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

FORM 10-K

☒ 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: 001-39399

JAMF HOLDING CORP.
(Exact name of registrant as specified in its charter)

Delaware	**82-3031543**
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)

100 Washington Ave S, Suite 1100
Minneapolis, MN 55401
(Address of principal executive offices)

(612) 605-6625
(Registrant's telephone number, including area code)

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

Title of each class	Trading symbol	Name of each exchange on which registered
Common Stock, $0.001 par value per share	JAMF	The NASDAQ Stock Market LLC

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. ☐

Indicated by check mark whether the registrant has filed a report on and attestation to it 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 ☒

The aggregate market value of the registrant's common stock held by non-affiliates as of June 30, 2021 was approximately $1.8 billion (based on a closing price of $33.57 per share).

On February 18, 2022, the registrant had 119,583,396 shares of common stock, $0.001 par value, outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's Proxy Statement relating to the 2022 Annual Meeting of Stockholders are incorporated by reference in Part III of this Annual Report on Form 10-K. This Proxy Statement will be filed with the Securities and Exchange Commission within 120 days of the registrant's fiscal year ended December 31, 2021.

JAMF HOLDING CORP.
FORM 10-K
FOR THE FISCAL YEAR ENDED DECEMBER 31, 2021

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Forward-Looking Statements

This Annual Report on Form 10-K contains forward-looking statements that are subject to risks and uncertainties. All statements other than statements of historical fact included in this Annual Report on Form 10-K are forward-looking statements. Forward-looking statements give our current expectations and projections relating to our financial condition, results of operations, plans, objectives, future performance, and business. You can identify forward-looking statements by the fact that they do not relate strictly to historical or current facts. These statements may include words such as “anticipate,” “estimate,” “expect,” “project,” “plan,” “intend,” “believe,” “may,” “will,” “should,” “can have,” “likely,” and other words and terms of similar meaning in connection with any discussion of the timing or nature of future operating or financial performance or other events. For example, all statements we make relating to our estimated and projected costs, expenditures, cash flows, growth rates, and financial results or our plans and objectives for future operations, growth initiatives, or strategies are forward-looking statements.

We derive many of our forward-looking statements from our operating budgets and forecasts, which are based on many detailed assumptions. While we believe that our assumptions are reasonable, we caution that it is very difficult to predict the impact of known factors, and it is impossible for us to anticipate all factors that could affect our actual results. Important factors that could cause actual results to differ materially from our expectations, or cautionary statements, are disclosed under “Risk Factors” and “Management’s Discussion and Analysis of Financial Condition and Results of Operations” in this Annual Report on Form 10-K. All written and oral forward-looking statements attributable to us, or persons acting on our behalf, are expressly qualified in their entirety by these cautionary statements as well as other cautionary statements that are made from time to time in our other Securities and Exchange Commission (“SEC”) filings and public communications. You should evaluate all forward-looking statements in the context of these risks and uncertainties.

We caution you that the important factors referenced above may not contain all of the factors that are important to you. In addition, we cannot assure you that we will realize the results or developments we expect or anticipate or, even if substantially realized, that they will result in the consequences or affect us or our operations in the way we expect. The forward-looking statements included in this Annual Report on Form 10-K are made only as of the date hereof. We undertake no obligation to update or revise any forward-looking statement as a result of new information, future events, or otherwise, except as otherwise required by law.

Part I.

Item 1. Business

Our Purpose and Mission

Our purpose is to empower people by simplifying work. As a result, our mission is to help organizations succeed with Apple.

Overview

We are the standard in Apple Enterprise Management, and our cloud software platform is the only vertically-focused Apple infrastructure and security platform of scale in the world. We help IT and security teams confidently protect the devices, data, and applications used by their workforce, while providing employees with consumer-simple, privacy-protecting technology. With Jamf's software, devices can be deployed to employees brand new in the shrink-wrapped box, set up automatically and personalized at first power-on and administered continuously throughout the lifecycle of the device.

Jamf was founded in 2002, around the same time that Apple was leading an industry transformation. Apple transformed the way people access and utilize technology through its focus on creating a superior consumer experience. With the release of revolutionary products like the Mac, iPod, iPhone, and iPad, Apple built the world's most valuable brand and became ubiquitous in everyday life.

We believe employees have come to expect the same high-quality Apple user experience at work as they enjoy in their personal lives. This is often not possible as many organizations rely on legacy solutions to administer devices or do not give employees a choice of device. Unlike competitors, our software solutions are Apple-first and Apple-best to preserve and extend the native Apple experience, allowing employees to use their devices as they do in their personal lives, while retaining their privacy and fulfilling IT's enterprise requirements around deployment, access, and security.

We have built our company through a primary focus on being the leading solution for Apple in the enterprise because we believe that due to Apple's broad range of devices, combined with the changing demographics of today's workforce and their strong preference for Apple, that Apple will become the number one device ecosystem in the enterprise by the end of this decade. We believe that the enterprise management provider that is best at Apple will one day be the enterprise leader, and that Jamf is best positioned for that leadership. Through our long-standing relationship with Apple, we have accumulated significant Apple technical experience and expertise that give us the ability to fully and quickly leverage and extend the capabilities of Apple products, operating systems, and services. This expertise enables us to fully support new innovations and operating system releases the moment they are made available by Apple. This focus has allowed us to create a best-in-class user experience in the enterprise and grow to more than 60,000 customers deploying 26.6 million devices in more than 100 countries and territories as of December 31, 2021.

We sell our SaaS solutions via a subscription model, through a direct sales force, online, and indirectly via our channel partners, including Apple. Our multi-dimensional go-to-market model and cloud-deployed offering enable us to reach all organizations around the world, large and small, with our software solutions. As a result, we continue to see rapid growth and expansion of our customer base as Apple continues to gain momentum in the enterprise. Our customers include many highly recognizable brands and organizations including Apple itself, 9 of the largest 10 Fortune 500 companies, 8 of the top 10 Fortune 500 technology companies, 22 of the 25 most valuable brands (according to the Forbes Most Valuable Brands rankings), and 10 of the 10 largest U.S. banks (based on total assets according to bankrate.com) as of December 31, 2021. Additionally, we see opportunities to sell add-on products from our software platform into our current install base in order to provide greater value for our customers. Our focus on customer success and innovation has resulted in a Net Promoter Score of 50 as of December 31, 2021, which significantly exceeds industry averages.

Complementing our software platform is Jamf Nation, the world's largest online community of IT and security professionals focused exclusively on Apple in the enterprise. This active, grassroots community serves as a highly-qualified and efficient crowd-sourced Q&A engine for anyone with questions about Apple deployments. This community selflessly acts as a resource for existing and potential customers and is also an important asset in providing feature feedback and ideas for our product roadmap.

On July 1, 2021, we completed our acquisition of Wandera, Inc. ("Wandera"), a leader in zero trust cloud security and access for mobile devices, extending our leadership in Apple Enterprise Management. The acquisition uniquely positions us to help IT and security teams protect devices, data, and applications while extending the intended Apple experience through the most robust and scalable Apple Enterprise Management platform in the market. Further, as we strive to enable an outstanding Apple experience, we look beyond the device hardware and ensure the full technology stack between the user and the application is harmonized. This experience includes identity and access management that does not harshly interrupt user productivity and workflows, security monitoring that respects end user privacy, and traffic routing that is optimized for each specific application — regardless of the location of the end user. From advanced anti-phishing and network threat protection to privacy-aware content filtering and fast, secure zero trust access, our network-based technologies are designed for any end user working from any platform.

Industry Background

Key trends impacting how enterprises use and manage technology to engage employees and drive productivity include:

Apple's democratization of technology

Apple is ubiquitous. It is the most valuable brand in the world according to Forbes, and in 2018, it became the first company to cross a market capitalization of $1 trillion. Apple's success has been driven by delivering the best user experience to its customers through its innovative combination of hardware, software, and cloud services. It has transformed the technology landscape by placing the user first, creating a harmonious, interconnected experience across devices, and designing everything around maximizing the Apple user experience.

In the 1990s and early 2000s, endpoint technology was dominated by Microsoft Windows, particularly in the workplace. Many enterprises prioritized standardization over user experience in order to facilitate the deployment, security, and management of massive numbers of Windows PCs. Employees were not typically given a choice in their devices. In the 2000s, Apple introduced a series of revolutionary products that transformed how the world interacts with technology. Apple released the iPod in 2001, followed by the iPhone in 2007, and the iPad in 2010. These products, which utilized Apple iOS (Apple's proprietary mobile operating system), shared a design element that placed the user first. The rapid rise in popularity of iOS devices, combined with the proliferation of web-based applications, created a "halo effect," leading to a resurgence of Apple's Mac computer. These devices empowered users to easily leverage powerful technology regardless of their technical expertise. Apple's consumer-focused technology provided a significantly more capable, intuitive, and faster experience than the technology many employees previously had in the workplace.

Apple's focus on the user experience has transformed employees' expectations for technology overall. Employees expect a simple, intuitive, seamless experience that fosters creativity, productivity, and collaboration. Apple currently offers an entire ecosystem of desktops, laptops, tablets, phones, and wearable devices designed to interoperate seamlessly at home, at work, and everywhere in-between. This has made Apple the leading technology brand overall, with nearly 60% of Apple users "not being able to live without the brand," according to a 2021 brand intimacy study by MBLM.

The consumerization of IT

The consumerization of IT refers to the migration of software and hardware products originally designed for personal use into the enterprise. Today, employees are often less inclined to draw a line between work and personal technology and commonly prefer not to settle for enterprise solutions that are harder to use than what they have at home. In response to the consumerization of IT movement, enterprises are transforming digitally to create a more engaged workforce, offering employees consumer-like tools and choice of technology brands. As the competition for talent escalates, we believe technology will play a central role in either improving or degrading the employee experience. Empowering employees to use their preferred devices is important to attract, engage, and retain productive employees. Today, with more organizations than ever before managing and onboarding new employees remotely, the technology experience and the employee experience are synonymous.

Rapidly evolving workplace demographics are also accelerating the consumerization of IT. Millennials currently represent the largest segment of the U.S. workforce, and have been since 2016, according to a 2018 study by the Pew Research Center. Millennials are the first digitally-native generation that has grown up with broadband, smartphones, tablets, laptops, and a massive library of apps through which they interact with the world and each other. Millennials demand more from their enterprise IT organizations. They expect to work from anywhere at any time. They expect to be able to collaborate instantly. They expect to have a choice in the technology brand they use.

This trend is expected to continue as younger generations continue to enter the workforce and workplace technology continues to directly impact employment decision-making. In a 2021 survey conducted by Vanson Bourne and commissioned by us, 89% of workers are willing to make a salary sacrifice for device choice and nearly two-thirds would choose Apple.

Consumerization of IT has been one of the most significant trends impacting enterprise IT over the past decade. This trend is exemplified by Apple’s iPhone, introduced in 2007. The iPhone was quickly preferred by many employees for its superior user experience compared to the corporate issued mobile phones controlled by enterprise IT departments. Mass consumer adoption of the iPhone pushed organizations to develop corporate policies that support the use of personal devices for work. As a result, Apple — the ultimate consumer technology company — has become critically important to enterprise IT organizations.

Apple’s momentum in enterprise IT

Fueled by Apple’s popularity and the consumerization of IT, Apple devices have gained widespread acceptance across the enterprise, from the executive suite to new hires. As a result, Apple market share in the enterprise has grown significantly. According to Apple CEO Tim Cook, Apple is now in every Fortune 500 company, and “eight in ten companies are writing custom apps for their enterprise.” Apple’s enterprise revenue, disclosed as $25 billion in 2015, is estimated to have grown to over $40 billion in 2019 according to Atherton Research. Apple’s commitment to the enterprise has expanded through partnerships with enterprise giants, such as Accenture, Cisco, Deloitte, General Electric, IBM, Salesforce, and SAP.

Evidence of this momentum is further supported by Statcounter, an organization that aggregates data based on web traffic. According to Statcounter, Apple operating systems comprised 24% of global web traffic (both business and consumer) in December 2021, up from 4% in January 2009. Apple’s gains in the U.S. have been even more significant, with Apple operating systems now representing over 44% of web traffic in December 2021, compared to 30% for Microsoft and 24% for Google. Over that same period, the market share of Microsoft in the U.S. has declined from 92% to 30%. According to IDC data, the Mac has been the fastest growing computer worldwide for the past two years with a Compound Annual Growth rate of 25%, more than ten percentage points faster than growth of the PC industry, and faster than all other major PC brands.

The increased use of mobile devices to access the internet is largely responsible for the decline in market share of Windows over the past decade. Over this same decade, however, the Mac computer has grown in popularity and market share, further demonstrating that Apple’s increased use is not limited to iOS devices. While the Mac computer was once primarily associated with creative or artistic activities, it now represents a growing share of computers within the enterprise. According to a 2021 IDC Report (Worldwide Unified Endpoint Management Software for Apple Devices 2021 Vendor Assessment), adoption of Mac usage in the enterprise (firms with 1,000+ employees according to IDC) is growing by many measures. In the United States, average penetration of macOS devices was around 23% in 2020, compared with 17% in 2019, according to IDC’s 2020 and 2019 Enterprise Mobility and Workspace Software Surveys. This wave of new Mac devices requiring seamless remote access to business apps and resources is causing friction among many enterprise end-user computing support and management teams, which have historically focused more on Windows device management. Macs, of course, are not the entire story around Apple devices in the enterprise. According to IDC’s 2021 enterprise survey, iPhones account for 49% of the smartphone installed base among U.S. enterprises, and iPads make up the majority of tablets used in the enterprise.

Given the expectations of both current and future employees, offering employees a choice in technology brand is becoming imperative for many enterprises. When given a choice, more than 70% of employees surveyed worldwide would choose Mac over PC and iOS over Android, according to a 2018 survey conducted by us. Considering IDC’s estimate of current Mac enterprise penetration, we believe there is significant opportunity to fill the gap between how many employees want a Mac and how many currently use one.

Digital transformation in response to COVID-19

The COVID-19 pandemic accelerated the need for solutions to empower remote work, distance learning, and telehealth. While these trends were gaining mind share prior to the pandemic, the pandemic created momentum for these digital transformation changes that we believe will continue post COVID-19. Workflows that were once aspirational have become essential. For example, many companies with a remote workforce need to ship devices directly from the manufacturer to the end user and have all the enterprise requirements fulfilled without IT ever touching the devices. While this workflow has been used by some organizations in the past to increase IT efficiency and smooth the user experience, it now has become a logistical and scalable advantage for device distribution and employee safety. In healthcare, providers are attempting to conserve personal protective equipment and generally minimize in-person patient contact. As such, providers have used iPads to facilitate virtual inpatient care, serve patients at home, and connect isolated patients with loved ones, with some providers even loaning the required devices to patients. In education, digital technology has never played a more important role, and many school districts continue to offer fully remote or hybrid learning models. These school districts require a solution that helps educators, students, and parents embrace distance learning technology. This sudden and significant shift from in-person to virtual interactions is forcing these modern workflows into the mainstream. The vision of employee or student empowerment delivered through Jamf solutions can help organizations operate at the level they did before the necessity to conduct their business or function in a remote environment.

We believe these trends will continue. According to a 2021 Gallup study, COVID-accelerated remote work trends have persisted with nearly half of employed Americans working exclusively or partially remote and over 90% of such remote workers hoping remote work continues post-pandemic. More organizations than ever before are examining their remote employee and work-from-home policies and looking for solutions to guide them. According to a 2021 PricewaterhouseCoopers study, over 70% of executives are planning new investment in tools for virtual collaboration and/or IT infrastructure to secure virtual connectivity to support remote work. Now, the technology experience and the employee experience are synonymous.

The limitations of legacy enterprise solutions

Legacy solutions do not deliver the full Apple user experience because they are either outdated, overly Windows-centric, or treat all devices the same across operating systems. In particular, cross-platform solutions that treat devices the same tend to rely on the lowest common denominator technology that is shared across the relevant ecosystems. Apple, Microsoft, and Google have each introduced device-specific cloud services to automate enterprise IT processes. Fully embracing these cloud services demands specific focus on the respective ecosystem. Legacy solutions do not leverage the native capabilities of Apple and do not deliver the full Apple experience across several key areas, including the following:

- ***Provisioning and deployment.*** Legacy solutions commonly rely on processes, such as disk imaging, that are manual or time-intensive for IT departments and diminish the Apple user experience. As a result, IT departments need to spend additional time and effort setting up and configuring devices similar to a traditional PC deployment, and users receive a muted Apple experience that is overly complex and falls short of expectations.

- ***Operating system updates.*** Cross-platform legacy solutions are unable to allocate sufficient resources to always support the latest operating systems from all manufacturers. As a result, IT departments are forced to place moratoriums on operating system upgrades (through manually distributed emails) so they can test and then slowly roll out operating system upgrades weeks or months after they become available. This approach is contrary to Apple user expectations and also delays deployment of potentially important security updates which often results in such solutions not supporting the latest Apple operating system features and can cause security vulnerabilities that put an organization at risk. This is exacerbated with the release of the Apple M1 chip on new Mac devices which revolutionizes its performance. Those not aligned with Apple and same-day support — be it management or security solution provider — are unable to support this new hardware which prevents users from being productive and protected.

- ***Application licensing and lifecycle.*** Cross-platform solutions offer limited options for application distribution and installation, which often require hands-on IT oversight. Microsoft, Apple, and Google each possess their own commerce solutions for third-party application purchases and distribution. Enterprise integrations for these commerce solutions require deep understanding of the platform and associated service. Cross-platform solutions have historically struggled to stay current with the standards of each platform’s features.

