	$ (51,541)

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

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

	Common Stock		Additional Paid-In Capital	Accumulated Other Comprehensive Income (Loss)	Accumulated Deficit	Total Stockholders' Equity
	Shares	Amount				
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 loss	—	—	—	(827)	—	(827)
Balance December 31, 2019	67,468,022	6	340,929	(285)	(135,413)	205,237
Net loss	—	—	—	—	(33,477)	(33,477)
Issuance of common stock from public offering, net of issuance costs	1,931,206	1	107,914	—	—	107,915
Issuance of common stock to directors	7,942	—	—	—	—	—
Vesting of restricted stock units	270,609	—	—	—	—	—
Exercise of stock options	1,001,411	—	6,376	—	—	6,376
Stock-based compensation expense	—	—	15,279	—	—	15,279
Other comprehensive loss	—	—	—	(4,725)	—	(4,725)
Balance December 31, 2020	70,679,190	7	470,498	(5,010)	(168,890)	296,605
Net loss	—	—	—	—	(88,641)	(88,641)
Issuance of common stock to directors	4,950	—	—	—	—	—
Vesting of restricted stock units	354,130	—	—	—	—	—
Exercise of stock options	423,824	—	2,786	—	—	2,786
Stock-based compensation expense	—	—	23,844	—	—	23,844
Other comprehensive loss	—	—	—	(677)	—	(677)
Balance December 31, 2021	71,462,094	$ 7	$ 497,128	$ (5,687)	$ (257,531)	$ 233,917

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,		
	2021	**2020**	**2019**
Cash flows from operating activities:			
Net loss	$ (88,641)	$ (33,477)	$ (50,714)
Adjustments to reconcile net loss to net cash used in operating activities:			
Depreciation and amortization	5,743	5,851	4,742
Bad debt expense	410	984	99
Loss on disposal of property and equipment	79	22	146
Change in fair value of available-for-sale securities	—	22	—
Deferred income taxes	(498)	(184)	(334)
Stock-based compensation	23,844	15,279	16,443
Changes in assets and liabilities:			
Accounts receivable	(33,904)	(33,559)	7,432
Prepaid expenses and other assets	2,094	3,740	8,972
Deferred commissions	(21,588)	(8,575)	(9,319)
Accounts payable and accrued expenses	11,467	(4,238)	(4,039)
Accrued compensation and related benefits	12,598	11,801	(3,072)
Other liabilities	(444)	3,681	1,318
Deferred revenue	33,378	27,626	12,573
Operating lease assets and liabilities	1,544	3,407	6,827
Net cash used in operating activities	(53,918)	(7,620)	(8,926)
Cash flows from investing activities:			
Purchases of investments	(41,870)	(145,968)	—
Payments for acquisitions, net of cash acquired	(30,729)	(6,138)	—
Proceeds from investments	120,593	—	—
Purchases of property and equipment	(6,058)	(1,251)	(32,421)
Net cash provided by (used in) investing activities	41,936	(153,357)	(32,421)
Cash flows from financing activities:			
Principal payments on finance leases	—	(3,822)	(653)
Proceeds from public offerings, net of underwriting discounts	—	108,260	101,653
Payments of costs related to public offerings	—	(346)	(350)
Proceeds from exercise of common stock options	2,786	6,376	4,899
Net cash provided by financing activities	2,786	110,468	105,549
Effect of foreign exchange rate changes on cash, cash equivalents, and restricted cash	694	3,216	623
Net (decrease) increase in cash, cash equivalents, and restricted cash	(8,502)	(47,293)	64,825
Cash, cash equivalents, and restricted cash at beginning of period	112,462	159,755	94,930
Cash, cash equivalents, and restricted cash at end of period	$ 103,960	$ 112,462	$ 159,755
Supplemental disclosure of cash flow information:			
Cash paid for interest	$ 323	$ 165	$ 331
Cash paid for income taxes	$ 1,505	$ 1,182	$ 356
Supplemental disclosure of non-cash investing and financing information:			
Accrued capital expenditures	$ 379	$ —	$ —
Finance lease obligations to acquire new office furniture and fixtures and computer hardware	$ —	$ —	$ 4,475

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

NOTES TO 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 platform that accelerates the creation of high-impact business applications and workflows, enabling our customers to automate the most important aspects of their business. The Appian Low-Code Platform unifies the key capabilities needed to get work done faster: Process Mining + Workflow + Automation. Since 1999, industry leaders have trusted Appian and our open, enterprise-grade platform. 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 McLean, Virginia and operate in Canada, Switzerland, the United Kingdom, France, Germany, the Netherlands, Italy, Australia, Spain, Singapore, Sweden, and Japan.

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 ("ASC").

We adopted Accounting Standards Update ("ASU") 2014-09, Revenue from Contracts with Customers (Topic 606) ("ASC 606"), the new revenue recognition guidance, 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 and applied the new standard only to contracts that were not completed prior to January 1, 2019. For fiscal years 2018 and prior, revenue was recognized under ASC Topic 605, Revenue Recognition ("ASC 605").

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 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, the valuation of goodwill and intangible assets, leases, costs to obtain a contract with a customer, the valuation of financial instruments, and stock-based compensation.

The ongoing outbreak of the novel coronavirus disease ("COVID-19") has resulted in the declaration of a global pandemic and introduced a level of disruption and uncertainty into the financial markets and global economy. While we continue to monitor the developments surrounding the pandemic, as of the date of issuance of these financial statements, we are not aware of any specific events or circumstances that would require us to update our estimates, assumptions, and judgments or revise the carrying value of our assets or liabilities. We cannot estimate the impacts COVID-19 may have on our business going forward as such impacts will be largely dependent upon a number of factors outside of our control including the extent and duration of the outbreak as well as any mitigating actions which may be undertaken by global governments and the general public.

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.

Public Offerings

In June 2020, we completed an underwritten public offering of 2,500,000 shares of our Class A common stock, of which 1,931,206 shares of Class A common stock were sold by us and 568,794 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 $56.50 per share. Our net proceeds from the offering were $107.9 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

Refer to Note 3 for a detailed discussion on specific revenue recognition principles related to our major revenue streams.

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 such as 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, third-party contractor costs, allocated facility costs and overhead, and 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 and allocated facility costs and overhead.

Concentration of Credit and Customer Risk

Our financial instruments exposed to concentration of credit and customer risk consist primarily of cash, cash equivalents, restricted cash, accounts receivable, and our short- and long-term investments. Deposits held with banks may exceed the amount of insurance provided on such deposits; however, we believe the financial institutions holding 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 no additional credit risk beyond amounts provided for collection loss are inherent in accounts receivable. Revenue generated from government agencies represented 19.6%, 18.1%, and 17.1% of our revenue for the years ended December 31, 2021, 2020, and 2019, respectively, of which the top three U.S. federal government agencies generated 5.6%, 6.6%, and 7.4% of our revenue for the years ended December 31, 2021, 2020, and 2019, respectively. Additionally, 34.0%, 33.8%, and 32.3% of our revenue during the years ended December 31, 2021, 2020, and 2019, respectively, was generated from foreign customers.