  Additionally, the enterprise requirements for security and privacy result in the need to wrap applications with middleware, such as containers, degrading Apple’s intended user experience. License tracking in the cross-platform solution environment can also be manual. All of this effort creates extra and error-prone work for IT departments and dilutes the Apple user experience.

- ***Endpoint protection.*** Legacy solutions do not leverage Apple’s native security tools and Endpoint Security framework, thereby providing limited visibility into an organization’s fleet of devices and limited identification of potential security threats. Those not fully aligned with Apple’s native security tools and Endpoint Security framework are unable to support the Apple M1 chip for Mac and cannot apply new restrictions in Apple’s latest operating system, macOS Monterey, on M1 Mac devices.

  In most cases, legacy solutions rely on endpoint protection solutions that were originally designed for Windows. As a result, these solutions deliver endpoint protection to devices in a manner which degrades the Apple user experience and performance and may not function properly in an Apple environment. In addition, the signature-based approach utilized by these solutions can only identify backward-looking threats specific to Microsoft and does not communicate with native Apple security tools that could identify more relevant and immediate threats.

- ***Identity-based access to resources.*** The concept of a workplace perimeter is quickly fading as employees demand flexibility to work from anywhere with seamless access to enterprise applications and resources. Enterprises need to make it simple for users to authenticate and access enterprise resources from anywhere with a single identity. To provide users access to corporate resources, many organizations bind their devices with Azure Active Directory ("AAD"). While binding devices to AAD works well with Windows-based devices, it does not create an efficient experience for other ecosystems, including Apple. Additionally, to be able to service devices in the enterprise, IT often creates a secondary administrator account on each device that tends to become a management headache, user experience burden, and security risk.

For enterprise Apple deployments, the limitations of legacy solutions all add up to higher operational and support costs, greater security vulnerability, lower productivity, and a degraded user experience. While its devices may have higher upfront costs, implementing the full Apple experience results in higher productivity and lower total cost of ownership. Realizing these potential benefits requires an enterprise software solution specifically built for the Apple ecosystem.

Our Solution

We are the standard in Apple Enterprise Management, and our cloud software platform is the only vertically-focused Apple infrastructure and security platform of scale in the world. Our SaaS solutions provide a cloud-based platform for full lifecycle enterprise security and IT management of devices. We help IT and security teams confidently protect the devices, data, and applications used by their workforce, while providing employees with consumer-simple, privacy-protecting technology. Our solutions are purpose-built to provide both technical and non-technical IT personnel with a single software platform to administer their end-users' devices, while preserving the legendary Apple experience end-users have come to expect. We believe that our success is born out of a primary focus on Apple and our commitment to optimizing the end-to-end user experience. As of December 31, 2021, we had more than 60,000 customers, over 24,000 of which became customers in the last two years, in more than 100 countries and territories.

We believe employees have come to expect the same high-quality Apple user experience at work as they enjoy in their personal lives. This is often not possible as many organizations rely on legacy solutions to administer devices or do not give employees a choice of device. Unlike competitors, our software solutions are Apple-first and Apple-best to preserve and extend the native Apple experience, allowing employees to use their devices as they do in their personal lives, while retaining their privacy and fulfilling IT's enterprise requirements around deployment, access, and security. Our software platform provides the following key benefits:

- ***Device provisioning and deployment.*** We provide a scalable, zero-IT-touch deployment right out of the shrink-wrapped box, personalized for each end-user. Our offering makes it possible for IT professionals to easily manage the traditionally challenging tasks of deployment, information encryption, and loading and updating software, without ever touching the device. Jamf customer research has shown that our seamless cloud deployment capabilities lower the total cost of ownership of its devices, enable the native Apple experience in the enterprise, and ultimately make the devices more effective and secure.

- ***Self-service.*** We extend the Apple experience with a customizable enterprise self-service app that empowers end users to satisfy their own IT needs. With a single click, end users can install apps pre-approved by IT, request a new app, automatically resolve common technical issues, and easily connect and configure enterprise resources, like the nearest printer, without waiting for IT. While the end user experience is simple, the range of capabilities is immense. Our self-service app empowers users to be productive and self-sufficient while simultaneously reducing the labor burden on IT.

- ***Operating system updates.*** Many Apple users expect immediate access to new features by upgrading the moment Apple releases a new operating system. Given our primary focus on Apple, we are able to offer robust, immediate support for operating system feature updates — including Apple's new M1 chip for Mac — so they can be effortlessly deployed on the same day they are released by Apple. IT teams have the flexibility to automate updates or let users initiate the updates, ensuring employees stay up-to-date with all of the latest security and privacy features, plus leverage new Apple hardware once available.

- ***Application lifecycle and licensing.*** We give IT teams the ability to automate key workflows related to the installation and deployment of both Apple App Store and third-party applications, all from the most expansive app catalog, ensuring a more efficient IT management process. These capabilities include automated targeted distribution of apps to employees based on their work needs, user-initiated app installed via a customized enterprise app store and automated volume purchasing and license management, and automated tracking, deployment, and updating of third-party applications.

- ***Endpoint protection.*** We safeguard and amplify device security through an enterprise endpoint protection solution purpose-built for Apple and mobile devices. Jamf endpoint protection is specifically designed to identify Apple and mobile targeted threats while preserving user experience and performance. Our software solution is built around the unique challenges that Apple and mobile devices face in enterprise security, with behavior-based detection and prevention of Apple-specific threats and enterprise visibility into native Apple security tools. Through close monitoring of a device's network communications, Jamf endpoint protection detects and blocks extends its protections to advanced security threats and phishing attacks. Jamf endpoint protection is architected using native Apple application programming interfaces ("APIs") and designed to co-exist within an organization's existing enterprise security solutions. It supports Apple's new M1 chip and empowers IT, InfoSec, and end users to take advantage of the revolutionary efficiency, speed, and performance the M1 chip offers.

- ***Identity-based access to resources.*** We enable end users to easily and securely connect to enterprise resources with a single cloud-based identity credential, simplified using biometrics on the Apple device. End users can then immediately access all of their corporate applications and shared resources. This eliminates the time-consuming need for multiple logins, reduces the number of IT tickets for password-related issues (which are frequently the leading cause of IT tickets) and removes the need for IT administrators to bind devices to AAD. Additionally, Jamf is able to dynamically block or grant administrative rights on the Apple device itself based on an end user's cloud-based identity, thus removing the need for additional administrator accounts on the device.

- ***Network risk management.*** Regardless of end-user device type, network security is critical, especially with remote work and as workers expect to access company resources anywhere at any time. Jamf replaces legacy conditional access and VPN technology to deliver true zero trust network access ("ZTNA"). It ensures that after a user authenticates into their device, business connections are secured while enabling non-business applications to route directly to the internet. This preserves end-user privacy and optimizes network infrastructure. We are focused on securing connections, regardless if the end user leverages Apple or another device type. Network security is an extension of the Apple experience, and Jamf is focused on protecting every connect point.

Our software platform provides value to both end users and IT departments. Users receive the legendary Apple experience they have come to expect, and IT departments are able to empower employees, enhance productivity and lower total cost of ownership. According to a July 2021 Apple-commissioned study conducted by Forrester Consulting, The Total Economic Impact Of Mac In Enterprise: M1 Update, an M1 Mac in the enterprise results in $843 cost savings per device versus a comparable PC (when considering three-year hardware, software, support, and operational costs), a 20% improvement in employee retention, and a 5% increase in productivity of all employees. An M1 Mac also results in 48 hours of increased productivity per employee over three years. These metrics result in a payback period of less than 6 months for an M1 Mac.

Furthermore, 2021 Jamf customer research conducted by Hobson & Company and commissioned by us found benefits from simplifying IT management, reducing the time spent provisioning devices, the time spent on ongoing device management, and the time spent managing apps all by 90%. Additionally, that research found Jamf improved end-user experience, reducing end-user productivity loss due to technical problems by 90% and the time spent on help desk tickets by 70%. According to this research, Jamf also helped mitigate risk by reducing the time IT spent remediating incidents and vulnerabilities by 70%. Overall, Hobson & Company found that a typical organization could expect a 781% three-year return on investment and a 2.7 month payback period when using Jamf.

Our Relationship with Apple

Jamf was founded in 2002 with the sole mission of helping organizations succeed with Apple, making it the first Apple-focused device management solution. Today, we have become the largest infrastructure and software platform built specifically for enterprise deployments of the Apple ecosystem. Our relationship with Apple has endured and grown to be multi-faceted over the past 20 years.

To continuously offer a software solution built specifically for Apple, we have always worked closely with Apple's worldwide developer relations organization in an effort to support all new Apple innovations the moment their hardware and software is released. Additionally, throughout the course of our relationship, Jamf and Apple have formalized several contractual agreements:

- ***Apple as a customer.*** In 2010, Apple became a Jamf customer, using our software solution to deploy and secure its fleet of devices internally. For the year ended December 31, 2021, Apple as a customer represented less than 1% of our total revenue.

- ***Apple as a channel partner in education and in retail.*** In 2011, Apple became a Jamf channel partner in the education market, reselling our software solution to K-12 and higher education organizations within the United States. In 2012, Apple expanded their channel relationship by offering our software solution to businesses through Apple retail stores in the United States. For the year ended December 31, 2021, Apple as a channel partner facilitated approximately 6% of our bookings.

- ***Mobility Partner Program.*** In 2014, we became a member of Apple's Mobility Partner Program, which focuses on solution development and effective go-to-market activities.

Each of these contractual relationships continue to this day and span all enterprise technology across the Apple ecosystem, including Mac, iPad, iPhone, and Apple TV. In addition to these contractual relationships, Apple and Jamf personnel frequently join forces to influence and collaborate as we work with customers, helping them succeed with Apple.

Market Opportunity

We believe our solution addresses a large and growing market covering the use of Apple technology in the enterprise. According to Frost & Sullivan, the global Total Addressable Market for Apple Enterprise Management was estimated to be $12.2 billion in 2020 and is expected to grow at a compound annual growth rate of 17.7% to $23.4 billion by the end of 2024. This market represents the potential number of Apple mobile phones (iPhones), tablets (iPads), laptop and desktop computers (Macs), media streaming devices (Apple TVs), and portable media players (iPods) based on growing acceptance by education and business IT departments. Frost & Sullivan includes both devices purchased and provided by enterprises as well as bring your own devices ("BYODs") owned by end-users that may require Apple Enterprise Management to provide necessary access to resources or services from the enterprises. The potential device numbers are multiplied by the Jamf average selling price ("ASP") for each Apple device and enterprise type.

With the Wandera acquisition in 2021, we estimate that Jamf's Total Addressable Market grew by $6 billion, to approximately $18 billion, as a result of the additional products we are able to sell to run on Apple devices. However, we believe our Total Addressable Market is even larger. While we strive to enable an outstanding Apple experience, we also look beyond the device hardware to ensure the full technology stack between the user and the application is optimized. This includes identity and access management that does not interrupt user productivity and workflows, security monitoring that respects end user privacy, and traffic routing that is optimized for each specific application. From advanced anti-phishing and network threat protection to privacy-aware content filtering and fast, secure zero trust access, our network-based technologies are designed for any end user working from any platform. We believe this cross-platform expansion knocks down barriers for customer adoption and will grow our Total Addressable Market. Additionally, we believe our Total Addressable Market could expand further as Apple may make additional devices available for enterprise management, such as the Apple Watch, and as we develop future solutions which provide value to enterprises managing their Apple ecosystem. We are currently in the process of refreshing our Total Addressable Market to incorporate a number of these factors.

Our Strengths

The following are key strengths which contribute directly to our ability to create value for customers, employees, partners, and stockholders:

- ***Long-standing relationship with and primary focus on Apple.*** We are the only vertically-focused Apple infrastructure and security platform of scale in the world, and we have built our company through a primary focus on being the leading solution for Apple in the enterprise. We have a collaborative relationship with Apple which, combined with our accumulated technical experience and expertise, gives us the ability to fully and quickly leverage and extend the capabilities of Apple products, operating systems, and services. This expertise and collaboration with Apple development programs enables us to fully support new Apple innovations and operating system releases the moment they are made available by Apple.

- ***Strong support from Jamf Nation.*** Jamf Nation is the world's largest online community of IT and security professionals exclusively focused on Apple in the enterprise. This active, grassroots community serves as a highly-qualified and efficient crowd-sourced Q&A engine for anyone with questions about Apple and Jamf deployments. Each year we celebrate this community through a customer event called Jamf Nation User Conference ("JNUC"). During the most recent JNUC in fall of 2021, which was held virtually, approximately 8,000 people attended from over 100 countries. This community of loyal Jamf supporters acts as a resource for existing and potential customers and is also an important asset in providing feature feedback and ideas for our product roadmap. Jamf Nation also serves as an efficient way to introduce potential customers to the Jamf brand and solutions.

- ***Standard for Apple in the enterprise.*** As the only vertically-focused software platform of scale entirely dedicated to the Apple ecosystem, we are the standard for Apple in the enterprise. This is evidenced by our growing number of more than 60,000 customers as of December 31, 2021, including 22 of the 25 most valuable brands (according to the Forbes Most Valuable Brands rankings). In addition, hundreds of independent customer ratings on popular software review websites, including Gartner Peer Insights, G2Crowd, and Capterra, have earned Jamf recognition as the "Customers' Choice." Through our intense focus on connecting, managing, and protecting devices, we are able to provide a differentiated solution when compared to other cross-platform providers who attempt to satisfy all requirements for all platforms.

- ***Strong partner ecosystem.*** Our meaningful expertise managing the Apple ecosystem and our unique understanding of enterprise customers have motivated us to publish a large catalog of open APIs so our customers can integrate and extend their existing software solutions. It is upon this robust APIs catalog that we have built a strong partner ecosystem that includes hundreds of integrations and solutions made available in our Jamf Marketplace.

In addition to our developer partners, we have relationships with solution partners. One example is the work we have done to integrate our products with Microsoft Endpoint Manager and AAD. Development activities with Microsoft have resulted in solutions that optimize the Apple ecosystem within a Microsoft-centric enterprise. Jamf's authentication and account management solutions have deep integrations with AAD. Additionally, customers can sync their Jamf inventory data with Microsoft Endpoint Manager, providing a consolidated view of all devices from all manufacturers in the organization's fleet. This integration provides customers with simple and unified visibility. In addition, the integration provides tremendous operational benefits, including enforcing compliance policies, ensuring only compliant devices can gain access to protected company resources like Office 365, and helping users remediate their device compliance issues via Jamf's self-service application.

- ***Effective go-to-market capabilities.*** The combination of our strong partner ecosystem (including Apple and Microsoft), our e-commerce capability, and our extensive enterprise and inside sales organizations has created a differentiated and powerful go-to-market approach. We believe this robust go-to-market structure allows us to effectively and efficiently reach our entire addressable market, including both large and small organizations in all geographic regions throughout the world. This also allows us to "land and expand" within our customer base by beginning with a limited engagement at each customer and increasing that customer relationship over time.

- ***Differentiated technology.*** While Jamf technology has many powerful capabilities built to help promote digital transformation and satisfy the challenging requirements of connecting, managing, and protecting Apple in the enterprise, specific innovations that set us apart from others in the market include:

  - *Powerful architected-for-Apple agent.* Apple IT administrators can access remote computers and file systems, collecting attributes and intelligence as if they were physically sitting with each and every Apple device in their fleet.

  - *Enterprise attributes and smart grouping.* Through our smart grouping technology, Jamf can dynamically group devices, based on standard attributes, enterprise attributes, or a combination thereof to target and execute business workflows at scale.

- *Leading security capabilities that extend cross-platform.* Jamf is the only endpoint security vendor with natively integrated network security and secure connections to remote applications.

- *Industry-specific workflows.* We have created industry-specific workflows that go beyond device management to solve issues for particular industries such as education, healthcare, and hospitality, including solutions built around remote work, distance learning, and telehealth.

- *High performance native Apple APIs.* Jamf creatively utilizes extensive APIs from published Apple technologies which allows us to be ready instantly with each new Apple operating system.

- *Enterprise self-service.* Our simple-to-use enterprise self-service solution enables IT to empower end-users with a privately brandable application that allows users to install approved apps or perform complex tasks from a personalized enterprise catalog.

Our Growth Strategy

We help organizations succeed with Apple by connecting the Apple experience with the needs of the enterprise. By preserving and enhancing the Apple experience in an enterprise context, we believe we can drive our growth within the current Apple ecosystem as well as fuel further Apple penetration in enterprises, which will extend our opportunity. The key elements of our growth strategy include:

- ***Extend technology leadership through R&D investment and new products.*** We intend to continue investing in research and development and pursuing select technology acquisitions in order to enhance our existing solutions, add new capabilities and deployment options, and expand use cases. For example, in 2021 following the Wandera acquisition, we launched three new products, Jamf Private Access (a ZTNA solution), Jamf Data Policy (a solution to enforce acceptable usage policies and manage data consumption), and Jamf Threat Defense (a mobile device solution to protect users from malicious intent). We believe this strategy of continued innovation will allow us to reach new customers, cross-sell to existing customers, and maintain our position as the standard for Apple in the enterprise. In addition, many organizations with Apple also have non-Apple devices. The solutions they use to connect, manage, and protect devices, users, and data can vary in platform-centricity (i.e. the level of focus centered on a specific platform, like Apple) as you move from the device to the network. As you move further away from device-level capabilities and move closer to cloud security and identity functions like network security and identity-based focus, the broader our focus is, and that's where solutions that offer cross-platform support, such as Jamf Private Access, provide Jamf with the ability to capture Windows and Android users in addition to our Apple base.

- ***Deliver unique industry-specific innovation.*** All industries today are experiencing new challenges related to social distancing, such as remote work, distance learning, and telehealth. We intend to continue developing and enhancing Apple-specific functionality for certain verticals, such as education, healthcare, and hospitality, to help these organizations serve the changing needs of their students, teachers, patients, and workers. For example, our patented mobile-to-mobile management technology provides teachers and parents control over school-issued iPads — whether they are ten feet away or ten miles. We have patent-pending healthcare listener functionality that empowers hospitals to launch device workflows based on events in the electronic medical record, giving patients access to their care plans and control over their room environment through a hospital-issued iPad. We have also launched a patented telehealth workflow, Virtual Visits, aimed to protect providers while still connecting patients to care and their communities. Providers are able to virtually round to their patients, and patients can simply connect with families outside the hospital without IT ever having to touch the device. Once patients are discharged, Virtual Visits can help to automatically digitally wipe the device to prepare it for the next patient. We believe targeted, vertical-specific functionality can help us further penetrate industries which already use devices, or provide a differentiated solution to enter a new industry or solve a new use case.

- ***Grow customer base with targeted sales and marketing investment.*** We aim to expand our customer base by continuing to make significant and targeted investments in our direct sales and marketing in an effort to attract new customers and drive broader awareness of our software solutions. In addition, with our expanded platform, we can reach beyond our historical sales efforts focused on IT executives and administrators and sell to Chief Information Officers, Chief Information Security Officers, and line-of-business leaders. We also plan to increase our channel sales and marketing organization to deepen and expand our joint go-to-market efforts through partners, including resellers, managed service providers, global systems integrators, carriers, and the Apple consultant network, in order to reach new territories and further scale our business through their loyal customer network and expert service delivery. We believe the channel is an efficient way to sell to a wide variety of customers and reach new jurisdictions in a cost-effective manner while still focusing on customer satisfaction and retention.

- ***Increase sales to existing customers.*** We believe our base of more than 60,000 customers as of December 31, 2021 represents a significant opportunity for sales expansion. Our opportunities to deliver further value to existing customers include (1) growing the customers' number of devices currently in use; (2) selling additional Jamf products; (3) expanding customers' use of Jamf from one Apple product, like Mac, to additional Apple products used within the organization, like iPad, iPhone, and Apple TV; and (4) expanding the way customers use Apple products by showcasing capabilities available once customers fully embrace Jamf for deployment. Additionally, Apple continues to grow their ecosystem of solutions that can bring value to organizations, as they did with the introduction of tvOS management in 2017, making the Apple TV an attractive product to deliver new use cases in conference rooms, classrooms, hospitality environments, and for digital signage across a range of industries. The strength of Jamf's "land and expand" strategy is evidenced by our dollar-based net retention rate, which has exceeded 116% as of the end of each of the twelve fiscal quarters ended December 31, 2021, calculated on a trailing twelve months basis.

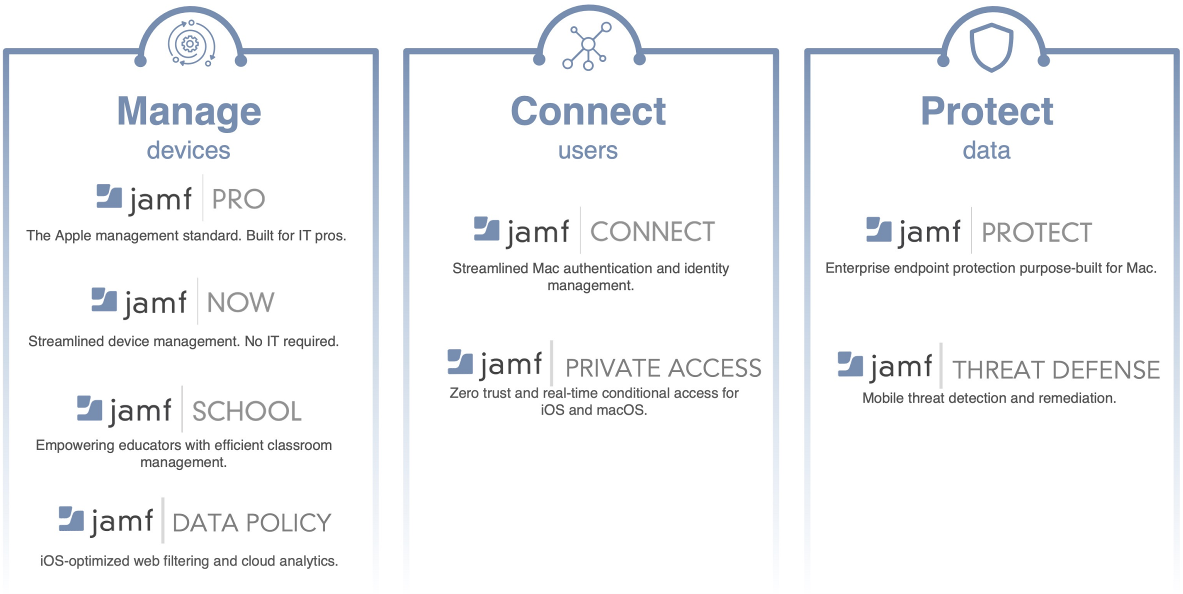
- ***Expand global presence.*** We have a large international presence which we intend to continue growing. For the year ended December 31, 2021, approximately 34% of our new subscriptions originated outside of North America, compared to 32% for the prior year. We intend to continue making investments in our international sales and marketing channels to take advantage of this market opportunity, while refining our go-to-market approach based on local market dynamics. Furthermore, we will invest in our products and technology to fulfill the unique needs of the market we target.

- ***Grow and nurture Jamf Nation.*** Jamf Nation is the world's largest online community of IT and security professionals focused exclusively on Apple in the enterprise. It consists of a knowledgeable and active community of Apple-focused administrators and Jamf users who come together to gain insight, share best practices, vet ideas with fellow administrators, and submit product feature requests. We intend to continue investing in our community platform and these relationships to ensure that our Jamf Nation community remains a vibrant forum for discussion and problem-solving for our users. We believe this community will continue to be a focal point for the Apple ecosystem and can also be helpful in introducing Jamf to potential new customers.

- ***Cultivate relationships with developer partners.*** We believe one of the most powerful elements of our software platform is the ability to use published APIs to extend its value with other third-party or custom solutions. As of December 31, 2021, more than 250 integrations and value-added solutions were published on the Jamf Marketplace. These solutions extend the value of Jamf, protect customers' existing IT investments and encourage greater use and expansion of Jamf within the enterprise.

Our Products

We provide industry-leading software solutions that help empower users with Mac, iPad, iPhone, and Apple TV. We deploy our solutions through the following main products:



Jamf Pro

Jamf Pro offers a robust Apple ecosystem management software solution for complex IT environments, serving both commercial businesses and educational institutions. Since its introduction in 2002, Jamf Pro has been our flagship product, serving the largest portion of Jamf's customer base.

Key capabilities of Jamf Pro include:

- providing a seamless initial device deployment, giving companies the ability to choose between a zero-touch experience or offering a more hands-on device enrollment and deployment;
- enrolling personally-owned devices with support of Apple's user enrollment workflows, allowing for management of corporate resources while maintaining the user's personal privacy.
- enabling customization of devices beyond configuration profiles, use policies, and scripts for the optimal user experience;
- facilitating pre-configuration of user settings before deployment;
- providing app management flexibility wherein apps can be made available automatically to users or through an enterprise self-service catalog;
- granting users the ability to update software and maintain their own devices through Jamf's brandable self-service application without a help desk ticket;
- automating ongoing inventory management, such as automatic collection of hardware, software, and security configuration details from devices, creating custom reports and alerts, and managing software licenses and warranty records; and
- securing devices by leveraging native security features, such as encryption, managing device settings and configurations, restricting malicious software, and patching all devices without the need for user interaction.

Jamf Now

Jamf Now is an intuitive, pay-as-you-go Apple device management software solution for small-to-medium-sized businesses ("SMBs"). Jamf Now prioritizes simplicity through a design that is targeted for organizations with limited or no IT resources, and it can be adopted by such organizations without engaging Jamf sales, training, or services personnel. Jamf Now allows customers to set up their own accounts to enroll their devices and immediately benefit regardless of any prior experience with Jamf. Jamf Now facilitates the consistent configuration of devices remotely, provides a 360-degree view of inventory, and remotely enforces passcodes, encryption, installed software, and locking or wiping of devices. Jamf also makes it easy to leverage its other solutions within Jamf Now with Jamf Now Plus. Jamf Now Plus is an enhanced tier of service that offers all the functionality of Jamf Now and support for custom applications, custom profiles, and macOS package deployment while still designed to be a streamlined, easy-to-use management tool. Jamf Now Plus also includes password sync preview functionality powered by Jamf Connect, which helps keep Mac passwords in sync with cloud credentials and enforces password policies from identity providers Microsoft Azure AD and Okta to maintain consistency and security across all users. We expect that soon Jamf Now Plus will include malware prevention preview functionality powered by Jamf Protect, which helps prevent malicious software and other threats from running on Mac devices in an environment. These capabilities better equip small and mid-sized businesses with key functionality to manage and secure their Apple devices.

Jamf School

Jamf School is a purpose-built software solution for educators and is supported by value-add workflow apps that empower teachers to create a focused, active, and personal learning environment. We have a long and successful presence in the education market, dating back to the early 2000s, and we introduced Jamf School in early 2019 following the acquisition of ZuluDesk B.V. ("ZuluDesk"). Launching Jamf School significantly increased our value in the classroom and allows us to further empower teachers, students, and even parents.

Teachers using Jamf School are able to quickly and easily control all devices in their classroom, which ultimately aids the focus of students. Teachers design lesson plans leveraging content from Apple's App Store combined with their own teaching materials to meet their curriculum needs to then easily deploy these lessons to students. They can also restrict specific functions during assessments and control what content and resources students have access to on their iPads at a specific time. This functionality works seamlessly whether the teacher and student(s) are in the same physical classroom or if they are learning from home or in different locations.

With Jamf School, parents can use their personal iPhone, iPad, Apple Watch, or Android device to govern the access children have when using their school-issued iPads at home. Parents can control and limit their children's device usage, applications, and functionality when the student is not in the school. Jamf School transforms processes that once required IT involvement into dynamic interactions that put the power in the hands of the people who have the greatest impact on meeting each student's learning needs.

Jamf School also engages and connects the student. Students can gain automatic access to subject-specific materials and applications, while unrelated or irrelevant content is hidden to avoid distraction. Through a self-service portal, students are also able to choose applications from an approved list of content, empowering them to have control over their learning. Teachers and parents can be confident students are focused and connected, which is specifically important in situations where students may bring their devices home or have prolonged control of their devices outside of the school district's possession.

Jamf Data Policy

Jamf Data Policy, launched in 2021 following the acquisition of Wandera, is a solution to enforce acceptable usage policies to eliminate shadow IT and block risky content and manage data consumption with real-time analytics and granular reporting.

Jamf Data Policy features include:

- configuring caps for when data usage thresholds are reached and setting real-time alerts and notifications for users and admins;
- setting rules to ensure only acceptable websites can be reached and data usage is compliant;
- implementing and enforcing policies to manage data usage based on locations;

- compressing data in real time to tackle rising data consumption without cutting performance or productivity;
- setting policies that apply to different groups in different circumstances; and
- accommodating all mobile and Windows 10 devices, allowing users to work with their preferred model.

Jamf Connect

Jamf Connect allows IT Admins to provision devices with business-critical applications based solely on an employee’s cloud-identity. Users will enjoy a seamless experience when accessing their device and applications by using either biometric passwordless access or a single password that is synchronized down to the local-account level, even when the password is changed— keeping employees on task. Jamf Connect transforms how users connect to their corporate identity and therefore provides users with a seamless connection to corporate resources.

Jamf Connect gives IT administrators the ability to monitor all company Mac devices and control who is accessing them, providing comfort that both the device and corporate information are protected. Jamf Connect substantially improves the user experience by reducing IT help desk tickets for password resets. Additionally, IT administrators are able to service each device using their cloud identity without requiring a separate admin account on the device, which is a management headache, security vulnerability, and a user experience hazard.

Jamf Private Access

Jamf Private Access, launched in 2021 following the acquisition of Wandera, is a ZTNA solution that replaces legacy conditional access and VPN technology. More employees than ever before are working from different locations and on various devices. Organizations need to be able to ensure secure access to company resources as devices are rarely being connected from within a traditional network perimeter. Jamf Private Access ensures that, after a user authenticates into their device, business connections are transparently secured while enabling non-business applications to route directly to the internet, preserving end-user privacy, maintaining the end-user experience without slowing it down, and optimizing secure network infrastructure. This solution works across device ecosystems and signifies Jamf’s expansion into cross-platform capabilities.

Jamf Protect

Jamf Protect provides protection of Mac-targeted malware and creates customized telemetry and detections that give enterprise security teams unprecedented visibility into their Macs, extending Apple’s security and privacy model to the enterprise while upholding the Apple user experience.

Based on historical needs, most endpoint security products have been designed for Windows and ported to Apple environments only when necessary. Jamf Protect was specifically designed to protect a customer’s fleet of Mac computers by leveraging in-depth knowledge of how adversaries attack Macs.

As market share for the Mac computer has grown in the enterprise, attackers have started focusing on and innovating malware for Macs. It is no longer sufficient to protect these devices with a solution designed for a different platform.

Capabilities of Jamf Protect include:

- mapping the security posture of a customer’s Mac fleet against the Center for Internet Security benchmarks;
- preventing execution and quarantining of known macOS malware and unwanted applications to keep end users safe;
- extending information security visibility into macOS built-in security tools for awareness and improved reporting, compliance, and security;
- receiving real-time alerts to analyze activity on the device and choose whether to proactively block, isolate, or remediate threats;

- providing granular control to information security teams over what data is collected and where it is sent, and allowing companies that monitor endpoint activity for compliance reasons to gather authentication and other activity tracked by macOS into their system of record; and
- supporting the latest operating system from the first day it's available to ensure users receive the latest and most pressing security updates, while providing the user with a superior macOS experience.

Jamf Threat Defense

Jamf Threat Defense, launched in 2021 following the acquisition of Wandera, is a complete solution to protect workers from malicious attackers with minimal impact to the user experience by monitoring a device's network activity. Jamf Threat Defense protects iOS, Android, and Windows endpoints from being compromised through mobile threat detection and zero-day phishing prevention with a streamlined app for notifications and remediation. Jamf Threat Defense operates across a diverse range of devices and ownership models, whether BYOD, corporate owned personally enabled ("COPE"), or corporate owned business only ("COBO"), empowering users with their preferred model in a way that protects the business.

Our Technology

Our software platform was purpose-built to help organizations succeed with Apple, ensuring the highest standards for security and performance while preserving the Apple user experience. Our platform is built on the following core tenets:

Optimized for cloud

We build products that provide Apple-focused device management, identity and access management, and endpoint protection solutions optimized for cloud environments. Our products are built on the market-leading cloud platform (Amazon Web Services ("AWS")), but are architected for flexibility to utilize other cloud platforms. This foundation has enabled us to scale and support millions of devices since our SaaS offering launched in 2012.

Global availability

Our products are designed to deploy worldwide, using regional AWS servers to deliver the performance required by our customers. We are able to rapidly expand our global cloud footprint as demand for our products grows in new regions.

Scalable and reliable

Our products are designed to remove customers' worry about availability, scalability, and maintenance of the infrastructure that powers their solution. Our customers are responsible for their fleet of devices, while Jamf handles all back-end management and scaling operations at the software layer and on a global basis for infrastructure management. Jamf employees are located worldwide to ensure we are available whenever and wherever our customers need us.

We are able to quickly provision new capacity and scale operations through automation on top of our cloud software platform. We continually demonstrate the success of our offering by supporting numerous Fortune 500 customers and large-scale education customers even at their most demanding peak periods.

Our SaaS offerings are designed for reliability with a highly available infrastructure design spanning numerous data centers for all regions in which we have operations. Jamf is built to be "always on" to all of our cloud customers. If infrastructure becomes unavailable for any reason, our offering reroutes traffic to a secondary location to ensure we deliver on our Service Level Agreements. This availability is monitored externally from an outside provider, and Jamf employees are proactively notified if availability is ever impacted.

Jamf empowers customers to seamlessly upgrade to our latest software. Our software platform streamlines automated backups, upgrades, and enables roll-back if required for any reason. Our extensive experience running distributed systems at scale helps our customers remain focused on meeting their organizational needs.

Enterprise-grade security

Security is a critical customer requirement and a guiding principle at Jamf. Our customers frequently use our products to manage integral platforms, which informs our approach to security and compliance. We integrate security principles into development processes, test product code and infrastructure for potential security issues, and deploy security technologies. We have access controls to data in our production environments that are strictly assigned, monitored, and audited. To ensure our processes remain innovative and secure, we undergo continuous third-party testing for vulnerabilities within our software architecture. We also engage with a third-party audit firm to audit our security program against well-known security standards like SOC2 Type II and ISO27001.

Differentiated technology

While there are many powerful capabilities of our technologies, the following are a few that set us apart from others in the market:

- ***Powerful architected-for-Apple agent.*** Jamf has been perfecting its Apple device agent for nineteen years. Using the Jamf agent, Apple IT administrators can access remote computers and file systems, collecting attributes and intelligence as if they were physically sitting with each and every Apple device in their fleet. The Jamf agent is written at the user-level and therefore does not require loading code into the operating system kernel, known as a kernel extension ("kext"). Most Windows-based cross-platform competitors employ kexts when they are ported to the Mac, which results in a slower, less secure and less stable solution. Jamf's agent is able to quickly and safely consolidate and scale Apple inventory data beyond any cross-platform solution.