Cash, Cash Equivalents, and Restricted Cash

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 agreements, to be cash equivalents. Restricted cash consists of cash designated to settle an escrow liability stemming from a holdback agreement enacted pursuant to our acquisition of Lana Labs. The restriction on 25% of the balance will lapse on the later of either two months following the establishment of Lana Labs' annual financial statements for the year ended December 31, 2021 or October 31, 2022. The restrictions on the remaining 75% of the balance will lapse on August 11, 2023.

The following table presents a reconciliation of cash, cash equivalents, and restricted cash as presented in the consolidated statements of cash flows (in thousands):

	Year Ended December 31,		
	2021	2020	2019
Cash and cash equivalents	$ 100,796	$ 112,462	$ 159,755
Restricted cash, current	791	—	—
Restricted cash, non-current	2,373	—	—
Total cash, cash equivalents, and restricted cash	$ 103,960	$ 112,462	$ 159,755

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 and incorporates an estimation of expected lifetime credit losses on our receivables. 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.

Activity in the allowance for doubtful accounts was as follows (in thousands):

	Year Ended December 31,		
	2021	2020	2019
Balance as of January 1	$ 1,400	$ 600	$ 600
Additions	410	984	99
Less write-offs, net of recoveries	(410)	(184)	(99)
Balance as of December 31	$ 1,400	$ 1,400	$ 600

Non-Trade Receivable

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 relate largely to receivables resulting from the tenant improvement allowance granted to us for the build out of the fourth floor of our headquarters. The balance of the tenant improvement allowance receivable was $2.0 million as of December 31, 2021 and was classified within Prepaid expenses and other current assets in the accompanying consolidated balance sheets. We have received $0.9 million of the tenant improvement allowance as of December 31, 2021.

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

We capitalize costs of obtaining a contract with a customer, including sales commissions paid to our direct sales team, 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 upsell are amortized over an estimated economic life of five years as sales commissions on initial sales are not commensurate with sales commissions on contract renewals. We determine 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 over the related renewal period. We also capitalize the incremental fringe benefits associated with commission expenses paid to our direct sales team. Costs to obtain a contract for professional services arrangements are expensed as incurred as the contractual period of our professional services arrangements are one year or less.

Amortization associated with deferred commission 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 years ended December 31, 2021, 2020, and 2019 (in thousands):

	Year Ended December 31,		
	2021	2020	2019
Balance as of January 1	$ 52,097	$ 43,522	$ 29,108
Adoption of ASC 606	—	—	5,094
Additional contract costs deferred	51,283	31,898	25,004
Amortization of deferred contract costs	(29,695)	(23,323)	(15,684)
Balance as of December 31	$ 73,685	$ 52,097	$ 43,522

Commission expense was $32.4 million, $23.3 million, and $15.7 million for the years ended December 31, 2021, 2020, and 2019, respectively.

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.

The following table outlines the useful lives of our major asset categories:

Asset Category	Useful Life (in years)
Computer software	3
Computer hardware	3
Equipment	5
Office furniture and fixtures	10
Leasehold improvements	(a)

(a) - Leasehold improvements have an estimated useful life of the shorter of the useful life of the assets or the lease term.

Business Combinations

We account for business combinations using the acquisition method of accounting as of the business combination date. Under this method, we allocate the fair value of purchase consideration to identifiable tangible and intangible assets acquired and liabilities assumed at their estimated fair values on the acquisition date. The excess of the consideration transferred over the fair value of the identifiable net assets acquired is recorded as goodwill and represents the future economic benefits expected to arise from other intangible assets acquired that do not qualify for separate recognition, including assembled workforce, non-contractual relationships, and expected future synergies. Determining the fair value of assets acquired and liabilities assumed requires us to use significant judgments and estimates, including the selection of valuation methodologies, estimates of future revenue, costs, and cash flows, and discount rates.

During the measurement period, which can be up to one year from the acquisition date, these estimates may be refined, as necessary, and we may record adjustments to the fair value of tangible and intangible assets acquired and liabilities assumed, with the corresponding offset to goodwill. Upon the conclusion of the measurement period or the final determination of the fair value of assets acquired or liabilities assumed, whichever comes first, any subsequent adjustments are recorded to our consolidated statements of operations. Acquisition related expenses and post-acquisition integration costs are recognized separately from the business combination and are expensed as incurred. Acquired property and equipment is depreciated on a straight-line basis over the assets' respective estimated remaining useful lives.

Impairment of Long-Lived Assets

Long-lived assets and certain intangible assets are reviewed for impairment at least annually or more frequently whenever events or changes in circumstances indicate 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.

With respect to goodwill, we have the option to qualitatively assess whether it is more likely than not the fair value of a reporting unit is less than its carrying value. If we elect to perform a qualitative assessment and conclude it is more likely than not the fair value of the reporting unit is equal to or greater than its carrying value, no further assessment of that reporting unit's goodwill is necessary; otherwise, goodwill must be tested for impairment. Absent a specifically identified triggering event, we historically perform our annual assessment on the first day of the fourth quarter.

Because we operate under one reporting unit, the fair value of our reporting unit is based on our enterprise value. No indicators of impairment were identified for the years ended December 31, 2021, 2020, and 2019.

Investments and Fair Value of Financial Instruments

Refer to Note 17 for a detailed discussion on our policies specific to investments and determining fair value.

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 ("RSUs") 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 such as RSUs, 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. We account for forfeitures as they occur rather than estimating expected forfeitures.

Leases

Refer to Note 4 for a detailed discussion on our policies specific to leasing arrangements.

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 the 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, 2021, 2020, and 2019, basic and diluted net loss per share were the same as the effect of potentially dilutive securities would have been antidilutive.

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 on a consolidated basis when deciding how to allocate resources and assess performance. Accordingly, we have determined we have one reportable segment and operating unit structure.

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 (income), net. Transaction gains and losses from transactions denominated in foreign currencies resulted in net transaction losses of $3.7 million for the year ended December 31, 2021, net transaction gains of $4.3 million, and net transaction losses of $0.2 million for the years ended December 31, 2020 and 2019, respectively.

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 necessary to establish products that meet design specifications including functions, features, and technical performance requirements. We have determined 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 Expenses

We expense advertising costs as they are incurred. Advertising expenses were $4.4 million, $6.0 million, and $4.1 million for the years ended December 31, 2021, 2020, and 2019, respectively.

Recent Accounting Pronouncements

Adopted

In December 2019, the FASB issued ASU 2019-12, *Income Taxes (Topic 740): Simplifying the Accounting for Income Taxes*, which amends and aims to simplify accounting disclosure requirements regarding a number of topics including, but not limited to, intraperiod tax allocations, accounting for deferred taxes when there are changes in the consolidation of certain investments, tax basis step ups in an acquisition, and the application of effective rate changes during interim periods. This guidance is effective for fiscal years, and interim periods within those fiscal years, beginning after December 15, 2020. The adoption of the new guidance did not have a material impact on our consolidated financial statements.

In March 2020, the FASB issued ASU 2020-04, *Reference Rate Reform - Facilitation of the Effects of Reference Rate Reform on Financial Reporting (Topic 848),* which provides temporary optional expedients and exceptions to the GAAP guidance on contract modifications and hedge accounting to ease the financial reporting burdens of the expected market transition from LIBOR and other interbank offered rates to alternative reference rates such as the Secured Overnight Financing Rate (SOFR). This guidance is effective upon issuance and generally can be applied through the end of calendar year 2022. The adoption of the new guidance did not have a material impact on our consolidated financial statements.