- ***Enterprise attributes and smart grouping.*** Not only does Jamf have more inventory information about devices than our competitors, but because of our extensible enterprise attributes, we can consolidate data based on device usage or user. Through our patented smart grouping technology, Jamf is then able to dynamically group devices, based on standard attributes, enterprise attributes or a combination thereof to target and execute business workflows at scale. These workflows can be extremely advanced when tapping into the Jamf policies engine, which includes full scripting capabilities for maximum flexibility.

- ***Industry workflows.*** Part of filling the gap between what Apple provides and what the enterprise requires is providing technology that extends far beyond basic management to meet the unique needs of specific industries. For example, Jamf's patented mobile-to-mobile management technology provides teachers the control of student iPads in the classroom they need. Jamf's patent-pending healthcare listener functionality empowers hospitals to launch device workflows based on events in the electronic medical record. Jamf also has developed a patented telehealth workflow, Virtual Visits, aimed to protect providers while still connecting patients to care and their communities during the COVID-19 pandemic. And Jamf's patented setup and reset iOS applications create a shared device workflow that is required in these industries as well as retail, hospitality, field services and more.

- ***High performance native Apple APIs.*** Jamf creatively utilizes extensive APIs from published Apple technologies. Using native Apple APIs also allows us to be ready instantly with each new Apple operating system as Apple preserves forward-moving compatibility of their native APIs. We have a pending patent application for this innovative solution.

- ***Enterprise self-service.*** Jamf's value is more than simply retaining the legendary Apple user experience as devices are deployed throughout the enterprise. We believe Jamf actually improves upon the Apple experience with a simple-to-use enterprise self-service solution. This application enables IT to empower end-users with a privately brandable application that allows users to install approved apps or perform complex tasks with a single mouse click from a personalized enterprise catalog. Jamf's self-service app empowers users to setup resources, update configurations, apply policies and troubleshoot common issues with a single click. The self-service app taps into Jamf's underlying technologies, allowing end-users to simply and quickly solve their own problems without submitting an IT ticket.

Sales and Marketing

Sales

We have a global, multi-faceted go-to-market approach that allows us to efficiently sell to and serve the needs of organizations of varying sizes. By offering a range of products and routes to the market, including through a direct sales force, online, and indirectly via our channel partners (including Apple), we can serve many types of organizations across the world.

Our direct sales force services larger organizations and those with more complex requirements. The direct sales organization is divided into inside and outside sales teams, organized by customer size, and is further segmented with teams focused on acquiring new logos or growing spend in our existing customer base. Our direct sales force is supported by sales development representatives that provide qualified leads as well as other technical resources.

To complement our direct sales teams, we have a large network of over 200 channel partners globally that resell our products located across the world. These channel partners provide us with expanded market coverage and an efficient way to reach smaller or emerging geographies, providing us with additional sales capacity and the ability to be present in more global markets. Approximately 54% of our bookings were facilitated via our channel partners for the year ended December 31, 2021.

One of our notable channel partners is Apple, which, as a channel partner, facilitated approximately 6% of our bookings for the year ended December 31, 2021. Apple education became a Jamf channel partner in 2011 and resells Jamf to K-12 and higher education organizations within the United States. In 2012, Apple expanded its channel relationship by offering Jamf products to businesses through Apple retail, which includes their stores in the United States and sales teams that are focused on SMBs. In 2014, we became a member of Apple’s Mobility Partner Program that focuses on solution development and effective go-to-market activities. We work closely with these various Apple teams across both sales and marketing to develop close relationships and expand our customer base.

For smaller businesses or those with less complex requirements, we provide an online self-service e-commerce model that allows organizations to find products best suited for their needs. This provides an efficient way to introduce smaller organizations to Jamf, with an opportunity for the relationship to grow over time.

Our global, multi-faceted go-to-market approach, combined with the ability for customers to easily trial our products, has allowed us to build an efficient, high velocity sales model.

Marketing

A key ingredient to our sales effectiveness and efficiency is our marketing engine. Our global marketing team builds market awareness of Jamf, generates preference and demand for our products, and enables our sales teams and channel partners to efficiently develop business with new and existing customers.

We focus our marketing strategy on building recognition of the Jamf brand through thought leadership and differentiated messaging that emphasizes the business value of our products. Our efforts include content marketing, social media, search engine optimization, events, and public and analyst relations. We leverage this brand awareness to acquire new customers and cross-market our software solutions to our existing customer base through global campaigns that integrate digital, social, web, email, customer advocacy, and field marketing tactics, such as regional customer/prospect conferences. To create maximum impact, these campaigns are created and adapted to serve all geographic regions and routes to market. We then accelerate prospects or customers through the buying journey by enabling our sales team and channel partners with a range of product/solution content, internal tools, such as return on investment calculators, competitive intelligence, and case studies. Finally, we capitalize on the voices of our highly satisfied and loyal customers using a variety of customer advocacy tactics including case studies and videos, software reviews, social amplification, references, and referrals.

The Jamf brand further benefits from Jamf Nation, the world’s largest online community of Apple administrators. Jamf Nation is our active community, including Jamf customers and potential customers, who share ideas and solutions related to their Apple deployments. Jamf Nation’s large volume of user-generated content serves as a great source of organic search traffic, introducing prospective customers to the Jamf brand and Jamf products. Complementing Jamf Nation, we host JNUC, the world’s largest enterprise Apple IT and security administrator conference. With thousands of attendees, publicly streamed keynotes and over 140 customer and Jamf-led sessions, we further tap into the power of our passionate customer base and garner significant market attention as the leader in our space.

Customers

As of December 31, 2021, we had more than 60,000 customers, over 24,000 of which became customers in the last two years, in more than 100 countries and territories. As of December 31, 2021, our customers include 9 of the largest 10 Fortune 500 companies, 8 of the top 10 Fortune 500 technology companies, 22 of the 25 most valuable brands (according to the Forbes Most Valuable Brands rankings), 10 of the 10 largest U.S. banks (based on total assets according to bankrate.com), 10 of the 10 best global universities (according to U.S. News and World Report), 7 of the 10 largest U.S. school districts (according to Niche), 8 of the 10 most prestigious consulting firms (according to Vault), 8 of the 10 largest U.S. retailers (according to the National Retail Federation), 13 of the 20 top U.S. hospitals (according to U.S. News and World Report), 7 of the top 10 global apparel companies (according to BizVibe), and 8 of the 10 top U.S. media companies (according to Fortune). Our customer base is highly diversified, with no single end customer representing more than 1% of Annual Recurring Revenue ("ARR"). We have a highly satisfied customer base, as evidenced by our Net Promoter Score that significantly exceeds industry averages.

Customer Success

We believe that the value generated by the adoption of our products is strengthened by our strong dedication to ensuring customer success and developing long-term relationships, as demonstrated by our Net Promoter Score that significantly exceeds industry averages.

Our services department helps educate, support, and engage our customers to ensure their success with our software. We provide expertise to our customer base both virtually and onsite. We offer implementation services to encourage faster adoption of our products, and onsite instructor-led training courses for customers that have adopted our products. As part of this training, customers can obtain intermediate to expert-level certifications. We also offer consultative services specific to customer needs with both in-house professional service engineers and a vast array of integration partners who deliver services worldwide. Additionally, we offer consulting services specific for customers' need to ensure rapid adoption of our products. These services are provided by in-house professional service engineers, and we utilize a vast array of integration partners that deliver services worldwide.

Our technical support department consists of a four-tier technical support model. The department is strategically located in five countries around the world. We offer 24/7 premium support for customers who have more complex environments or require more comprehensive support. We maintain a robust and up-to-date knowledge base and online technical documentation resource base for our customers, along with an online training catalog with hundreds of video-based training modules aimed at helping them better understand and use our products. We strive to provide the best possible support for our customers and maintained a high customer satisfaction score over 9.5 out of 10 in 2021 based on our surveys.

We value customer engagement and have a dedicated team of customer success professionals who work within three tiers of engagement models to proactively drive adoption, foster communication, and ensure the success of our products. We offer success planning exercises for our high-tier enterprise customers, and all customers benefit from our health scoring algorithm that uses multiple factors of product usage and company engagement to determine how we can best support their needs.

It is important to us that our customers have the resources they need to succeed with Apple, and customers are encouraged to connect and engage with the larger community of Apple administrators. This is best evidenced by Jamf Nation. Complementing our world-class technical support, this active, grassroots community serves as a highly-qualified and efficient crowd-sourced Q&A engine for anyone with questions about Apple and Jamf deployments. Jamf Nation members come together to gain insight, share best practices, vet ideas with fellow administrators, and submit product feature requests. We intend to continue investing in these relationships and ensure that our Jamf Nation community remains a vibrant forum for discussion and problem-solving for our customers.

Research and Development

Our research and development department is focused on enhancing our existing products and developing new products to maintain and extend our leadership position. Our department is built around small teams who practice agile development methodologies that enable us to innovate at a rapid pace and at scale on a global basis. The teams are organized to support our mission of helping organizations succeed with Apple and ensuring that we continue to deliver same-day support for Apple across our portfolio. In order to provide same day support for Apple, we deliberately schedule our annual efforts around Apple's anticipated product release schedules and we reserve engineering capacity accordingly. This nimble approach enables us to successfully support the Apple enterprise by staying current on Apple releases and delivering differentiated solutions, many of which form the core of our intellectual property portfolio. Approximately 25% of our global employee base is dedicated to research and development. Our research and development teams are organized into teams that are focused by product and based principally in Minneapolis, MN, Eau Claire, WI, Katowice, Poland, and Brno, Czech Republic.

Intellectual Property

We rely on a combination of patent, copyright, trademark, trade dress, and trade secret laws in the United States and other jurisdictions, as well as confidentiality procedures and contractual restrictions, to establish and protect our intellectual property and proprietary rights. These laws, procedures, and restrictions provide only limited protection. As of December 31, 2021, we owned nine issued U.S. patents and sixteen issued patents in foreign jurisdictions. Excluding any patent term adjustments or patent term extensions, our issued U.S. patents will expire between 2034 and 2040. We cannot be assured that any of our patent applications will result in the issuance of a patent or whether the examination process will require us to narrow the scope of the claims sought. Our issued patents, and any future patents issued to us, may be challenged, invalidated, or circumvented, may not provide sufficiently broad protection, and may not prove to be enforceable in actions against alleged infringers.

We have registered “Jamf” and the “Jamf” logo as trademarks in the United States and other jurisdictions. We have also registered numerous Internet domain names related to our business.

We enter into agreements with our employees, contractors, customers, partners, and other parties with which we do business to limit access to and disclosure of our technology and other proprietary information. We cannot be certain that the steps we have taken will be sufficient or effective to prevent the unauthorized access, use, copying, or the reverse engineering of our technology and other proprietary information, including by third parties who may use our technology or other proprietary information to develop products and services that compete with ours. Moreover, others may independently develop technologies that are competitive with ours or that infringe on, misappropriate, or otherwise violate our intellectual property and proprietary rights, and policing the unauthorized use of our intellectual property and proprietary rights can be difficult. The enforcement of our intellectual property and proprietary rights also depends on any legal actions we may bring against any such parties being successful, but these actions are costly, time-consuming, and may not be successful, even when our rights have been infringed, misappropriated, or otherwise violated.

Furthermore, effective patent, copyright, trademark, trade dress, and trade secret protection may not be available in every country in which our products are available, as the laws of some countries do not protect intellectual property and proprietary rights to as great an extent as the laws of the United States. In addition, the legal standards relating to the validity, enforceability, and scope of protection of intellectual property and proprietary rights are uncertain and still evolving.

Companies in the software industry or non-practicing entities may own large numbers of patents, copyrights, trademarks, and other intellectual property and proprietary rights, and these companies and entities have and may in the future request license agreements, threaten litigation, or file suit against us based on allegations of infringement, misappropriation, or other violations of their intellectual property and proprietary rights.

See “Risk Factors — Risks Related to Our Intellectual Property and IT Systems” for a more comprehensive description of risks related to our intellectual property.

Competition

We generally compete with large cross-platform enterprise providers and early stage providers of Apple enterprise solutions. Large enterprise providers, such as VMware, Microsoft, and IBM, typically compete with us on one particular solution (e.g. device management, identity, or endpoint-security) intended for cross-platform use and not specialized for Apple. Given Jamf’s success, a number of companies are following our approach to deliver on an Apple ecosystem vision. While the latter category of competitors are Apple-focused, they lack the depth of our platform and none have grown to a meaningful scale to be considered material competitors.

Key competitive factors in our market include:

- user experience;
- breadth of product offerings;
- IT efficiency;
- total cost of ownership;

- reliability and performance of solutions;
- turnkey product capabilities;
- interoperability with other software solutions;
- speed, compatibility, and feature support of new operating systems;
- quality and availability of global service and support; and
- brand awareness, reputation, and influence among IT professionals.

We believe that we compete favorably on these factors.

Human Capital Resources

Jamf is a culmination of passionate, committed, and bright people who shape our culture and live our core values of Selflessness and Relentless Self-Improvement. We do not say we are the best, but we strive to be the best — for our customers, our employees, and our communities. Our leaders encourage autonomy, exploration, and innovation with spirit and enthusiasm. Through transparency, openness, and humility, we embrace the opportunity to challenge ourselves. We are a group of curious self-starters who thrive on taking initiative and are excited by global impact. We strive to provide an environment where our employees enjoy the freedom to be themselves and work how they work best. As of December 31, 2021, our voluntary retention rate for employees was 91%. Additionally, in our annual employee engagement survey conducted in September 2021, 88% of over 1,800 employees responding agreed that they would recommend Jamf as a great place to work. Furthermore, in December 2021, Jamf was certified by Great Place to Work®, a global leader in workplace culture, as a "Great Place to Work®," with 90% of employees saying Jamf is a great place to work compared to 59% of employees at a typical U.S.-based company. In 2021, Jamf also ranked as a Fortune Best Workplaces for Women, Fortune Best Workplaces in Technology, Fortune Best Workplaces for Millennials, and Fortune Best Workplaces for Parents.

We believe that we can only be our best selves when given the freedom to be ourselves. To that end, we believe it is important to create a safe space where everyone is able to express their unique needs to propel Jamf to be a global leader of equality and fairness in the workplace. Our employee-led Inclusion & Diversity Global Steering Committee's goal is to help others feel empowered for safe and authentic expression, to lead the projects, events and groups that they are passionate about, and take action on issues related to inclusion and diversity at Jamf. Our Employee Resource Groups, Womxn@Jamf, Accessibility@Jamf, The Shades of Jamf, and PROUD@Jamf, provide a safe space for empowerment and cultural education. As of December 31, 2021, based on employees who chose to identify their gender, approximately 31.1% of our workforce and 35.8% of new hires in 2021 were women. Women also made up approximately 34.5% of the Jamf management team as of December 31, 2021.

As of December 31, 2021, we had 2,212 employees, of which 1,407 were employed in the United States and 805 were employed outside of the United States. We have high employee engagement and consider our current relationship with our employees to be good. In certain countries in which we operate we are subject to, and comply with, local labor law requirements, which automatically make our employees subject to industry-wide collective bargaining agreements. An insubstantial number of our employees are currently subject to collective bargaining agreements. We have not experienced any work stoppages.

In response to the COVID-19 pandemic, we have implemented a number of measures focused on promoting employee choice, health, and safety and ensuring business continuity. We carefully assess, and reassess, safe working conditions for our offices on a case-by-case basis to ensure that we implement appropriate protective measures, such as capacity restrictions based on local government and health organization guidance. We believe that we have the opportunity to be a leader in a new approach to work, which is rooted in a flexible and hybrid model enabled by a digital-first mindset that puts employee choice, health, and safety first.

Government Regulation

We are subject to many U.S. federal and state and foreign laws and regulations that involve matters central to our business, including laws and regulations that involve data privacy and data protection, intellectual property, advertising, marketing, health and safety, competition, consumer protection, taxation, anti-bribery, anti-money laundering and corruption, economic or other trade prohibitions or sanctions, and securities law compliance. Our business may also be affected by the adoption of any new or existing laws or regulations or changes in laws or regulations that adversely affect our business. Many relevant laws and regulations are still evolving and may be interpreted, applied, created or amended in a manner that could harm our business, and new laws and regulations may be enacted, including in connection with the restriction or prohibition of certain content or business activities.

We receive, process, store, use and share data, some of which contains personal information. We are therefore subject to U.S. federal, state, local and foreign laws and regulations regarding data privacy and the collection, storage, sharing, use, processing, disclosure and protection of personal information and other data from users, employees or business partners, including the General Data Protection Regulation ("GDPR"), the U.K. - General Data Protection Regulation" ("UK-GDPR") and the California Consumer Privacy Act ("CCPA"), among others. These laws expand the rights of individuals to control how their personal data is processed, collected, used and shared and create new regulatory and operational requirements for processing personal data, increase requirements for security and confidentiality and provide for significant penalties for non-compliance. The implementation of the expanded data protection regulation like the GDPR has led other jurisdictions to either amend, or propose legislation to amend their existing data privacy and cyber-security laws to resemble all or a portion of the requirements of such expanded regulation (e.g., for purposes of having an adequate level of data protection to facilitate data transfers from the EU) or enact new laws to do the same. Accordingly, the challenges we face in the with respect to the GDPR, UK-GDPR, and CCPA will likely also apply to other jurisdictions that adopt regulatory frameworks of equivalent complexity. Accordingly, there are also a number of legislative proposals recently enacted or pending before the U.S. Congress, various state legislatures and foreign governments concerning content regulation and data protection that could affect us. These and other laws and regulations that may be enacted, or new interpretation of existing laws and regulations, may require us to modify our data processing practices and policies and to incur substantial costs in order to comply.