In October 2021, the FASB issued ASU 2021-08, *Business Combinations (Topic 805): Accounting for Contract Assets and Contract Liabilities from Contracts with Customers*, which aims to improve the accounting for acquired revenue contracts with customers in a business combination. The ASU requires an entity to recognize and measure contract assets and contract liabilities acquired in a business combination in accordance with Topic 606. The guidance is effective for fiscal years beginning after December 15, 2022 and interim periods within those fiscal years. Early adoption is permitted including in interim periods. Refer to Note 5 for further details on the impact of adopting this new guidance.

3. Revenue

Revenue Recognition

We generate subscriptions revenue primarily through the sale of software-as-a-service ("SaaS") subscriptions bundled with maintenance and support and hosting services as well as 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 as well as training related to our platform.

The following table summarizes revenue from contracts with customers for the years ended December 31, 2021, 2020, and 2019 (in thousands):

	Year Ended December 31,		
	2021	**2020**	**2019**
SaaS subscriptions	$ 179,415	$ 129,219	$ 95,028
Term license subscriptions	63,203	51,415	40,428
Maintenance and support	21,120	18,076	15,843
Total subscriptions	263,738	198,710	151,299
Professional services	105,521	105,863	109,053
Total revenue	$ 369,259	$ 304,573	$ 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 while 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 or through 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. 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 have been 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 Revenue

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

Consulting Services

We sell consulting services to assist customers in planning and executing the 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) under a fixed-fee arrangement or (2) on 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

Determining 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 a significant reversal will not occur. The amount of variable consideration excluded from the transaction price for the years ended December 31, 2021, 2020, and 2019 was insignificant. Our estimates of variable consideration are also subject to subsequent true-up adjustments and may result in changes to transaction prices; however, such true-up adjustments are not expected to be material.

Allocating the Transaction Price Based on Standalone Selling Prices ("SSP")

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 the residual approach to estimating 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 in conjunction with renewals of our legacy perpetual software licenses and within a narrow range of the net license fee. Because an economic relationship exists between the license and maintenance and support, we have concluded the residual approach to estimating SSP of term license subscriptions is an appropriate allocation of the transaction price.

3. Maintenance and support - We establish the 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 and training services - The SSP of consulting 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 December 31, 2021 and 2020, contract assets of $14.0 million and $20.1 million, respectively, are included in the Prepaid expenses and other current assets and Other assets line items in our consolidated balance sheets.

Contract liabilities consist of deferred revenue and include payments received in advance of the satisfaction of performance obligations. Deferred revenue is then recognized as the revenue recognition criteria are met. 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. For the year ended December 31, 2021, we recognized $114.2 million of revenue that was included in the deferred revenue balance as of December 31, 2020.

Transaction Price Allocated to the Remaining Performance Obligations

As of December 31, 2021, we had an aggregate transaction price of $285.5 million allocated to unsatisfied performance obligations. We expect to recognize $189.6 million of this balance as revenue over the next 12 months with the remaining amount recognized thereafter.

4. Leases

As of December 31, 2021, we have operating leases for corporate offices. Our operating leases have remaining lease terms of roughly two years to 10 years, some of which include options to extend the leases for up to an additional 10 years.

Right-of-Use ("ROU") Assets and Lease Liabilities

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 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 our consolidated balance sheets 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 but rather to account for the lease and non-lease components as a single lease component.

Lease liabilities and their corresponding ROU assets are recorded based on the present value of lease payments over the expected lease term. The implicit rates within most of our leases are generally not determinable; 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 the currency in which the lease is denominated. Operating lease ROU assets also include 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 while 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.

Headquarters Lease

In April 2018, we entered into a lease agreement with respect to 176,222 square feet of office space in McLean, Virginia for a new corporate headquarters. The initial 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 as of that date. In February 2019, we took possession of an additional 28,805 square feet of adjacent office space.

In January 2020, we entered into an amendment which adjusted the original terms of the headquarters lease. Under this amendment, we exercised an option to expand occupancy, adding 34,158 square feet of office space. Occupancy of the added space commenced on October 14, 2020. The amendment is considered a modification to the original lease and is accounted for as a separate contract because it represents a new ROU asset and the lease costs on the new space are charged at prevailing market rates. Effective July 1, 2020, we took possession of the space, began to recognize rent expense, and recorded a $7.9 million ROU asset and lease liability on our consolidated balance sheets.

In November 2021, we entered into a third amendment to our headquarters lease, in which we exercised an option to expand occupancy into two adjacent office spaces of 32,883 and 25,925 square feet, with occupancy to commence on September 1, 2022 and May 1, 2023, respectively. Concurrent with the amendment, we also entered into a sublease agreement in which we agreed to sublease 32,883 square feet of space effective September 1, 2022. The sublease terminates on August 31, 2025 but may be extended one additional year at the sublessee's option. The amendment is considered a modification to the original lease and each space is accounted for as a separate contract because it represents a new ROU asset and the lease costs charged on the new spaces are at prevailing market rates. As of December 31, 2021, we have not taken possession of either space nor met the criteria for the leases and sublease to be considered commenced. Accordingly, we have not reported an ROU asset or liability on our consolidated balance sheets nor have recorded expense or sublease income on our consolidated statements of operations in relation to the additional spaces.

Paydown of Finance Leases

In October 2020, we paid the full $2.7 million principal balances outstanding under our finance leases pursuant to an option permitting us to pay such balances in full at any time. As of the date of the paydown, the titles to the assets were transferred to us, the associated lease liabilities were retired, the carrying values of the purchased assets were adjusted, and the assets were reclassified from finance leases to property and equipment, net on the consolidated balance sheets.

Lease Costs

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 ROU assets or lease liabilities but rather are expensed as incurred and recorded as variable lease expense.

The following table sets forth the components of lease expense for the years ended December 31, 2021 and 2020 (in thousands):

	Year Ended December 31,	
	2021	**2020**
Operating lease costs	$ 6,619	$ 6,649
Finance lease costs:		
Amortization of right-of-use assets	—	1,242
Interest on lease liabilities	—	150
Short-term lease costs	149	565
Variable lease costs	2,713	281
Total	$ 9,481	$ 8,887

Supplemental Lease Information

Supplemental balance sheet information related to operating leases as of December 31, 2021 and December 31, 2020 was as follows (in thousands, except for lease term and discount rate):

	As of December 31,	
	2021	2020
Operating right-of-use assets	$ 27,897	$ 30,659
Operating lease liabilities, current	$ 8,110	$ 6,923
Operating lease liabilities, net of current portion	48,784	51,194
Total operating lease liabilities	$ 56,894	$ 58,117
Weighted average remaining lease term (in years)	9.5	10.6
Weighted average discount rate	9.5 %	9.6 %

For the years ended December 31, 2021 and 2020, amortization of operating ROU assets totaled $1.4 million and $1.6 million, respectively. For the years ended December 31, 2021 and 2020, interest expense on operating ROU liabilities totaled $5.3 million and $1.9 million, respectively.

Supplemental cash flow information related to leases for the years ended December 31, 2021 and 2020 was as follows (in thousands):

	Year Ended December 31,		
	2021	2020	2019
Cash paid for amounts included in the measurement of lease liabilities:			
Operating cash outflows for operating leases	$ 7,732	$ 3,407	$ 6,413
Operating cash outflows for finance leases	—	150	108
Financing cash outflows for finance leases	—	3,822	653
ROU assets obtained in exchange for lease obligations:			
Operating leases	—	—	523
Finance leases	—	—	4,475

A summary of our future minimum lease commitments under non-cancellable leases as of December 31, 2021 is as follows (in thousands):

	Operating Leases
2022	$ 8,451
2023	8,309
2024	8,632
2025	9,329
2026	9,366
Thereafter	48,775
Total lease payments	92,862
Less: imputed interest	(35,968)
Total	$ 56,894

5. Business Combinations

Lana Labs

In August 2021, we acquired 100% of the outstanding common stock of Lana Labs, a developer of process mining software, for approximately $30.7 million, net of cash acquired and debt. The acquisition was made due to the attractive nature of the product offerings of Lana Labs and in furtherance of our objective to enhance our platform. The transaction was financed through available cash on hand.

The allocation of the purchase price is preliminary pending the finalization of the fair value of the acquired net assets, liabilities assumed, deferred income taxes, and any assumed income and non-income based tax liabilities. As of the acquisition date, the purchase price was assigned to the acquired assets and assumed liabilities as follows (in thousands):

Cash acquired	$ 256
Other current assets	106
Property and equipment	59
Developed technology	5,974
Customer relationships	750
Goodwill	24,521
Other non-current assets	27
Total assets acquired	31,693
Current liabilities	638
Non-current liabilities	38
Total liabilities assumed	676
Net assets acquired	$ 31,017

There were no changes to our reportable segments as a result of the acquisition. From the acquisition date to December 31, 2021, Lana Labs' revenue was $0.3 million and net loss before taxes was $2.6 million. Acquisition costs incurred in relation to the transaction were immaterial. We do not expect the purchase price allocated to goodwill and intangible assets to be deductible for tax purposes.

Measurement period adjustments recognized in the year ended December 31, 2021 included a $0.8 million adjustment to developed technology and goodwill related to an update to the discount rate utilized in our valuation of intangibles, a $0.1 million deferred tax adjustment, and an immaterial adjustment to working capital. Additionally, as a result of our early adoption of ASU 2021-08, deferred revenue as of the acquisition date increased by $0.3 million, $0.1 million of which was recognized as revenue through December 31, 2021.

Novayre Solutions SL

In January 2020, we acquired 100% of the outstanding common stock of Novayre Solutions SL (“Novayre”), a developer of a robotic process automation platform, for approximately $6.9 million. The acquisition was made due to the attractive nature of the product offerings of Novayre and in furtherance of our objective to enhance our platform. The transaction was financed through available cash on hand.

The allocation of the purchase price was based upon estimated fair values of the assets acquired and liabilities assumed. As of the acquisition date, the purchase price was assigned to the acquired assets and assumed liabilities as follows (in thousands):

Cash acquired	$	731
Other current assets		213
Property and equipment		22
Developed technology		1,537
Customer relationships		406
Goodwill		4,348
Other non-current assets		10
Total assets acquired		7,267
Current liabilities		14
Non-current liabilities		344
Total liabilities assumed		358
Net assets acquired	$	6,909

There were no changes to our reportable segments as a result of the acquisition. Additionally, acquisition costs incurred in relation to the transaction were immaterial. We do not expect the purchase price allocated to goodwill and intangible assets to be deductible for tax purposes.

6. Goodwill and Intangible Assets

Goodwill was comprised of the following as of December 31, 2021 and 2020 (in thousands):

	Carrying Amount	
Balance as of December 31, 2019	$	—
Goodwill acquired		4,348
Foreign currency translation adjustments		514
Balance as of December 31, 2020	$	4,862
Goodwill acquired		24,521
Foreign currency translation adjustments		(1,588)
Balance as of December 31, 2021	$	27,795

Intangible assets, net consisted of the following as of December 31, 2021 and 2020 (in thousands):

	As of December 31,			
	2021		2020	
Developed technology	$	7,271	$	1,719
Customer relationships - Non-Robotic Process Automation (“RPA”)		872		172
Customer relationships - RPA		261		282
Intangible assets, gross		8,404		2,173
Less: accumulated amortization		(1,260)		(429)
Intangible assets, net	$	7,144	$	1,744

Intangible amortization expense was $0.8 million and $0.4 million for the years ended December 31, 2021 and 2020, respectively. As of December 31, 2021, the weighted average remaining amortization periods for developed technology, non-RPA customer relationships, and RPA customer relationships were approximately 4.4 years, 9.0 years, and 8.0 years, respectively.

The projected annual amortization expense related to amortizable intangible assets as of December 31, 2021 is as follows (in thousands):

Year Ended December 31,	
2022	$ 1,604
2023	1,552
2024	1,552
2025	1,234
2026	794
Thereafter	408
Total projected amortization expense	$ 7,144

7. Property and Equipment, net

Property and equipment, net consisted of the following as of December 31, 2021 and 2020 (in thousands):

	As of December 31,	
	2021	2020
Leasehold improvements	$ 41,005	$ 36,263
Office furniture and fixtures	2,536	2,521
Computer hardware	6,001	4,535
Computer software	1,353	1,352
Equipment	124	49
Property and equipment, gross	51,019	44,720
Less: accumulated depreciation	(14,106)	(9,316)
Property and equipment, net	$ 36,913	$ 35,404

Depreciation expense totaled $4.9 million, $5.4 million, and $4.7 million for the years ended December 31, 2021, 2020, and 2019, respectively. During the year ended December 31, 2021, we retired $0.1 million of leasehold improvements, and $0.1 million losses on disposal were recorded. During the year ended December 31, 2020, we retired $1.3 million of leasehold improvements, $0.2 million of computer hardware, and $0.1 million of office furniture and fixtures, and nominal losses on disposal were recorded.

8. Accrued Expenses

Accrued expenses consisted of the following as of December 31, 2021 and 2020 (in thousands):

	As of December 31,	
	2021	2020
Accrued hosting costs	$ 1,995	$ 1,229
Accrued labor costs	891	908
Accrued marketing and tradeshow expenses	1,167	596
Accrued audit and tax expenses	439	370
Accrued taxes payable	550	—
Accrued legal costs	5,511	760
Accrued reimbursable employee expenses	870	231
Accrued third party license fees	1,066	570
Accrued capital expenditures	379	—
Other accrued expenses	2,615	1,157
Total	$ 15,483	$ 5,821

9. Debt

Line of Credit

In November 2017, we entered into a $20.0 million revolving line of credit with a lender with an original maturity date of November 2022. In December 2021, we executed the first loan modification agreement which extended the revolving line of credit's maturity date to November 2025 and amended certain borrowing terms and financial covenants. Under the amended agreement, we may elect whether amounts drawn on the revolving line of credit bear interest on the outstanding principal amount at a rate per annum equal to either a) the Prime rate plus an additional interest rate margin or b) the secured overnight financing rate ("SOFR") 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 0.75% to 1.25% in the case of Prime rate advances and from 1.75% to 2.25% in the case of SOFR rate advances. The revolving line of credit contains an unused facility fee up to 0.20% 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 1.00 subject to a net cash threshold as set forth in the agreement 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, 2021. As of December 31, 2021, we had no outstanding borrowings under this revolving line of credit, and we had outstanding letters of credit totaling $11.2 million in connection with securing our leased office space.