The foregoing description does not include an exhaustive list of the laws and regulations governing or impacting our business. See the discussion contained in Part I, Item 1A, "Risk Factors" of this Annual Report on Form 10-K for information regarding how actions by regulatory authorities or changes in legislation and regulation in the jurisdictions in which we operate may have a material adverse effect on our business.

Corporate Information

Jamf was founded in 2002. Our principal executive offices are located at 100 Washington Ave S, Suite 1100, Minneapolis, MN. Our telephone number is (612) 605-6625. Our website address is www.jamf.com. 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, and you should not consider any information contained on, or that can be accessed through, our website as part of this Annual Report on Form 10-K or in deciding whether to purchase our common stock. We are a holding company, and all of our business operations are conducted through our subsidiaries.

This Annual Report on Form 10-K includes our trademarks and service marks, such as "Jamf," which are protected under applicable intellectual property laws and are our property. This Annual Report on Form 10-K also contains trademarks, service marks, trade names, and copyrights of other companies, such as "Amazon," "Apple," and "Microsoft," 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 may appear without the ® or ™ symbols, but such references are not intended to indicate, in any way, that we will not assert, to the fullest extent under applicable law, our rights or the rights of the applicable licensor to these trademarks and trade names.

Available Information

We make available, free of charge through our investor relations website (ir.jamf.com), our annual reports on Form 10-K, quarterly reports on Form 10-Q and current reports on Form 8-K, and amendments to those reports, filed or furnished pursuant to Sections 13(a) and 15(d) of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), as soon as reasonably practicable after they have been electronically filed with, or furnished to, the SEC.

The SEC also maintains a website (www.sec.gov) that contains reports, proxy and information statements, and other information regarding issuers that file electronically with the SEC.

Item 1A. Risk Factors

A description of the risks and uncertainties associated with our business is set forth below. You should carefully consider the risks described below, together with the financial and other information contained in this Annual Report on Form 10-K, before you decide to purchase shares of our common stock. If any of the following risks actually occur, or if any additional risks not presently known to us or that we have currently deemed immaterial occur, our business, financial condition, results of operations, cash flows, and prospects could be materially and adversely affected. In such an event, the trading price of our common stock could decline and you could lose all or part of your investment in our common stock.

Risk Factor Summary

The following summarizes certain of the principal factors that make an investment in our Company speculative or risky:

- the impact on our operations and financial condition from the effects of the current COVID-19 pandemic;
- the potential impact of customer dissatisfaction with Apple or other negative events affecting Apple services and devices, and failure of enterprises to adopt Apple products;
- the potentially adverse impact of changes in features and functionality by Apple and other third parties on our engineering focus or product development efforts;
- changes in our continued relationship with Apple;
- the fact that we are not party to any exclusive agreements or arrangements with Apple;
- our reliance, in part, on channel partners for the sale and distribution of our products;
- our ability to successfully develop new products or materially enhance current products through our research and development efforts;
- our ability to continue to attract new customers;
- our ability to retain our current customers;
- our ability to sell additional functionality to our current customers;
- our ability to correctly estimate market opportunity and forecast market growth;
- risks associated with failing to continue our recent growth rates;
- our dependence on one of our products for a substantial portion of our revenue;
- our ability to scale our business and manage our expenses;
- our ability to change our pricing models, if necessary to compete successfully;
- the impact of delays or outages of our cloud services from any disruptions, capacity limitations, or interferences of third-party data centers that host our cloud services, including AWS;
- our ability to meet service-level commitments under our subscription agreements;
- our ability to maintain, enhance, and protect our brand;
- our ability to maintain our corporate culture;
- the ability of Jamf Nation to thrive and grow as we expand our business;
- the potential impact of inaccurate, incomplete, or misleading content that is posted on Jamf Nation;

- our ability to offer high-quality support;
- risks and uncertainties associated with acquisitions and divestitures (such as our recent acquisition Wandera);
- our ability to predict and respond to rapidly evolving technological trends and our customers' changing needs;
- our ability to compete with existing and new companies;
- the impact of adverse general and industry-specific economic and market conditions;
- the impact of reductions in IT spending;
- our ability to attract and retain highly qualified personnel;
- risks associated with competitive challenges faced by our customers;
- the impact of our often long and unpredictable sales cycle;
- the risks associated with sales to new and existing enterprise customers;
- our ability to develop and expand our marketing and sales capabilities;
- the risks associated with free trials and other inbound, lead-generation sales strategies;
- the risks associated with indemnity provisions in our contracts;
- our management team's limited experience managing a public company;
- risks associated with cyber-security events;
- the impact of real or perceived errors, failures, or bugs in our products;
- the impact of general disruptions to data transmission;
- risks associated with stringent and changing privacy laws, regulations, and standards, and information security policies and contractual obligations related to data privacy and security;
- the risks associated with intellectual property infringement, misappropriation, or other claims;
- our reliance on third-party software and intellectual property licenses;
- our ability to obtain, protect, enforce, and maintain our intellectual property and proprietary rights;
- the risks associated with our use of open source software in our products; and
- risks related to our indebtedness, including our ability to raise the funds necessary to settle conversions of our convertible senior notes, repurchase our convertible senior notes upon a fundamental change, or repay our convertible senior notes in cash at their maturity.

These and other risks are more fully described below. If any of these risks actually occurs, our business, financial condition, results of operations, cash flows, and prospects could be materially and adversely affected. As a result, you could lose all or part of your investment in our common stock.

Risks Associated with Our Business, Operations, and Industry

The COVID-19 pandemic could materially adversely affect our business, operating results, financial condition, and prospects.

The severity, magnitude, and duration of the current COVID-19 pandemic continues to be uncertain and rapidly changing. Efforts to combat the virus have been complicated by viral variants and uneven access to, and acceptance and effectiveness of, vaccines globally. Measures to control the virus have impacted and may continue to impact all or portions of Jamf's workforce and operations and the operations of customers, dealers, and suppliers. Although certain restrictions related to the COVID pandemic have eased, uncertainty continues to exist regarding such measures and potential future measures.

In response to disruptions caused by the COVID-19 pandemic, we have implemented a number of measures designed to protect the health and safety of our workforce, including a digital-first hybrid work model, restrictions on business travel, new operating guidelines for our offices based on local conditions, and additional wellness benefits for employees. Our employees may elect to return to the office in jurisdictions where both local requirements and our own health and safety standards have been met, and we may experience increased costs in order to comply with these requirements and provide our employees with a safe physical work environment. While most of our operations can be performed remotely, there is no guarantee that we will be as effective while working remotely because our team is dispersed, many employees may have additional personal needs to attend to (such as looking after children as a result of school closures or family who become sick), and employees may become sick themselves and be unable to work. Over time, our remote operations may decrease the cohesiveness of our teams and our ability to maintain our culture, both of which are critical to our success. In addition, at home technology infrastructure may not perform as well as the infrastructure available at our office workplaces. The increase in remote working may also result in privacy, data protection, data security, and fraud risks. Decreased effectiveness of our team could adversely affect our results due to our inability to meet in person with potential customers, cancellation and inability to participate in conferences and other industry events that lead to sales generation, longer time periods to review and approve work product and a corresponding reduction in innovation, longer time to respond to platform performance issues, or other decreases in productivity that could seriously harm our business. Such effects may adversely affect the productivity of our team members and overall operations, which could have a material adverse effect on our business, results of operations, financial condition, and cash flows.

The extent to which the COVID-19 pandemic impacts our business operations in future periods continues to depend on multiple uncertain factors, including: the duration and impact of the resurgence in COVID-19 cases in any country, state, or region; the emergence, contagiousness, and threat of new and different strains of virus; the availability, acceptance, and effectiveness of vaccines, additional closures or other actions as mandated or otherwise made necessary by governmental authorities, including employee vaccine mandates; its overall negative impact on the global economy and, in some cases, the regional and national economies of areas experiencing a localized surge in COVID-19 cases, an increasingly competitive labor market due to the "Great Resignation"; challenges with respect to the supply chain, including those caused by industry capacity constraints, material availability, global logistics delays and constraints; and the impacts on customer buying decisions and budgets due to their own business and market uncertainties. These and other impacts of the COVID-19 pandemic could have the effect of heightening many of the other risks described in this "Risk Factors" section, such as those relating to our reputation, product sales, results of operations, or financial condition. We might not be able to predict or respond to all impacts on a timely basis to prevent near- or long-term adverse impacts to our results. As a result, we cannot at this time predict the ultimate impact of the COVID-19 pandemic, but it could have a material adverse effect on our business, results of operations, financial condition, and cash flows.

Because our products focus primarily on Apple, potential customer dissatisfaction with Apple, other negative events affecting Apple services and devices, or failure of enterprises to adopt Apple products could have a negative effect on our results of operations.

Our products are primarily focused on Apple devices. Because of this, our customers' satisfaction with our software and products is largely dependent in part upon their perceptions and satisfaction with Apple. Customer dissatisfaction with Apple could be attributed to us, impact our relationships with customers, and/or result in the loss of customers across all of our products if any of our customers chose to discontinue or reduce their use of Apple devices. For example, any incident broadly affecting the interaction of Apple devices with necessary Apple services (e.g., iCloud or Apple push notifications), including any delays or interruptions in such Apple services, could negatively affect our products and solutions. Similarly, any cyber-security events affecting Apple devices could result in a disruption to Apple services, regulatory investigations, reputational damage, and a loss of sales and customers for Apple. A prolonged disruption, cyber-security event, or any other negative event affecting Apple could lead to customer dissatisfaction and could in turn damage our reputation with current and potential customers, expose us to liability, and cause us to lose customers or otherwise harm our business, financial condition, and results of operations. In addition, since our products and solutions primarily focus on Apple devices, in the event of a prolonged disruption affecting Apple devices, we may not be able to provide our software to our customers. We may also incur significant costs for taking actions in preparation for, or in reaction to, events that damage Apple devices used by our customers.

Overall, Apple's reputation and consumers' views of Apple products could change if other technology companies release products that compete with Apple devices that customers view more favorably. For example, other technology companies could introduce new technology or devices that reduce demand for Apple devices. Our financial results could also be harmed if customers choose non-Apple products based on cost, availability, user experience, functionality, or other factors. The market for Apple products may not continue to grow, or may grow more slowly than we expect. As a result, enterprise adoption of Apple products may be slower than anticipated. Moreover, many enterprises use technology platforms other than Apple and have used other technologies for a long time. While this creates significant market opportunity for these enterprises to adopt Apple technology, we cannot be certain that enterprises will adopt Apple technology. There are many factors underlying an enterprise's adoption of new technology, including cost, time, and knowledge required to implement such technology, data transfer, compatibility with existing technology, familiarity with and institutional loyalty to technology other than Apple, among other factors. If these enterprise users do not continue to adopt Apple technologies at recent historical rates and the rates that we anticipate, our revenue growth will be adversely affected, there will be adverse consequences to our results of operations and will reduce the number of potential new Jamf customers. See also "— Certain estimates of market opportunity and forecasts of market growth included in this Annual Report on Form 10-K may prove to be inaccurate." Any of these factors could have a material adverse effect on our business, results of operations, and financial condition.

Changes in features and functionality by Apple and other third-party systems could cause us to make short-term changes in engineering focus or product development or otherwise impair our product development efforts or strategy, increase our costs, and harm our business.

Our products depend on interoperability with Apple operating systems and cloud services, including interoperability at the moment of each new Apple release. Apple does not typically preview its technology with us or other partners and, as such, we do not receive advanced notice of changes in features and functionality of Apple technologies with which our products need to interoperate. In addition, unforeseen events (such as discovery of vulnerabilities and release of patches) may constrain our ability to respond in a timely manner. In any such events, we may be forced to divert resources from our preexisting product roadmap in order to accommodate these changes. As a result of having a short time to implement and test changes to our products to accommodate these new features, there is an increased risk of product defects. The frequency and complexity of new Apple features and updates may make it difficult for us to continue to support new releases in a timely manner. If we fail to enable IT departments to support Apple upgrades upon release, our business and reputation could suffer. This could disrupt our product roadmap and cause us to delay introduction of planned solutions, features, and functionality, which could harm our business. In addition, the functionality and popularity of our platform also depends on its interoperability with other third-party operating systems and devices, such as Microsoft and Google.

We rely on open standards for many integrations between our products and third-party applications that our customers utilize, and in other instances on such third parties making available the necessary tools for us to create interoperability with their applications. If application providers were to move away from open standards, or if a critical, widely-utilized application provider were to adopt proprietary integration standards and not make them available for the purposes of facilitating interoperability with our products, the utility of our products for our customers would be decreased. Furthermore, some of the features and functionality in our products require interoperability with operating system APIs. We also offer a robust catalog of APIs that our developer partners utilize to build integrations and solutions that are made available in our Jamf Marketplace to enhance features and functionality of our products. If operating system providers decide to restrict our access to their APIs, or if our developer partners cease to build integrations and solutions for our Jamf Marketplace, that functionality would be lost and our business could be impaired.

Changes in our continued relationship with Apple may have an impact on our success.

We have a broad relationship with Apple that covers all aspects of our business. We have always worked closely with Apple's worldwide developer relations organization in an effort to support all new Apple innovations the moment the hardware or software is released. Apple and Jamf personnel frequently join forces to influence and collaborate as we work with customers. We also have several direct contractual relationships with Apple that span all enterprise devices across the Apple ecosystem, including Mac, iPad, iPhone, and Apple TV. Additionally, Apple is a significant reseller of Jamf products, particularly in education. These contractual relationships can be terminated by Apple at any time with limited advance notice to us. In addition, Apple recently launched a beta release Apple Business Essentials and the full service is expected to be available in the spring of 2022. While this platform is still in its early stages, Apple Business Essentials is focused on SMBs with 500 or fewer employees, and we believe its feature set will provide limited direct competition with our complete Apple Enterprise Management solutions. In the future, however, Apple could leverage this platform or create other offerings to compete more directly with the scale and breadth of product offerings we provide. Our future relationship with Apple is important to Jamf's success. If we fail to maintain our current relationship and contracts with Apple, our ability to compete and grow our business may be materially impacted. For example, we may not be able to continue to support new Apple innovations and releases at the moment the hardware and software are released. While we do not rely on any private APIs or collaboration with Apple to provide our same-day support, reduced cooperation with Apple may make it more difficult for us to continue to support new releases in a timely manner and result in us devoting significant resources in order to meet our commitment to provide same-day support. If our relationship with Apple changes, it could become more difficult to integrate our products with Apple and could reduce or eliminate the sales we expect from Apple as a reseller. As a result, if we fail to maintain our current relationship with Apple, our business, financial condition, and results of operation could be adversely affected.

We are not party to any exclusive agreements or arrangements with Apple.

We are not party to any exclusive agreements or arrangements with Apple. Accordingly, while we believe our market opportunity expands as organizations increasingly adopt Apple technologies, the continued success and growth of our business is ultimately dependent upon our ability to compete effectively by reaching new customers, cross-selling to existing customers, and maintaining our position as the standard for Apple in the enterprise. As a result, even if organizations' adoption of Apple technologies continues to increase, if we are not able to compete successfully, our business, results of operations, and financial condition could be adversely affected. See "— If we fail to maintain, enhance, or protect our brand, our ability to expand our customer base will be impaired and our business, financial condition, and results of operations may suffer" and "— We are in a highly competitive market, and competitive pressures from existing and new companies, including as a result of consolidation in our market, may harm our business, revenues, growth rates, and market share."

We rely, in part, on channel partners for the sale and distribution of our products and, in some instances, for the support of our products. A loss of certain channel partners, a decrease in revenues from certain of these channel partners, or any failure in our channel strategy could adversely affect our business.

We rely on channel partners for the sale and distribution of a substantial portion of our products. For the year ended December 31, 2021, approximately 54% of our bookings were through channel partners. We anticipate that we will continue to depend on relationships with third parties, such as our channel partners and system integrators, to sell, market, and deploy our products. Identifying partners, and negotiating and documenting relationships with them, requires significant time and resources. Our arrangements with our channel partners are generally non-exclusive, meaning they may offer customers the products of several different companies, including products that compete with us. Our competitors may be effective in providing incentives to channel partners and other third parties to favor their products or services over subscriptions to our products and a substantial number of our agreements with channel partners are non-exclusive such that those channel partners may offer customers the products of several different companies, including products that compete with ours. Our channel partners may cease marketing or reselling our products with limited or no notice and without penalty. If our channel partners do not effectively sell, market, or deploy our products, choose to promote our competitors' products, or otherwise fail to meet the needs of our customers, our ability to grow our business and sell our products may be adversely affected. In addition, acquisitions of such partners by our competitors could result in a decrease in the number of our current and potential customers, as these partners may no longer facilitate the adoption of our applications by potential customers. Further, some of our partners are or may become competitive with certain of our products and may elect to no longer integrate with our products. If we are unsuccessful in establishing or maintaining our channel partners and system integrators, our ability to compete in the marketplace or to grow our revenue could be impaired, and our results of operations may suffer.

In addition, our service provider partners often provide support to our customers and enter into similar agreements directly with our mutual customers to host our software and/or provide other value-added services. Our agreements and operating relationships with our service provider partners are complex and require a significant commitment of internal time and resources. In addition, our service provider partners are large corporations with multiple strategic businesses and relationships, and thus our business may not be significant to them in the overall context of their much larger enterprise. These partnerships may require us to adhere to outside policies, which may be administratively challenging and could result in a decrease in our ability to complete sales. Even if the service provider partner considers us to be an important strategic relationship, internal processes at these large partners are sometimes difficult and time-consuming to navigate.