10. Income Taxes

For the years ended December 31, 2021, 2020, and 2019, our loss before income taxes was comprised of the following (in thousands):

	Year Ended December 31,		
	2021	2020	2019
Domestic	$ (48,743)	$ (25,463)	$ (32,091)
Foreign	(39,120)	(7,131)	(17,803)
Total	$ (87,863)	$ (32,594)	$ (49,894)

For the years ended December 31, 2021, 2020, and 2019, our income tax expense (benefit) was comprised of the following (in thousands):

	Year Ended December 31,		
	2021	2020	2019
Current:			
Federal	$ 15	$ 11	$ 3
State	79	79	60
Foreign	1,156	977	1,091
Total current expense	1,250	1,067	1,154
Deferred:			
Federal	—	—	—
State	—	—	—
Foreign	(472)	(184)	(334)
Total deferred benefit	(472)	(184)	(334)
Total income tax expense	$ 778	$ 883	$ 820

For the years ended December 31, 2021, 2020, and 2019, 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:

	Year Ended December 31,		
	2021	2020	2019
U.S. federal statutory tax rate	21.0 %	21.0 %	21.0 %
State tax expense	4.7	18.2	7.1
Foreign rate differential	(4.1)	(3.6)	(5.1)
Nondeductible expenses	(0.5)	(0.6)	(0.7)
Foreign tax expense	(0.2)	—	—
Equity compensation	7.0	46.2	12.0
Tax credits	5.0	12.0	6.5
Unrecognized tax benefits	(0.9)	(2.2)	(1.1)
Change in tax rate	(1.2)	—	—
Other	(0.1)	(1.1)	(0.8)
Deferred adjustments	0.9	(1.7)	(1.6)
Change in valuation allowance	(32.5)	(90.9)	(38.9)
Total	(0.9)%	(2.7)%	(1.6)%

The effective tax rate of (0.9)% in 2021 includes $28.5 million of tax expense attributable to the change in the valuation allowance in the United States, Switzerland, and Germany (Lana Labs GmbH), partially offset by $10.5 million of 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, 2021 and 2020, significant components of our deferred tax assets and liabilities were as follows (in thousands):

	As of December 31,	
	2021	2020
Deferred tax assets:		
Net operating losses	$ 81,499	$ 59,417
Tax credits	15,510	11,922
Deferred revenue	466	824
Equity compensation	4,917	3,090
Lease liabilities	15,089	15,768
Accrued compensation	3,390	339
Bad debt	373	383
Other accrued expense	1,452	—
Other	301	1,234
Gross deferred tax assets	122,997	92,977
Less: Valuation allowance	(94,399)	(65,914)
Total deferred tax assets	28,598	27,063
Deferred tax liabilities:		
Prepaid expenses	(12,576)	(11,082)
Right-of-use assets	(7,361)	(8,270)
Unbilled receivables	(1,248)	(2,559)
Depreciation	(3,892)	(4,221)
Intangible	(2,102)	—
Other	(603)	(512)
Total deferred tax liabilities	(27,782)	(26,644)
Net deferred tax asset	$ 816	$ 419

As of December 31, 2021 and 2020, we had $239.9 million and $183.9 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, gross, generated prior to 2018 will expire, if unused, in 2037. Under the Tax Cuts and Jobs Act of 2017 (the "TCJA"), as modified by the Coronavirus Aid, Relief, and Economic Security Act (the "CARES Act"), federal NOL carryforwards generated in tax years beginning after December 31, 2017 may be carried forward indefinitely. As of December 31, 2021, we had $215.5 million of gross NOL carryforwards generated after 2017 for U.S. federal tax purposes, which may be used to offset 80% of our taxable income annually.

Section 382 of the Internal Revenue Code limits the utilization of NOL carryforwards when ownership changes occur, as defined by that section. A number of states have similar state laws that limit utilization of state NOL carryforwards when ownership changes occur. We have performed an analysis of our Section 382 ownership changes and have determined all U.S. federal and state NOL carryforwards are available for use as of December 31, 2021.

As of December 31, 2021 and 2020, we had $13.7 million and $10.5 million, respectively, of U.S. federal tax credit carryforwards which will expire, if unused, between 2031 and 2041.

As of December 31, 2021 and 2020, we had U.S. gross state NOL carryforwards of $249.8 million and $177.2 million, respectively. We had tax effected state NOL carryforwards of $14.1 million and $11.2 million as of December 31, 2021 and 2020, respectively. The rules regarding carryforwards vary from state to state, and the ability to utilize NOLs varies based on timing and amount. 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, 2021 and 2020, we had foreign gross NOL carryforwards of $126.6 million and $78.6 million, respectively, primarily attributable to our subsidiary in Switzerland. Those NOL carryforwards will begin to expire, if unused, between 2022 to 2029.

The net change in the total valuation allowance during the year ended December 31, 2021 was $28.5 million, primarily driven by the valuation allowance recorded against the United States, Switzerland, and Germany (Lana Labs GmbH) deferred tax assets.

As of December 31, 2021, we continued to maintain a full valuation allowance against U.S. deferred tax assets based on our cumulative operating results as of December 31, 2021, 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 we determined the negative evidence outweighed the positive evidence.

As of December 31, 2021, we have a valuation allowance of $14.8 million against foreign deferred tax assets, primarily for deferred tax assets at our subsidiary in Switzerland and Germany. Based on our cumulative operating results as of December 31, 2021 and assessment of our expected future results of operations, we determined 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, 2021 and 2020, we had unrecognized tax benefits of $3.1 million and $2.3 million, respectively, none of which would affect our effective tax rate if recognized due to the valuation allowance. The following table summarizes the activity related to our unrecognized tax benefit from January 1, 2019 to December 31, 2021 (in thousands):

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
Additions for tax positions in current years		702
Additions for tax positions in prior years		—
Reductions due to lapse in statutes of limitations		—
Settlements		—
Balance as of December 31, 2020		2,277
Additions for tax positions in current years		812
Additions for tax positions in prior years		—
Reductions due to lapse in statutes of limitations		—
Settlements		—
Balance as of December 31, 2021	$	3,089

We recognize interest and penalties related to uncertain tax positions in income tax expense. During the years ended December 31, 2021, 2020, and 2019, we recognized nominal amounts in interest. The cumulative balance of interest and penalties as of December 31, 2021 and 2020 were not meaningful.

We anticipate 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. Due to the NOL carryforward, tax years 2016 through 2021 remain open to examination by the major taxing jurisdictions to which we are subject. There are no open examinations that would have a meaningful impact to our consolidated financial statements.