We invest significantly in research and development, and to the extent our research and development investments do not translate into new products or material enhancements to our current products, or if we do not use those investments efficiently, our business and results of operations would be harmed.

A key element of our strategy is to invest significantly in our research and development efforts to develop new products and enhance our existing products to address additional applications and markets. For the year ended December 31, 2021, our research and development expense was approximately 23% of our revenue. If we do not spend our research and development budget efficiently or effectively on compelling innovation and technologies, our business may be harmed and we may not realize the expected benefits of our strategy. Moreover, research and development projects can be technically challenging and expensive. The nature of these research and development cycles may cause us to experience delays between the time we incur expenses associated with research and development and the time we are able to offer compelling products and generate revenue, if any, from such investment. Additionally, anticipated customer demand for a product we are developing could decrease after the development cycle has commenced, rendering us unable to recover substantial costs associated with the development of such product. If we expend a significant amount of resources on research and development and our efforts do not lead to the successful introduction or improvement of products that are competitive in our current or future markets, it would harm our business and results of operations.

If we are unable to attract new customers, retain our current customers, or sell additional functionality and services to our existing customers, our revenue growth will be adversely affected.

To increase our revenue, we must continue to attract new customers and increase sales to existing customers. As our market matures, product and service offerings evolve, and competitors introduce lower cost or differentiated products or services that are perceived to compete with our products, our ability to sell our products could be adversely affected. Similarly, our sales could be adversely affected if customers or users within these organizations perceive that features incorporated into competitive products reduce the need for our products or if they prefer to purchase other products that are bundled with products offered by Apple or by other companies, including our partners, that operate in adjacent markets and compete with our products. As a result of these and other factors, we may be unable to attract new customers or increase sales to existing customers, which could have an adverse effect on our business, revenue, gross margins, and other operating results, and accordingly, on the trading price of our common stock.

We must also continually increase the depth and breadth of deployments of our products with our existing customers. While customers may initially purchase a relatively modest number of subscriptions or licenses, it is important to our revenue growth that they later expand the use of our software on substantially more devices or for more users throughout their business. We also need to upsell, or sell additional products, to the same customer in order to increase our revenues. Our ability to retain our customers and increase the amount of subscriptions or support and maintenance contracts our customers purchase could be impaired for a variety of reasons, including customer reaction to changes in the pricing of our products, competing priorities in IT budgets, or the other risks described herein. As a result, we may be unable to renew our subscriptions with existing customers or attract new business from existing customers, which would have an adverse effect on our business, revenue, gross margins and other operating results, and accordingly, on the trading price of our common stock.

In addition, our ability to sell additional functionality to our existing customers may require more sophisticated and costly sales efforts, especially as we target larger enterprises and more senior management who make these purchasing decisions, such as CIOs and CISOs and line-of-business leaders. Similarly, the rate at which our customers purchase additional products from us depends on a number of factors, including general economic conditions and the pricing of additional product functionality. If our efforts to sell additional functionality to our customers are not successful, our business and growth prospects would suffer.

Our customers have no obligation to renew their subscriptions or support for our products after the expiration of the terms thereof. Our contracts are typically one year in duration. In addition, certain of our customers are able to terminate their contracts with us for any or no reason. In order for us to maintain or improve our results of operations, it is important that our customers maintain their subscriptions and renew their subscriptions with us on the same or more favorable terms. We cannot accurately predict renewal or expansion rates given the diversity of our customer base, in terms of size, industry, and geography. Our renewal and expansion rates may decline or fluctuate as a result of a number of factors, including customer spending levels, customer dissatisfaction with our products, decreases in the number of users at our customers, changes in the type and size of our customers, pricing changes, competitive conditions, the acquisition of our customers by other companies, and general economic conditions. If our customers do not renew their subscriptions or licenses for our products, or if they reduce their subscription amounts at the time of renewal, our revenue and other results of operations will decline and our business will suffer. If our renewal or expansion rates fall significantly below the expectations of the public market, securities analysts, or investors, the trading price of our common stock would likely decline.

Certain estimates of market opportunity and forecasts of market growth included in this Annual Report on Form 10-K may prove to be inaccurate.

This Annual Report on Form 10-K includes our internal estimates of the addressable market for our products. Market opportunity estimates and growth forecasts, whether obtained from third-party sources or developed internally, are subject to significant uncertainty and are based on assumptions and estimates that may prove to be inaccurate. The estimates and forecasts in this Annual Report on Form 10-K relating to the size and expected growth of our target market, market demand and adoption, capacity to address this demand, and pricing may also prove to be inaccurate. In particular, our estimates regarding our current and projected market opportunity are difficult to predict. The addressable market we estimate may not materialize for many years, if ever, and even if the markets in which we compete meet the size estimates and growth forecasted in this Annual Report on Form 10-K, our business could fail to grow at similar rates, if at all.

We have experienced rapid growth in recent periods, and our recent growth rates may not be indicative of our future growth. As our costs increase, we may not be able to generate sufficient revenue to achieve and, if achieved, maintain profitability.

We have experienced significant revenue growth in recent periods. In future periods, we may not be able to sustain revenue growth consistent with recent history, or at all. We have also experienced significant growth in our customer adoption and have expanded and intend to continue to expand our operations, including our domestic and international employee headcount. We believe our revenue growth depends on a number of factors, including, but not limited to, our ability to:

- price our products effectively so that we are able to attract and retain customers without compromising our profitability;
- maintain and grow our Jamf Nation community support network to support growth in existing products and new products;
- attract new customers, successfully deploy and implement our products, upsell or otherwise increase our existing customers' use of our products, obtain customer renewals, and provide our customers with excellent customer support;
- increase our network of channel partners;
- adequately expand, train, integrate, and retain our sales force and other new employees, and maintain or increase our sales force's productivity;
- effectively manage our hybrid work model;
- hire and retain sufficient numbers of sales and marketing, research and development, and general and administrative personnel, and expand our global operations;
- enhance our information, training, and communication systems to ensure that our employees are well-coordinated and can effectively communicate with each other and customers;
- improve our internal control over financial reporting and disclosure controls and procedures to ensure timely and accurate reporting of our operational and financial results;
- successfully identify and enter into agreements with suitable acquisition targets, integrate any acquisitions and acquired technologies into our existing products or use them to develop new products;
- successfully introduce new products, enhance existing products, and address new use cases;
- successfully introduce our products to new markets outside of the United States;
- successfully compete against larger companies and new market entrants; and

- increase awareness of our brand on a global basis.

We may not successfully accomplish any of these objectives and, in particular, COVID-19 may impact our ability to successfully accomplish any of the above, and as a result, it is difficult for us to forecast our future results of operations. Our historical growth rate should not be considered indicative of our future performance and may decline in the future. In future periods, our revenue could grow more slowly than in recent periods or decline for any number of reasons, including those outlined above. We also expect our operating expenses to increase in future periods, particularly as we continue to invest in research and development and technology infrastructure, expand our operations globally, develop new products and enhancements for existing products, and as we support our operations as we grow and mature as a public company. If our revenue growth does not increase to offset these anticipated increases in our operating expenses, our business, financial position, and results of operations will be harmed, and we may not be able to achieve or maintain profitability. In addition, the additional expenses we will incur may not lead to sufficient additional revenue to maintain historical revenue growth rates and profitability.

As we expand our business, it is important that we continue to maintain a high level of customer service and satisfaction. As our customer base continues to grow, we will need to expand our account management, customer service, and other personnel and our network of channel partners and system integrators to provide personalized account management and customer service. If we are not able to continue to provide high levels of customer service, our reputation, as well as our business, results of operations, and financial condition, could be adversely affected.

We derive a substantial portion of our revenue from one product.

For the year ended December 31, 2021, sales of subscriptions to our Jamf Pro product accounted for approximately 71% of our total revenue. We expect these subscriptions to account for a large portion of our total revenue for the foreseeable future. As a result, our operating results could suffer due to:

- any decline in demand for this product;
- the failure of our other products to achieve market acceptance;
- the market for Apple products not continuing to grow, or growing more slowly than we expect, and enterprise adoption of Apple products being slower than anticipated;
- the introduction of products and technologies that serve as a replacement or substitute for, or represent an improvement over, our products;
- the introduction of products and technologies that could serve as a replacement or substitute for our products that are offered with more limited functionality or are less advanced than our products, but are offered at a lower price point;
- technological innovations or new standards that our products do not address;
- sensitivity to current or future prices offered by us or our competitors; and
- our inability to release enhanced versions of our products on a timely basis.

Our inability to renew or increase sales of subscriptions to our products or market and sell additional products and functionality, or a decline in prices of our platform subscription levels, would harm our business and operating results more seriously than if we derived significant revenue from a variety of products. In addition, if the market for our products grows more slowly than anticipated, or if demand for our products does not grow as quickly as anticipated, whether as a result of competition, pricing sensitivities, product obsolescence, technological change, unfavorable economic conditions, uncertain geopolitical environment, budgetary constraints of our customers, or other factors, our business, results of operations, and financial condition would be adversely affected.

If we are not able to scale our business and manage our expenses, our operating results may suffer.

We have expanded specific functions over time in order to scale efficiently, improve our cost structure, and help scale our business. Our need to scale our business has placed, and will continue to place, a significant strain on our administrative and operational business processes, infrastructure, facilities, and other resources. Our ability to manage our operations will require significant expenditures and allocation of valuable management resources to improve internal business processes and systems, including investments in automation. Further, we expect to continue to expand our business globally. International expansion may also be required for our continued business growth, and managing any international expansion will require additional resources and controls. If our operations, infrastructure, and business processes fail to keep pace with our business and customer requirements, customers may experience disruptions in service or support or we may not scale the business efficiently, which could adversely affect our reputation and adversely affect our revenues. There is no guarantee that we will be able to continue to develop and expand our infrastructure and business processes at the pace necessary to scale the business, and our failure to do so may have an adverse effect on our business. If we fail to efficiently expand our engineering, operations, customer support, professional services, cloud infrastructure, IT and financial organizations and systems, or if we fail to implement or maintain effective internal business processes, controls, and procedures, our costs and expenses may increase more than we planned or we may fail to execute on our product roadmap or our business plan, any of which would likely seriously harm our business, operating results, and financial condition.

We may need to change our pricing models to compete successfully.

The intense competition we face in the sales of our products and services and general economic and business conditions can put pressure on us to change our prices. If our competitors offer deep discounts on certain products or services or develop products that the marketplace considers more valuable than ours, we may need to lower prices or offer other favorable terms in order to compete successfully. Any such changes may reduce margins and could adversely affect operating results. Our competitors may offer lower pricing on their support offerings, which could put pressure on us to further discount our offerings. In addition, some of our competitors offer free or significantly discounted product offerings to our customers in order to incentivize switching from our products to such competitor’s products, or to otherwise enter the Apple ecosystem. This may require us to offer discounts or other incentives to keep such customers, and we may not be able to match free product offerings or significant discounts offered by these competitors. This may result in customers choosing such competitor’s products instead of ours. We also must determine the appropriate price of our offerings and services to enable us to compete effectively internationally. Our prices may also change because of discounts, a change in our mix of products toward subscription, enterprise-wide licensing arrangements, bundling of products, features and functionality by us or our competitors, potential changes in our pricing, anticipation of the introduction of new products or promotional programs for customers or channel partners. In response to macroeconomic conditions, including those resulting from COVID-19, we may be required to offer deeply discounted pricing, adopt new pricing models, and offer extended payment terms in order to attract new and retain existing customers, which could have a material adverse impact on our liquidity and financial condition.

Any broad-based change to our prices and pricing policies could cause our revenue to decline or be delayed as our sales force implements and our customers adjust to new pricing policies. We or our competitors may bundle products for promotional purposes or as a long-term go-to-market or pricing strategy or provide guarantees of prices and product implementations. These practices could, over time, significantly constrain the prices that we can charge for certain of our products. If we do not adapt our pricing models to reflect changes in customer use of our products or changes in customer demand, our revenue could decrease.

Disruptions, capacity limitations, or interference with our use of the data centers operated by third-party providers that host our cloud services, including AWS, could result in delays or outages of our cloud service and harm our business.

We currently host our cloud service from third-party data center facilities operated by AWS from several global locations. Any damage to, failure of, or interference with our cloud service that is hosted by AWS, or by third-party providers we may utilize in the future, whether as a result of our actions, actions by the third-party data centers, actions by other third parties, or acts of God, could result in interruptions in our cloud service and/or the loss of our or our customers’ data. While the third-party data centers host the server infrastructure, we manage the cloud services through our site reliability engineering team, and we need to support version control, changes in cloud software parameters, and the evolution of our products, all in a multi-OS environment. As we utilize third-party data centers, we may move or transfer our data and our customers’ data from one region to another. Despite precautions taken during this process, any unsuccessful data transfers may impair the delivery of our service. Many of our customer agreements contain contractual service level commitments to maintain uptime of at least 99.9% for our cloud services, and if we, AWS, or any other third-party data center facilities that we may utilize fail to meet these service level commitments, we may have to issue credits to these customers, which could adversely affect our operations. Impairment of, or interruptions in, our cloud services may reduce our subscription revenues, subject us to claims and litigation, cause our customers to terminate their subscriptions, and adversely affect our subscription renewal rates and our ability to attract new customers. Our business will also be harmed if our customers and potential customers believe our services are unreliable. Additionally, any limitation of the capacity of our third-party data centers could impede our ability to scale, onboard new customers, or expand the usage of existing customers, which could adversely affect our business, financial condition, and results of operations. In addition, our customers' satisfaction with our offerings is dependent in part upon their perceptions and satisfaction with our cloud infrastructure service providers. Dissatisfaction with such providers could damage our relationships with customers and/or result in the loss of customers across one or more of our products.

We do not control, or in some cases have limited control over, the operation of the data center facilities we use, and they are vulnerable to damage or interruption from earthquakes, floods, fires, power loss, telecommunications failures, and similar events. They may also be subject to cyberattacks, computer viruses, disabling devices, break-ins, sabotage, intentional criminal acts, acts of vandalism, and similar misconduct and to adverse events caused by operator error. Despite precautions taken at these facilities, the occurrence of a natural disaster, an act of terrorism, war, or other act of malfeasance, a decision to close the facilities without adequate notice, or other unanticipated problems at these facilities could result in lengthy interruptions in our service and the loss of customer data and business. We may also incur significant costs for using alternative equipment or facilities or taking other actions in preparation for, or in reaction to, any such events.

In the event that any of our agreements with our third-party service providers are terminated, there is a lapse or elimination of any services or features that we utilize or there is an interruption of connectivity or damage to facilities, whether due to actions outside of our control or otherwise, we could experience interruptions or delays in customer access to our platform and incur significant expense in developing, identifying, obtaining, and/or integrating replacement services, which may not be available on commercially reasonable terms or at all, and which would adversely affect our business, financial condition, and results of operations.

We provide service-level commitments under our subscription agreements. If we fail to meet contractual commitments for service level commitments or quality of professional services, we could be obligated to provide credits for future service or face subscription termination with refunds of prepaid amounts, which would lower our revenue and harm our business, results of operations, and financial condition.

Many of our subscription agreements contain service-level commitments. If we are unable to meet the stated service-level commitments, including failure to meet the uptime and delivery requirements under our customer subscription agreements, we may be contractually obligated to provide these customers with service credits, which could significantly affect our revenue in the periods in which the uptime or delivery failure occurs and the credits are applied. We could also face subscription terminations, which could significantly affect both our current and future revenue. In addition, if the quality of our professional services does not meet contractual requirements, we may be required to re-perform the services at our expense or refund amounts paid for the services. Any failure to meet these contractual commitments could also damage our reputation, which could also adversely affect our business and results of operations.

If we fail to maintain, enhance, or protect our brand, our ability to expand our customer base will be impaired and our business, financial condition, and results of operations may suffer.

We believe that maintaining, enhancing and protecting the Jamf brand, including Jamf Nation, is important to support the marketing and sale of our existing and future products to new customers and expand sales of our products to existing customers. We also believe that the importance of brand recognition will increase as competition in our market increases. Successfully maintaining, enhancing, and protecting our brand will depend largely on the effectiveness of our marketing efforts, our ability to provide reliable products that continue to meet the needs of our customers at competitive prices, our ability to maintain our customers' trust, our ability to continue to develop new functionality and use cases, our ability to successfully differentiate our products and product capabilities from competitive products, and our ability to obtain, maintain, protect, and enforce trademark and other intellectual property protection for our brand. Our brand promotion activities may not generate customer awareness or yield increased revenue, and even if they do, any increased revenue may not offset the expenses we incur in building our brand. In addition, independent industry analysts provide reviews of our platform, as well as products and services offered by our competitors, and perception of our platform in the marketplace may be significantly influenced by these reviews. If these reviews are negative, or less positive as compared to those of our competitors' products and services, our brand may be adversely affected. If we fail to successfully promote, maintain, or protect our brand, our business, financial condition, and results of operations may suffer.

If we cannot maintain our corporate culture as we grow, our business may be harmed.

We believe that our corporate culture has been a critical component to our success and that our culture creates an environment that drives and perpetuates our overall business strategy. We have invested substantial time and resources in building our team and we expect to continue to hire aggressively as we expand both locally and internationally. As we grow and mature as a public company and grow internationally, we may find it difficult to maintain our corporate culture. Over time, our remote operations may decrease the cohesiveness of our teams and our ability to maintain our culture, both of which are critical to our success. Any failure to preserve our culture could negatively affect our future success, including our ability to recruit and retain personnel and effectively focus on and pursue our business strategy.

If Jamf Nation does not continue to thrive as we grow and expand our business, or if content posted on Jamf Nation is inaccurate, incomplete, or misleading, our business could be adversely affected.