11. Stock-Based Compensation

Equity Incentive Plans

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 initial public offering. The 2017 Plan provides for the grant of incentive stock options to employees and for the grant of nonstatutory stock options, restricted stock awards, RSUs, stock appreciation rights, performance-based stock awards, and other forms of equity compensation to employees, including officers, 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 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, 2021, there were 7,178,269 shares of Class A common stock reserved for issuance under the 2017 Plan, of which 3,920,861 were available to be issued.

Stock Options

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 our common stock and the 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 vests when shares of our Class A common stock close at or above $84.63 per share for a period equal to or greater than 90 consecutive 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 is amortized over the derived service period of 2.6 years. Effective February 2021, the 2019 CEO Grant has satisfied all of the conditions required to be considered fully vested. As a result, we accelerated the recognition of approximately $3.3 million in stock-based compensation expense during the year ended December 31, 2021.

The following table summarizes the assumptions used to estimate the fair value of stock options granted during the years ended December 31, 2021, 2020, and 2019:

	Year Ended December 31,		
	2021	2020	2019
Risk-free interest rate	*	*	2.1%
Expected term (in years)	*	*	2.6
Expected volatility	*	*	55.0%
Expected dividend yield	*	*	—%

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

The following table summarizes stock option activity for the years ended December 31, 2021, 2020, and 2019:

	Number of Shares	Weighted Average Exercise Price	Weighted Average Remaining Contractual Term (Years)	Aggregate Intrinsic Value (in thousands)
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
Forfeited	(67,986)	10.17		
Outstanding at December 31, 2019	4,458,611	12.30	5.8	115,501
Granted	—	—		
Exercised	(1,001,411)	6.39		81,181
Expired	(1,380)	11.82		
Forfeited	(56,580)	11.33		
Outstanding at December 31, 2020	3,399,240	14.06	4.9	503,174
Granted	—	—		
Exercised	(423,824)	6.55		43,525
Expired	(4,100)	10.54		
Forfeited	(17,960)	11.78		
Outstanding at December 31, 2021	2,953,356	$ 15.16	4.0	$ 147,812
Exercisable at December 31, 2021	2,777,396	$ 15.37	3.9	$ 138,434

There were no stock options granted during the years ended December 31, 2021 and 2020. The weighted average grant date fair value of stock options granted during the year ended December 31, 2019 was $13.57 per share. The total fair value of stock options that vested during the years ended December 31, 2021, 2020, and 2019 was $10.8 million, $2.8 million, and $2.0 million, respectively. As of December 31, 2021, the total compensation cost related to unvested stock options not yet recognized was $0.1 million, which will be recognized over a weighted average period of 0.4 years.

Restricted Stock Units

The following table summarizes RSU activity for the years ended December 31, 2021, 2020, and 2019:

	Number of Shares	Weighted Average Grant Date Fair Value
Non-vested and outstanding at December 31, 2018	1,175,049	$ 26.04
Granted	436,912	40.70
Vested	(521,460)	27.81
Forfeited	(67,666)	26.38
Non-vested and outstanding at December 31, 2019	1,022,835	31.39
Granted	589,692	60.47
Vested	(270,609)	31.29
Forfeited	(176,915)	32.01
Non-vested and outstanding at December 31, 2020	1,165,003	46.04
Granted	488,462	108.98
Vested	(354,130)	43.39
Forfeited	(89,806)	62.72
Non-vested and outstanding at December 31, 2021	1,209,529	$ 70.99

As of December 31, 2021, total unrecognized compensation cost related to unvested RSUs was approximately $76.2 million, which will be recognized over a weighted average period of 2.1 years.

In November 2018, our co-founders were granted 255,930 RSUs under the 2017 Plan at a fair value of $30.06 per share. The awards were approved by the Board of Directors. The value of these awards at the grant date was $7.7 million and was amortized over the vesting periods. The RSUs vested during the year ended December 31, 2020.

Stock-Based Compensation Expense

The following table summarizes the components of our stock-based compensation expense by instrument type for the years ended December 31, 2021, 2020, and 2019 (in thousands):

	Year Ended December 31,		
	2021	2020	2019
RSUs	$ 19,382	$ 10,745	$ 12,667
Stock options	3,839	4,164	3,408
Common stock awards to Board of Directors	623	370	368
Total stock-based compensation expense	$ 23,844	$ 15,279	$ 16,443

Stock-based compensation expense for RSUs, stock options, and issuances of common stock to the Board of Directors is included in the following line items in the accompanying consolidated statements of operations for the years ended December 31, 2021, 2020, and 2019 (in thousands):

	Year Ended December 31,		
	2021	2020	2019
Cost of revenue			
Subscriptions	$ 1,199	$ 943	$ 647
Professional services	3,131	1,477	2,748
Operating expenses			
Sales and marketing	5,426	2,821	4,742
Research and development	5,224	2,718	3,480
General and administrative	8,864	7,320	4,826
Total stock-based compensation expense	$ 23,844	$ 15,279	$ 16,443

12. Stockholders' Equity

As of December 31, 2021, 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 39,964,298 shares of Class A common stock and 31,497,796 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 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 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.

13. 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, 2021, 2020, and 2019 (in thousands, except share and per share data):

	Year Ended December 31,		
	2021	2020	2019
Numerator:			
Net loss	$ (88,641)	$ (33,477)	$ (50,714)
Denominator:			
Weighted average common shares outstanding, basic and diluted	71,036,490	69,050,565	65,479,327
Net loss per share, basic and diluted	$ (1.25)	$ (0.48)	$ (0.77)

The following outstanding securities, prior to the use of the treasury stock method or the if-converted method, have been excluded from the computation of diluted weighted-average shares outstanding for the respective periods below because they would have been antidilutive:

	Year Ended December 31,		
	2021	2020	2019
Stock options	2,953,356	3,399,240	4,458,611
Non-vested restricted stock units	1,209,529	1,165,003	1,022,835

14. Commitments and Contingencies

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.

Minimum Purchase Commitments

In July 2021, we executed a non-cancellable cloud hosting arrangement with Amazon Web Services (“AWS”) that contains provisions for minimum purchase commitments. Specifically, purchase commitments under the agreement total $131.0 million over five years, including $22.0 million in the first year, $25.0 million in the second year, and $28.0 million in each of the third, fourth, and fifth years. The timing of payments under the agreement may vary, and the total amount of payments may exceed the minimum depending on the volume of services utilized. Spending under this agreement for the year ended December 31, 2021 totaled $11.8 million.

Exclusive of the AWS contract, we have other non-cancellable agreements for subscription software products that contain provisions stipulating minimum purchase commitments. However, the annual purchase commitments under these contracts are, individually and in the aggregate, immaterial to our consolidated statements of operations.

Letters of Credit

At each of December 31, 2021 and 2020, we had outstanding letters of credit totaling $11.2 million in connection with securing our leased office space. All letters of credit are secured by our borrowing arrangement as described in Note 9.

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 expected to have a material adverse impact on our consolidated financial statements.

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.

15. Segment and Geographic Information

We consider operating segments to be components of our business in which separate financial information is available and evaluated regularly by our Chief Operating Decision Maker (“CODM”). Our CODM, who is our Chief Executive Officer, reviews financial information on a consolidated basis when deciding how to allocate resources and assessing performance. Accordingly, we have determined we have a single reporting segment and operating unit structure.

The following table summarizes revenue by geography for the years ended December 31, 2021, 2020, and 2019 (in thousands):

	Year Ended December 31,		
	2021	2020	2019
Domestic	$ 243,562	$ 201,483	$ 176,187
International	125,697	103,090	84,165
Total	$ 369,259	$ 304,573	$ 260,352

With respect to geographic information, revenue is attributed to respective geographies based on the contracting address of the customer. There were no individual foreign countries from which more than 10% of our total revenue was attributable for the year ended December 31, 2021. Revenue from customers attributed to the United Kingdom were 12.5% and 12.2% of our total revenue for the year ended December 31, 2020 and 2019, respectively. Substantially all of our long-lived assets were held in the United States as of December 31, 2021 and 2020.

16. Retirement Plans

We have a defined contribution 401(k) retirement and savings plan (the “Plan”) to provide retirement benefits for all eligible employees. With limited exceptions, all employees over the age of 21 on the first day of the month immediately following the month of hiring are eligible to participate in the Plan. The Plan excludes United States expatriate employees, employees who are residents of Puerto Rico, and employees covered by another country’s pension retirement plan who are receiving employer contributions in that plan. The Plan allows eligible employees to make salary-deferred contributions up to 75% of their pre-tax annual compensation, as defined in the Plan, as long as the total contributed does not exceed the annual maximum allowable amount under the Internal Revenue Code. The Company makes a semi-monthly matching contribution of 100% of the employee's contribution for that pay period, up to a maximum of 4% of the employee's eligible gross compensation for that pay period. Company contributions vest ratably based on years of service over a four year period, beginning with the completion of the first year of service. For the years ended December 31, 2021, 2020, and 2019, we incurred $8.7 million, $6.8 million, and $5.5 million, respectively, in contribution expense related to employer matching contributions.

We are obligated to make plan contributions for the employees of certain of our wholly-owned foreign subsidiaries. For the years ended December 31, 2021, 2020, and 2019, we incurred $2.4 million, $1.7 million, and $1.5 million, respectively, in contribution expense related to our foreign subsidiaries.

17. Investments and Fair Value Measurements

Fair Value Measurements

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.

The asset or liability’s fair value measurement level within the fair value hierarchy is based on the lowest level of any input that is significant to the fair value measurement. Valuation techniques maximize the use of relevant observable inputs and minimize the use of unobservable inputs. There were no instruments measured at fair value on a recurring basis using significant unobservable inputs during the years ended December 31, 2021 and 2020.

The valuation techniques that may be used to measure fair value are as follows:

- Market approach - Uses prices and other relevant information generated by market transactions involving identical or comparable assets or liabilities;
- Income approach - Uses valuation techniques to convert future amounts to a single present amount based on current market expectations about those future amounts; and
- Cost approach - Based on the amount that currently would be required to replace the service capacity of an asset (i.e., replacement cost).

The carrying amounts of our cash and cash equivalents, accounts receivable, accounts payable, and accrued expenses approximate fair value as of December 31, 2021 and December 31, 2020 because of the relatively short duration of these instruments.

Investments

Our investment portfolio consists largely of debt investments classified as available-for-sale. Changes in the fair value of available-for-sale securities, excluding other-than-temporary impairments, are recorded in other comprehensive income (loss). Our investments as of December 31, 2021 and 2020 are as follows (in thousands):

	As of December 31, 2021						
	Fair Value Measurement				Balance Sheet Classification		
	Fair Value Level	Cost Basis	Unrealized Gains (Losses)	Market Value	Cash and Cash Equivalents	Short-term Investments and Marketable Securities	Long-term Investments
Money market fund	Level 1	$ 38,301	$ —	$ 38,301	$ 38,301	$ —	$ —
U.S. Treasury bonds	Level 1	8,171	—	8,171	—	8,171	—
Commercial paper	Level 2	23,312	—	23,312	—	23,312	—
Corporate bonds	Level 2	20,107	(14)	20,093	—	8,049	12,044
Asset-backed securities	Level 2	15,655	(8)	15,647	—	15,647	—
Total investments		$ 105,546	$ (22)	$ 105,524	$ 38,301	$ 55,179	$ 12,044

	As of December 31, 2020						
	Fair Value Measurement				Balance Sheet Classification		
	Fair Value Level	Cost Basis	Unrealized Gains (Losses)	Market Value	Cash and Cash Equivalents	Short-Term Investments and Marketable Securities	Long-Term Investments
Money market fund	Level 1	$ 27,150	$ —	$ 27,150	$ 27,150	$ —	$ —
U.S. Treasury bonds	Level 1	24,445	(3)	24,442	—	16,273	8,169
Commercial paper	Level 2	76,905	—	76,905	16,493	60,412	—
Corporate bonds	Level 2	34,738	(11)	34,727	—	27,542	7,185
Asset-backed securities	Level 2	26,373	(8)	26,365	—	5,599	20,766
Total investments		$ 189,611	$ (22)	$ 189,589	$ 43,643	$ 109,826	$ 36,120

There were no Level 3 assets held at any point during the year ended December 31, 2021 and 2020. Additionally, there were no transfers between Levels 1 and 2 during the year ended December 31, 2021 and 2020.

The amortized cost basis and fair value of debt securities at December 31, 2021 and 2020, by contractual maturity, are as follows (in thousands):

	As of December 31, 2021	
	Cost Basis	Fair Value
Due in one year or less	$ 93,497	$ 93,480
Due after one year through five years	12,049	12,044
Total investments	$ 105,546	$ 105,524

	As of December 31, 2020	
	Cost Basis	Fair Value
Due in one year or less	$ 153,483	$ 153,469
Due after one year through five years	36,128	36,120
Total investments	$ 189,611	$ 189,589

Actual maturities may differ from the contractual maturities in the table above because borrowers have the right to call or prepay certain obligations.

18. Subsequent Events

In January 2022, our Chief Executive Officer exercised the 2019 CEO Grant of stock options as described in Note 11. Pursuant to this exercise, we received cash proceeds from the exercise of common stock options totaling $23.8 million.

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

Not applicable.

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 information required to be disclosed by a company in the reports 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 information required to be disclosed by a company in the reports 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, 2021. Based on the evaluation of our disclosure controls and procedures as of December 31, 2021, our Chief Executive Officer and Chief Financial Officer concluded, 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, 2021 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, 2021, our internal control over financial reporting was effective.

Management's assessment of and conclusion on the effectiveness of internal control over financial reporting did not include the internal controls of Lana Labs GmbH, which was acquired in August 2021. We began consolidating the results of Lana Labs in the 2021 consolidated financial statements of Appian Corporation in connection with the acquisition, which represented approximately 6.0% of total assets as of December 31, 2021 and 0.1% of total revenue for the year ended December 31, 2021. Due to the timing of this acquisition and as permitted by SEC guidance, management excluded Lana Labs from its December 31, 2021 assessment of internal control over financial reporting.

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

There was no change in our internal control over financial reporting that occurred during the quarter ended December 31, 2021 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 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 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 the objectives of the control system are met. Further, the design of a control system must reflect the fact 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 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.

Not applicable.

Item 9C. Disclosure Regarding Foreign Jurisdictions that Prevent Inspections.