Jamf Nation provides a critical support function for our products and solutions. We allow users of Jamf Nation to post content directly. While we monitor such posts, we cannot control what users post. As a result, we can provide no assurance that users of Jamf Nation will continue to provide support by responding to questions with respect to our existing products and solutions, or any new products and solutions we may develop as we grow and expand our business. Moreover, as we further expand our business into new geographies, we can provide no assurance that Jamf Nation users will provide support for any issues specific to those jurisdictions or in relevant languages. In addition, because we cannot control what users post, users may post content that may be inaccurate, incomplete, or misleading, or that infringes, misappropriates, or otherwise violates third-party intellectual property or proprietary rights. It may take us time to correct any inaccuracies or remove such posts, and we can provide no assurance that we will successfully correct or remove all posts that are inaccurate or that allege to infringe, violate, or misappropriate third-party intellectual property or proprietary rights. As a result, customers relying on Jamf Nation for support for our products and solutions may suffer harm if the advice in a post is inaccurate, does not provide a thorough explanation, or is inconsistent with our best practices or intended use of our products, which could in turn damage our reputation and cause customers to lose faith in Jamf Nation. Any of these factors could adversely affect our reputation and/or confidence in Jamf Nation and could have a material adverse effect on our business, results of operations, and financial condition.

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

Our customers rely on our customer support personnel to resolve issues and realize the full benefits that our products provide. High-quality support is also important for the renewal and expansion of our subscriptions with existing customers. The importance of our support function will increase as we expand our business and pursue new customers. Many of our enterprise customers, particularly large enterprise customers, have complex networks and require high levels of focused support, including premium support offerings, to fully realize the benefits of our products. Any failure by us to maintain the expected level of support could reduce customer satisfaction and hurt our customer retention, particularly with respect to our large enterprise customers.

Furthermore, as we sell our products internationally, our support organization faces additional challenges, including those associated with delivering support, training, and documentation in languages other than English. Any failure to maintain high-quality customer support, or a market perception that we do not maintain high-quality support, could materially harm our reputation, business, financial condition, and results of operations, and adversely affect our ability to sell our products to existing and prospective customers. The importance of high-quality customer support will increase as we expand our business and pursue new customers.

Acquisitions and divestitures could harm our business and operating results.

We have acquired in the past, and plan to acquire in the future, other businesses, products, or technologies. Since 2019, we have completed five acquisitions, including our acquisition of Wandera in July 2021, which represented our largest acquisition to date. Acquisitions and divestitures, including those completed to date, involve significant risks and uncertainties, which include:

- disrupting our ongoing operations, diverting management from day-to-day responsibilities, increasing our expenses, and adversely impacting our business, financial condition, and operating results;
- inherent uncertainties in valuation models;
- failure of an acquired business to further our business strategy;
- uncertainties in achieving the expected benefits of an acquisition or disposition, including enhanced revenue, technology, human resources, cost savings, operating efficiencies, and other synergies;

- reductions to our cash flows in subsequent periods, to the extent we defer the payment of the purchase price for any acquisition or license;
- reducing cash available for operations, stock repurchase programs, and other uses and resulting in potentially dilutive issuances of equity securities or the incurrence of debt;
- incurring amortization expense related to identifiable intangible assets acquired that could impact our operating results;
- difficulty integrating the operations, systems, technologies, products, and personnel of acquired businesses effectively;
- challenges with implementing adequate and appropriate controls, procedures, and policies in acquired businesses;
- increased exposure to risks related to foreign operations due to the increase in our employee presence outside the U.S.;
- potential difficulties in completing projects associated with in-process research and development of acquired businesses;
- the need to provide transition services in connection with a disposition, which may result in the diversion of resources and focus;
- difficulty achieving expected business results due to a lack of experience in new markets, products, or technologies or the initial dependence on unfamiliar distribution partners or vendors;
- retaining and motivating key personnel from acquired companies;
- declining employee morale and retention issues affecting employees of businesses that we acquire or dispose of, which may result from changes in compensation, or changes in management, reporting relationships, future prospects, or the direction of the acquired or disposed business;
- assuming the liabilities of an acquired business, including existing contractual obligations, acquired litigation-related liabilities and regulatory compliance issues, and potential litigation or regulatory action arising from a proposed or completed acquisition;
- issuing equity awards to new employees, which may more rapidly deplete share reserves available under our shareholder-approved equity incentive plans;
- lawsuits resulting from an acquisition or disposition;
- maintaining good relationships with customers or business partners of an acquired business or our own customers as a result of any integration of operations;
- unidentified issues not discovered during the diligence process, including issues with the acquired or divested business’s intellectual property, product quality, security, privacy practices, accounting practices, regulatory compliance, or legal contingencies;
- maintaining or establishing acceptable standards, controls, procedures, or policies with respect to an acquired business;
- risks relating to the challenges and costs of closing a transaction, including, for example, obtaining stockholders’ approval where applicable, including from a majority of the minority stockholders, tendering shares under terms of the cash tender offer where applicable and satisfaction of regulatory approvals, as well as completion of customary closing conditions for each transaction; and
- the need to later divest acquired assets at a loss if an acquisition does not meet our expectations.

We may not be able to respond to rapid technological changes with new products and services offerings. If we fail to predict and respond rapidly to evolving technological trends and our customers' changing needs, we may not be able to remain competitive.

Our market is characterized by rapid technological change, changing customer needs, frequent new software product introductions, and evolving industry standards. The introduction of third-party products embodying new technologies and the emergence of new industry standards and Apple operating systems and products could make our existing and future software products obsolete and unmarketable. We may not be able to develop updated products and services that keep pace with these and other technological developments that address the increasingly sophisticated needs of our customers or that meet new industry standards or interoperate with new or updated operating systems and hardware devices. We may also fail to adequately anticipate and prepare for the commercialization of emerging technologies and the development of new markets and applications for our technology and thereby fail to take advantage of new market opportunities or fall behind early movers in those markets. Our customers require that our products effectively identify and respond to these challenges on a timely basis without disrupting the performance of our customers' IT systems or interrupting their operations. As a result, we must continually modify and improve our offerings in response to these changes on a timely basis. If we are unable to evolve our products in time to respond to and remain ahead of new technological developments, our ability to retain or increase market share and revenue in our markets could be materially adversely affected.

Our ability to expand sales of our products depends on several factors, including potential customer awareness of our products; the timely completion, introduction and market acceptance of enhancements to our products or new products that we may introduce; our ability to attract, retain and effectively train inside and field sales personnel in a hybrid work environment; our ability to develop or maintain integrations with partners; the effectiveness of our marketing programs; and the costs of our products and the success of our competitors. If we are unsuccessful in developing and marketing our products, or if organizations do not perceive or value the benefits of our products, the market for our products might not continue to develop or might develop more slowly than we expect, either of which would harm our growth prospects and operating results.

In addition, the process of developing new technology is complex and uncertain, and if we fail to accurately predict customers' changing needs and emerging technological trends, our business could be harmed. We believe that we must continue to dedicate significant resources to our research and development efforts, including significant resources to developing new products and product enhancements before knowing whether the market will accept them. Our new products and product enhancements could fail to attain sufficient market acceptance for many reasons, including:

- the failure to accurately predict market or customer demands;
- defects, errors or failures in the design or performance of our new products or product enhancements;
- negative publicity about the performance or effectiveness of our products;
- the introduction or anticipated introduction of competing products by our competitors; and
- the perceived value of our products or enhancements relative to their cost.

Our competitors, particularly those with greater financial and operating resources, may 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, the evolution of our products and new market entrants, we expect competition to intensify in the future. For example, as we expand our focus into new use cases or other product offerings beyond our existing product portfolio, we expect competition to increase. Pricing pressures and increased competition generally could result in reduced sales, reduced margins, losses or the failure of our products to achieve or maintain more widespread market acceptance.

We are in a highly competitive market, and competitive pressures from existing and new companies, including as a result of consolidation in our market, may harm our business, revenues, growth rates, and market share.

Our products seek to serve multiple markets, and we are subject to competition from a wide and varied field of competitors. Some competitors, particularly new and early-stage companies and large cross-platform enterprise providers, could focus all of their energy and resources on one product line or use case and, as a result, any one competitor could develop a more successful product or service in a particular market, which could decrease our market share and harm our brand recognition and results of operation. In addition, some of our competitors may be able to leverage their relationships with customers based on an installed base of products or to incorporate functionality into existing products to gain business in a manner that discourages customers from including us in competitive bidding processes, evaluating and/or purchasing our products. They have done this in the past, and may in the future do this, by selling at zero or negative margins, through product bundling or through enterprise license deals. Some potential customers, especially Global 2000 Companies, have already made investments in, or may make investments in, substantial personnel and financial resources and established deep relationships with these much larger enterprise IT vendors, which may make them reluctant to evaluate our products or work with us regardless of product performance or features. Potential customers may prefer to purchase a broad suite of products from a single provider, or may prefer to purchase products from an existing supplier rather than a new supplier, regardless of performance or features.

With the recent increase in merger and acquisition transactions in the technology industry, particularly transactions involving cloud-based technologies, we may face increased competitive pressures in the future as a result of industry consolidation. Strategic or financial buyers, including our existing competitors, could acquire one or more of our competitors and provide alternative products that compete more effectively against us. In addition, Apple could choose to develop competing technology, leverage its existing offerings and/or acquire one or more of our competitors and standardize those competing offerings for a particular Apple product line or use case, which could reduce or eliminate the utility of our products for that product line or use case. For example, Apple recently announced the launch of Apple Business Essentials in the spring of 2022. While this platform is still in its early stages, we believe it will be primarily focused on the Mac and U.S.-based SMB customers and will provide limited direct competition with our complete Apple Enterprise Management solutions. In the future, however, Apple could leverage this platform or create other offerings, whether through additional investment or the consolidation of other competitors of ours, to compete more directly with the scale and breadth of product offerings we provide. As a result of any such industry consolidation, our competitive position and our ability to retain or increase market share and revenue in our markets could be materially adversely affected.

For all of these reasons and others we cannot anticipate today, we may not be able to compete successfully against our current and future competitors, which could harm our business, results of operations and financial condition.

Adverse general and industry-specific economic and market conditions and reductions in IT spending may reduce demand for our products, which could harm our results of operations.

Our revenue, results of operations, and cash flows depend on the overall demand for our products. Concerns about the systemic impact of economic contraction (in the United States or internationally), geopolitical issues, or the availability and cost of credit could lead to increased market volatility, decreased consumer confidence, and diminished growth expectations in the U.S. economy and abroad, which in turn could result in reductions in IT spending by our existing and prospective customers. Prolonged economic slowdowns may result in customers delaying or canceling IT projects, choosing to focus on in-house development efforts, or seeking to lower their costs by requesting us to renegotiate existing contracts on less advantageous terms or defaulting on payments due on existing contracts or not renewing at the end of existing contract terms.

Our customers may merge with other entities who use alternatives to our products and, during weak economic times, there is an increased risk that one or more of our customers will file for bankruptcy protection, either of which may harm our revenue, profitability, and results of operations. We also face risk from international customers that file for bankruptcy protection in foreign jurisdictions, particularly given that the application of foreign bankruptcy laws may be more difficult to predict. In addition, we may determine that the cost of pursuing any claim may outweigh the recovery potential of such claim. As a result, broadening or protracted extension of an economic downturn could harm our business, revenue, results of operations, and cash flows.

We must attract and retain highly qualified personnel in order to execute our growth plan.

Competition for highly qualified personnel is intense, especially for experienced design and software development engineers and sales professionals. In recent years, recruiting, hiring, and retaining employees with expertise in our industry and in the geographies where we operate has become increasingly difficult as the demand for software professionals, particularly in the geographies where we maintain our facilities, has increased as a result of the proliferation of SaaS companies requiring these talents and an increasingly competitive labor market in part due to the effects of the “Great Resignation” and macro-economic consequences from the COVID-19 pandemic. We have, from time to time experienced, and we expect to continue to experience, difficulty in hiring and retaining employees with appropriate qualifications. Many of the companies with which we compete for experienced personnel have greater resources than we have. If we hire employees from competitors or other companies, their former employers may attempt to assert that these employees or we have breached certain legal obligations, resulting in a diversion of our time and resources. If we fail to attract new personnel or fail to retain and motivate our current personnel, our business and future growth prospects could be harmed.

In addition, job candidates and existing employees often consider the value of the equity awards they receive in connection with their employment. Volatility or lack of performance in our stock price may also affect our ability to attract and retain our key employees. Also, some of our employees have become, or will soon become, vested in a substantial amount of equity awards, which may give them a substantial amount of personal wealth. This may make it more difficult for us to retain and motivate these employees, and this wealth could affect their decision about whether or not they continue to work for us. Any failure to successfully attract, integrate, or retain qualified personnel to fulfill our current or future needs could adversely affect our business, results of operations, and financial condition.

The loss of key management personnel could harm our business.

We depend on the continued services of key management personnel, including our Chief Executive Officer, Dean Hager. We generally do not have fixed-term employment agreements with our employees, and, therefore, they could terminate their employment with us at any time without penalty. While we do enter into non-compete agreements with certain of our employees, they could pursue employment opportunities with other parties, including, potentially any of our competitors and there are no assurances that our non-compete agreements with any such key management personnel would be enforceable. Additionally, our non-compete periods expire, at which time key management personnel could work for any of our competitors. In addition, we do not maintain any key-person life insurance policies. The loss of key management personnel could harm our business.

Our customers face numerous competitive challenges, which may materially adversely affect their business and ours.

Our customers include enterprises in a broad range of industries, including financial services, government, healthcare, legal, manufacturing, professional services, retail, technology, and telecommunications. Factors adversely affecting our customers may also adversely affect us. These factors include:

- recessionary periods in our customers’ markets, including the impact of COVID-19 on their budgets and financial condition;
- the inability of our customers to adapt to rapidly changing technology and evolving industry standards, which may contribute to short product life cycles or shifts in our customers’ strategies;
- regulation changes in our customers’ respective industries;
- the inability of our customers to develop, market, or gain commercial acceptance of their products, some of which are new and untested;
- the potential that our customers’ products become commoditized or obsolete;
- loss of business or a reduction in pricing power experienced by our customers;
- the emergence of new business models or more popular products and shifting patterns of demand; and
- a highly-competitive consumer products industry, which is often subject to shorter product lifecycles, shifting end-user preferences, and higher revenue volatility.

If our customers are unsuccessful in addressing these competitive challenges, their businesses may be materially adversely affected, reducing the demand for our services or decreasing our revenues, each of which could adversely affect our ability to cover fixed costs and our gross profit margins and results of operations.

Our sales efforts require considerable time and expense.

The timing of our sales can be difficult to predict. We and our channel partners are often required to spend significant time and resources to better educate and familiarize potential customers with the value proposition of our products. Customers often view the purchase of our products as a strategic decision and significant investment and, as a result, frequently require considerable time to evaluate, test, and qualify our products prior to purchasing them. In particular, for customers in highly-regulated industries, the selection of a software provider is a critical business decision due to the sensitive nature of these customers’ data, which results in particularly extensive evaluation prior to the selection of information security vendors. During the sales cycle, we expend significant time and money on sales and marketing and contract negotiation activities, which may not result in a sale. Additional factors that may influence the length and variability of our sales cycle include:

- the discretionary nature of purchasing and budget cycles and decisions;
- impacts on customers’ business, cash flows, and financial condition as a result of COVID-19;
- lengthy purchasing approval processes;
- the industries in which our customers operate;
- the evaluation of competing products during the purchasing process;
- time, complexity, and expense involved in replacing existing products;
- announcements or planned introductions of new products, features, or functionality by our competitors or of new products or offerings by us; and
- evolving functionality demands.

If our efforts in pursuing sales and customers are unsuccessful, or if our sales cycles lengthen, our revenue could be lower than expected, which would adversely affect our business, results of operations, or financial condition.

As we continue to pursue sales to new and existing enterprise customers, our sales cycle, forecasting processes, and deployment processes may become more unpredictable and require greater time and expense.

Sales to new and existing enterprises involve risks that may not be present or that are present to a lesser extent with sales to smaller organizations. As we seek to increase our sales to enterprise customers, we face more complex customer requirements, substantial upfront sales costs, less predictability and, in some cases, longer sales cycles than we do with smaller customers. With enterprises, the decision to subscribe to our products may require the approval of multiple management personnel and more technical personnel than would be typical of a smaller organization, and accordingly, sales to enterprises may require us to invest more time educating these potential customers. Purchases by larger enterprises are also frequently subject to budget constraints and unplanned administrative, processing, and other delays, which are likely to extend given the impact of the COVID-19 pandemic, which means we may not be able to come to agreement on the subscription or payment terms with enterprises. Our ability to successfully sell our products to larger enterprises is also dependent upon the effectiveness of our sales force, including new sales personnel, who currently represent the majority of our sales force. In addition, if we are unable to increase sales of our products to larger enterprise customers while mitigating the risks associated with serving such customers, our business, financial position, and operating results may be adversely affected.

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

Our ability to increase our customer base and achieve broader market acceptance of our products will depend to a significant extent on our ability to expand our marketing and sales operations. We plan to continue expanding our direct sales force and engaging additional channel partners, both domestically and internationally. This expansion will require us to invest significant financial and other resources. Our business will be harmed if our efforts do not generate a corresponding increase in revenue. We may not achieve anticipated revenue growth from expanding our direct sales force if we are unable to hire and develop talented direct sales personnel, if our new direct sales personnel are unable to achieve desired productivity levels in a reasonable period of time, or if we are unable to retain our existing direct sales personnel. We also may not achieve anticipated revenue growth from our channel partners if we are unable to attract and retain additional motivated channel partners, if any existing or future channel partners fail to successfully market, resell, implement, or support our products for their customers, or if they represent multiple providers and devote greater resources to market, resell, implement, and support the products and products of these other providers. We may not achieve our anticipated revenue growth. We may also experience labor market competition in expanding our sales force, particularly if we expand to new geographies and/or sectors. Any of these factors could harm our business, results of operations, and financial condition.