Not applicable.

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 2022 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the fiscal year ended December 31, 2021.

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 any amendments to the Code of Conduct or any waivers of its requirement will be disclosed on our website (www.appian.com) as required by applicable law or the listing standards of the Nasdaq Stock Market. 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 11. Executive Compensation.

The information required by this item is incorporated by reference to our Proxy Statement for our 2022 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the year ended December 31, 2021.

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 2022 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the year ended December 31, 2021.

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 2022 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the year ended December 31, 2021.

Item 14. Principal Accounting Fees and Services.

The information required by this item is incorporated by reference to our Proxy Statement for our 2022 Annual Meeting of Stockholders to be filed with the SEC within 120 days after the end of the year ended December 31, 2021.

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 No.	Description	Reference
3.1	Amended and Restated Certificate of Incorporation of Appian Corporation.	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.
3.2	Amended and Restated Bylaws of Appian Corporation.	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.
4.1	Form of Class A common stock certificate of Appian Corporation.	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.
4.2	Amended and Restated Investors' Rights Agreement by and among Appian Corporation and certain of its stockholders, dated February 21, 2014.	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.
4.3	Description of Securities.	Filed herewith.
10.1	2007 Stock Option Plan and Form of Option Agreement and Exercise Notice thereunder, as amended to date.+	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.
10.2	2017 Equity Incentive Plan and Forms of Stock Option Agreement, Notice of Exercise and Stock Option Grant Notice thereunder.+	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.
10.3	Non-Employee Director Compensation Plan, as amended December 16, 2020.+	Previously filed as Exhibit 10.3 to the Company's Annual Report on 10-K (File No. 001-38098), filed with the Securities and Exchange Commission on February 18, 2021, and incorporated herein by reference.
10.4	Form of Indemnification Agreement by and between Appian Corporation and each of its directors and executive officers.+	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.
10.5	Employment Agreement, dated as of September 7, 2012, by and between Appian Corporation and Matthew Calkins.+	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.

10.6	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.+	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.
10.7	Senior Executive Cash Incentive Bonus Plan.+	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.
10.8	Forms of Restricted Stock Unit Grant Notices and Restricted Stock Unit Award Agreements under 2017 Equity Incentive Plan.+	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.
10.9	Forms of Restricted Stock Award Grant Notice and Restricted Stock Award Agreement under 2017 Equity Incentive Plan.+	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.
10.10	2017 Equity Incentive Plan French Qualifying Sub-Plan, with Forms of Restricted Stock Unit Grant Notice and Restricted Stock Unit Award Agreement thereunder.+	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.
10.11	2017 Equity Incentive Plan CSOP Sub-Plan for UK Eligible Employees, with Forms of CSOP Stock Option Grant Notice and CSOP Option Agreement thereunder.+	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.
10.12	Deed of Lease, dated April 17, 2018, between Appian Corporation and Tamares 7950 Owner LLC.	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.
10.13	First Amendment to Deed of Lease, dated December 23, 2019, between Appian Corporation and Tamares 7950 Owner LLC.	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 20, 2020, and incorporated herein by reference.
10.14	Second Amendment to Deed of Lease, effective as of January 1, 2020, between Appian Corporation and Tamares 7950 Owner LLC.	Previously filed as Exhibit 10.16 to the Company's Annual Report on Form 10-K (File No. 001-38098), filed with the Securities and Exchange Commission on February 20, 2020, and incorporated herein by reference.
10.15	Software Enterprise OEM License Agreement, dated as of June 15, 2016, by and between Appian Corporation and Kx Systems, Inc.†	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.
10.16	Addendum No. 1 to Software Enterprise OEM License Agreement, dated as of August 20, 2019, by and between Appian Corporation and Kx Systems, Inc.	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.
10.17	Third Amended and Restated Loan and Security Agreement, dated as of November 1, 2017, by and between Appian Corporation and Silicon Valley Bank.†	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.
10.18	Employment Agreement, dated as of September 7, 2012, by and between Appian Corporation and Robert Kramer.+	Previously filed as Exhibit 10.2 to the Company's Quarterly Report on Form 10-Q (File No. 001-38098) filed with the Securities and Exchange Commission on May 7, 2020, and incorporated herein by reference.
10.19	Employment Agreement, dated as of May 6, 2020, by and between Appian Corporation and Eric Cross.+	Previously filed as Exhibit 10.2 to the Company's Quarterly Report on Form 10-Q (File No. 001-38098) filed with the Securities and Exchange Commission on August 6, 2020, and incorporated herein by reference.
10.20	Appian Corporation Employee Stock Purchase Plan.+	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 August 5, 2021, and incorporated herein by reference.
10.21	Third Amendment to Deed of Lease, dated as of November 30, 2021, between Appian Corporation and Tamares 7950 Owner LLC.	Filed herewith.

10.22	Agreement of Sublease, dated as of November 30, 2021, between Appian Corporation and Octagon, Inc.	Filed herewith.
10.23	Agreement on the Sale and Transfer of Shares dated as of August 4, 2021, by and among Appian Europe Ltd., and each of the Sellers and Managers identified therein.	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 November 4, 2021, and incorporated herein by reference.
10.24	First Loan Modification Agreement, dated as of December 30, 2021, by and between Appian Corporation and Silicon Valley Bank.	Filed herewith.
21.1	Subsidiaries of Appian Corporation.	Filed herewith.
23.1	Consent of BDO USA, LLP, independent registered public accounting firm.	Filed herewith.
24.1	Power of Attorney. Reference is made to the signature page hereto.	Filed herewith.
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.	Filed herewith.
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.	Filed herewith.
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.*	Filed herewith.
101.INS	XBRL Instance Document - The instance document does not appear in the interactive data file because its XBRL tags are embedded within the inline XBRL document.	Attached.
101.SCH	Inline XBRL Taxonomy Extension Schema Document	Attached.
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document	Attached.
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document	Attached.
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase Document	Attached.
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document	Attached.
104	Cover page interactive data file (formatted as Inline XBRL and contained in Exhibit 101)	Attached.

+ Indicates management contract or compensatory plan.

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

* 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

February 17, 2022

By: /s/ Matthew Calkins

Name: Matthew Calkins

Title: Chief Executive Officer and Chairman of the Board (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 17, 2022
/s/ Mark Lynch **Mark Lynch**	Chief Financial Officer *(Principal Financial Officer)*	February 17, 2022
/s/ Mark Matheos **Mark Matheos**	Chief Accounting Officer *(Principal Accounting Officer)*	February 17, 2022
/s/ Robert C. Kramer **Robert C. Kramer**	General Manager and Director	February 17, 2022
/s/ A.G.W. “Jack” Biddle, III **A.G.W. "Jack" Biddle, III**	Director	February 17, 2022
/s/ Prashanth “PV” Boccassam **Prashanth “PV” Boccassam**	Director	February 17, 2022
/s/ Michael G. Devine **Michael G. Devine**	Director	February 17, 2022
/s/ Barbara “Bobbie” Kilberg **Barbara “Bobbie” Kilberg**	Director	February 17, 2022
/s/ Michael J. Mulligan **Michael J. Mulligan**	Director	February 17, 2022

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