We rely upon free trials of our products and other inbound lead-generation strategies to drive our sales and revenue. If these strategies fail to continue to generate sales opportunities or trial users do not convert into paying customers, our business and results of operations would be harmed.

We rely, in part, upon our marketing strategy of offering free trials of our products and other inbound, lead-generation strategies to generate sales opportunities. Many of our customers start with the free trial version of our products. These strategies may not be successful in continuing to generate sufficient sales opportunities necessary to increase our revenue. Many early users never convert from the trial version of a product to a paid version of such product. Further, we often depend on individuals within an organization who initiate the trial versions of our products being able to convince decision makers within their organization to convert to a paid version. Many of these organizations have complex and multi-layered purchasing requirements. To the extent that these users do not become, or are unable to convince others to become, paying customers, we will not realize the intended benefits of this marketing strategy, and our ability to grow our revenue will be adversely affected.

We have indemnity provisions under our contracts with our customers, channel partners, and other third parties, which could have a material adverse effect on our business.

In our agreements with customers, channel partners, and other third parties, we typically agree to indemnify them for losses related to claims by third parties of intellectual property infringement, misappropriation, or other violation. Additionally, from time to time, customers require us to indemnify them for breach of confidentiality or violation of applicable law, among other things. Although we normally seek to contractually limit our liability with respect to such obligations, some of these agreements provide for uncapped liability and the existence of any dispute may have adverse effects on our customer relationships and reputation, and we may incur substantial liability related to them. In addition, provisions regarding limitation of liability in our agreements with customers, channel partners or other third parties may not be enforceable in some circumstances or jurisdictions or may not protect us from claims and related liabilities and costs. We maintain insurance to protect against certain types of claims associated with the use of our products, but our insurance may not adequately cover any such claims and may not continue to be available to us on acceptable terms or at all. If any such indemnification obligations are triggered, we could face substantial liabilities or be forced to make changes to our products, enter into license agreements, which may not be available on commercially reasonable terms or at all, or terminate our agreements with customers, channel partners, and other third parties and provide refunds. In addition, even claims that ultimately are unsuccessful could result in expenditures of management's time and other resources. Furthermore, any legal claims from customers and channel partners could result in reputational harm and the delay or loss of market acceptance of our products.

Our management team has limited experience managing a public company.

Many members of our management team have limited experience managing a publicly-traded company, interacting with public company investors, and complying with the increasingly complex laws pertaining to public companies. Our management team may not successfully or efficiently manage us as a public company that is subject to significant regulatory oversight and reporting obligations under the federal securities laws and the continuous scrutiny of securities analysts and investors. These obligations and constituents require significant attention from our senior management and could divert their attention away from the day-to-day management of our business, which could adversely affect our business, results of operations, and financial condition.

Risks Related to Our Intellectual Property and IT Systems

If we or our third-party service providers suffer a cyber-security event, our reputation may be harmed, we may lose customers, and we may incur significant liabilities, any of which would harm our business and operating results.

Cyberattacks, computer malware, viruses, social engineering (including phishing and ransomware attacks), and general hacking are becoming more prevalent and more sophisticated in our industry, and we may in the future become the target of third parties seeking unauthorized access to our confidential or sensitive information or that of our customers. While we have security measures in place designed to protect our and our customers' confidential and sensitive information and prevent data loss, these measures cannot provide absolute security and may not be effective to prevent a security breach, including as a result of employee error, theft, misuse, or malfeasance, third-party actions, unintentional events, or deliberate attacks by cyber criminals, any of which may result in someone obtaining unauthorized access to our customers' data, our data, our intellectual property, and/or our other confidential or sensitive business information. In addition, third parties may attempt to fraudulently induce employees, contractors, or users to disclose information, including user names and passwords, to gain access to our customers' data, our data, or other confidential or sensitive information, and we may be the target of email scams that attempt to acquire personal information or company assets. Because techniques used to sabotage or obtain unauthorized access to systems change frequently, have increased in sophistication, and generally are not recognized until successfully launched against a target, we may be unable to anticipate these techniques, react in a timely manner, or implement adequate preventative measures. Furthermore, our solutions may not help detect situations in which a valid user identity has been compromised, for example as part of a sophisticated cyberattack. We devote significant financial and personnel resources to implement and maintain security measures; however, these resources may not be sufficient, and as cyber-security threats develop, evolve, and grow more complex over time, it may be necessary to make significant further investments to protect our data and infrastructure.

We rely on certain third party software vendors to operate our business, including identity and access management, payment processing, and hosting services; however, our ability to monitor our third-party service providers' data security is limited. Because we do not control our third-party service providers, or the processing of data by our third-party service providers, we cannot ensure the integrity or security of measures they take to protect and prevent unauthorized, accidental, or unlawful access or loss of our data or our customers' data.

A security breach suffered by us or our third-party service providers, an attack against our service availability, any unauthorized, accidental, or unlawful access or loss of data, or the perception that any such event has occurred, could result in a disruption to our service, litigation, an obligation to notify regulators and affected individuals, the triggering of service availability, indemnification and other contractual obligations, regulatory investigations, government fines and penalties, reputational damage, loss of investor confidence, loss of sales and customers, mitigation and remediation expenses, and other significant costs and liabilities. In addition, we may incur significant costs and operational consequences of investigating, remediating, eliminating, and putting in place additional tools and devices designed to prevent future actual or perceived security incidents, as well as the costs to comply with any notification or other obligations resulting from any security incidents. We also cannot be certain that our existing insurance coverage will cover any indemnification claims against us relating to any security incident or breach, will be available in sufficient amounts to cover the potentially significant losses that may result from a security incident or breach, will continue to be available on acceptable terms or at all or that the insurer will not deny coverage as to any future claim. The successful assertion of one or more large claims against us that exceed available insurance coverage, or the occurrence of changes in our insurance policies, including premium increases or the imposition of large deductible or co-insurance requirements, could adversely affect our reputation, business, financial condition and results of operations.

We cannot assure you that our products or hosted services will not be subject to cyberattacks, or other security incidents, especially in light of the rapidly changing security threat landscape that our products and hosted services seek to address. Due to a variety of both internal and external factors, including, without limitation, defects or misconfigurations of our products, our products could become vulnerable to security incidents (both from intentional attacks and accidental causes). In addition, because the techniques used by computer hackers to access or sabotage networks and endpoints change frequently, are increasing in sophistication, and generally are not recognized until launched against a target, there is a risk that advanced attacks could emerge that attack our software that we are unable to detect or prevent until after some of our customers are affected.

If a Jamf security product fails to detect a security incident, there could potentially be claims against Jamf for such security incident, which could require Jamf to pay damages and could hurt Jamf's reputation, whether or not the security incident was the fault of Jamf.

Further, our customers and their service providers administer access to data and control the entry of such data. We offer tools and support for what we believe are best practices to maintain security utilizing our services, but customers are not required to utilize those tools or follow our suggested practices, and the obligation to install and update security protection for our products lies with our customers. As a result, a customer may suffer a cyber-security event on its own systems, unrelated to our own, and a malicious actor could obtain access to the customer's information held on our system. Even if such a breach is unrelated to our own security programs or practices, or if the customer failed to adequately protect our products, that breach could result in our incurring significant economic and operational costs in investigating, remediating, eliminating, and putting in place additional tools and devices to further protect our customers from their own vulnerabilities, and could also result in reputational harm to us.

As a result, the reliability and capacity of our information technology systems is critical to our operations and the implementation of our growth initiatives. Any cyber-security event or other material disruption in our information technology systems, or delays or difficulties in implementing or integrating new systems or enhancing current systems, could have an adverse effect on our business and results of operations.

Real or perceived errors, failures, or bugs in our products could adversely affect our business, results of operations, financial condition, and growth prospects.

Our products are complex, and therefore, undetected errors, failures, bugs, or defects may be present in our products or occur in the future in our products, our technology or software or technology or software we license in from third parties, including open source software, especially when updates or new products are released. Such software and technology is used in IT environments with different operating systems, system management software, devices, databases, servers, storage, middleware, custom and third-party applications, and equipment and networking configurations, which may cause errors, failures, bugs, or defects in the IT environment into which such software and technology is deployed. This diversity increases the likelihood of errors, failures, bugs, or defects in those IT environments. Some of our product features are powered by ML and AI, which depend on datasets and algorithms that could be flawed, including through inaccurate, insufficient, outdated, or biased data. Despite testing by us, real or perceived errors, failures, bugs, or defects may not be found until our customers use our products. Real or perceived errors, failures, bugs, or defects in our products could result in negative publicity, loss of or delay in market acceptance of our products and harm to our brand, loss of investor confidence, weakening of our competitive position, claims by customers for losses sustained by them, or failure to meet the stated service level commitments in our customer agreements. In such an event, we may be required, or may choose, for customer relations or other reasons, to expend significant additional resources in order to help correct the problem. Any real or perceived errors, failures, bugs, or defects in our products could also impair our ability to attract new customers, retain existing customers, or expand their use of our products, which would adversely affect our business, results of operations, and financial condition.

Moreover, as our products are adopted by an increasing number of enterprises, including education, healthcare, and hospitality, it is possible that the individuals and organizations behind advanced cyberattacks will begin to focus on finding ways to hack our products. If this happens, our customers could be specifically targeted by attackers exploiting vulnerabilities in our products, which could adversely affect our reputation. Further, if a high profile security breach occurs with respect to any Apple operating systems, our customers and potential customers may lose trust in our products generally in addition to any Apple operating system products, such as ours in particular.

Organizations are increasingly subject to a wide variety of attacks on their networks, systems, and endpoints. If any of our customers experiences a successful third-party cyberattack on our products, such customer could be dissatisfied with our products, regardless of whether theft of any of such customer’s data occurred in such attack. Additionally, if customers fail to adequately deploy protection measures or update our products, customers and the public may erroneously believe that our products are especially susceptible to cyberattacks. Real or perceived security breaches against our products could cause disruption or damage to our customers’ networks or other negative consequences and could result in negative publicity to us, damage to our reputation, lead to other customer relations issues, and adversely affect our revenue and results of operations. We may also be subject to liability claims for damages related to real or perceived errors, failures, bugs, or defects in our products. A material liability claim or other occurrence that harms our reputation or decreases market acceptance of our products may harm our business and results of operations. Finally, since some our customers use our products for compliance reasons, any errors, failures, bugs, defects, disruptions in service, or other performance problems with our products may damage our customers’ business and could hurt our reputation.

If there are interruptions or performance problems associated with our technology or infrastructure, our existing customers may experience service outages, and our new customers may experience delays in the deployment of our products.

Our continued growth depends on the ability of our existing and potential customers to access our products and applications 24 hours a day, seven days a week, without interruption or degradation of performance. We may in the future experience disruptions, outages and other performance problems with our infrastructure due to a variety of factors, including infrastructure changes, introductions of new functionality, service interruptions from our hosting or technology partners, human or software errors, capacity constraints, distributed denial of service attacks or other security-related incidents. In some instances, we may not be able to identify the cause or causes of these performance problems immediately or in short order. We may not be able to maintain the level of service uptime and performance required by our customers or our contractual commitments, especially during peak usage times and as our products become more complex and our user traffic increases. If any of our products malfunction or if our customers are unable to access our products or deploy them within a reasonable amount of time, or at all, our business would be harmed. The adverse effects of any service interruptions on our reputation and financial condition may be disproportionately heightened due to the nature of our business and the fact that our customers expect continuous and uninterrupted access to our products and have a low tolerance for interruptions of any duration. Since our customers may rely on our products to secure their Apple products and systems, and because customers use our products to assist in necessary business and service interactions and to support customer and client-facing applications, any outage on our products would impair the ability of our customers to operate their businesses and provide necessary services, which would negatively impact our brand, reputation and customer satisfaction.

If Apple experiences service outages, such failure could interrupt our customers' access to our services, which could adversely affect their perception of our products' reliability and our revenue. Additionally, customers may attribute Apple service outages to our products, which may harm our reputation and cause our customers to ask us for assistance with these outages that are outside of our control. Any disruptions in these services, including as a result of actions outside of our control, would significantly impact the continued performance of our products. In the future, these services may not be available to us on commercially reasonable terms, or at all. If we do not accurately predict our infrastructure capacity requirements, our customers could experience service shortfalls. We may also be unable to effectively address capacity constraints, upgrade our systems as needed and continually develop our technology and network architecture to accommodate actual and anticipated changes in technology.

Any of the above circumstances or events may harm our reputation, cause customers to terminate their agreements with us, impair our ability to obtain subscription renewals from existing customers, impair our ability to grow our customer base, result in the expenditure of significant financial, technical and engineering resources, subject us to financial penalties and liabilities under our service level agreements, and otherwise could adversely affect our business, results of operations and financial condition.

Failures in internet infrastructure or interference with broadband or wireless access could cause current or potential customers to believe that our products are unreliable, leading these customers to switch to our competitors or to avoid using our products, which could negatively impact our revenue or harm our opportunities for customer growth.

Our products depend in part on our customers' high-speed broadband or wireless access to the internet. Increasing numbers of customers and bandwidth requirements may degrade the performance of our products due to capacity constraints and other internet infrastructure limitations, and additional network capacity to maintain adequate data transmission speeds may be unavailable or unacceptably expensive. If adequate capacity is not available to us, our products may be unable to achieve or maintain sufficient data transmission, reliability, or performance. In addition, if internet service providers and other third parties providing internet services, including incumbent phone companies, cable companies and wireless companies, have outages or suffer deterioration in their quality of service, our customers may not have access to or may experience a decrease in the quality of our products. These providers may take measures that block, degrade, discriminate, disrupt, or increase the cost of customer access to our products. Any of these disruptions to data transmission could lead customers to switch to our competitors or avoid using our products, which could negatively impact our revenue or harm our opportunities for growth.

We are subject to stringent and changing privacy laws, regulations and standards, information security policies and contractual obligations related to data privacy and security. Our actual or perceived failure to comply with such obligations could harm our business.

We have legal and contractual obligations regarding the protection of confidentiality and appropriate use of personally identifiable information. We are subject to a variety of federal, state, local and international laws, directives and regulations relating to the collection, use, retention, security, disclosure, transfer and other processing of personally identifiable information. The regulatory framework for privacy and security issues worldwide is rapidly evolving and, as a result, implementation standards and enforcement practices are likely to remain uncertain for the foreseeable future. We publicly post documentation regarding our practices concerning the collection, processing, use and disclosure of data.

Although we endeavor to comply with our published policies and documentation, we may at times fail to do so or be alleged to have failed to do so. The publication of our privacy policy and other documentation that provide promises and assurances about privacy and security can subject us to potential state and federal action if they are found to be deceptive, unfair or misrepresentative of our actual practices. Any failure by us, our suppliers or other parties with whom we do business to comply with this documentation or with federal, state, local or international regulations could result in proceedings against us by governmental entities or others. In many jurisdictions, enforcement actions and consequences for noncompliance are rising. In the United States, these include enforcement actions in response to rules and regulations promulgated under the authority of federal agencies and state attorneys general and legislatures and consumer protection agencies. In addition, privacy advocates and industry groups have regularly proposed, and may propose in the future, self-regulatory standards with which we must legally comply or that contractually apply to us. If we fail to follow these security standards even if no customer information is compromised, we may incur significant fines or experience a significant increase in costs. Evolving and changing definitions of personal data and personal information within the European Union, the United States, and elsewhere may limit or inhibit our ability to operate or expand our business, including technology partnerships that may involve the sharing of data. Even the perception of privacy concerns, whether or not valid, may harm our reputation or inhibit adoption of our products by current and future customers.

Internationally, 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, including, but not limited to, the EU. The EU's data protection landscape is currently unstable, resulting in possible significant operational costs for internal compliance and risk to our business. The EU has adopted the GDPR, which went into effect in May 2018 and contains numerous requirements and changes from previously existing EU law, including more robust obligations on data processors and heavier documentation requirements for data protection compliance programs by companies. Among other requirements, the GDPR regulates transfers of personal data subject to the GDPR to third countries that have not been found to provide adequate protection to such personal data, including the United States. While we have taken steps to mitigate the impact on us with respect to transfers of data, the efficacy and longevity of these transfer mechanisms remains uncertain. The GDPR also introduced numerous privacy-related changes for companies operating in the EU, including greater control for data subjects (including, for example, the "right to be forgotten"), increased data portability for EU consumers, data breach notification requirements and increased fines. In particular, under the GDPR, fines of up to 20 million euros or up to 4% of the annual global revenue of the noncompliant company, whichever is greater, could be imposed for violations of certain of the GDPR's requirements. Such penalties are in addition to any civil litigation claims by customers and data subjects. The GDPR requirements apply not only to third-party transactions, but also to transfers of information between us and our subsidiaries, including employee information. The UK GDPR is currently generally aligned with the EU GDPR, but Brexit has created the opportunity for the UK to develop its own data protection regime which may diverge from the European standard in the future.

In addition to the GDPR, the European Commission has adopted the Regulation on Privacy and Electronic Communications (the "ePrivacy Regulation"), which focuses on protection of personal data. New rules related to the ePrivacy Regulation are likely to include enhanced consent requirements in order to use communications content and communications metadata, which may negatively impact our products and our relationships with our customers.

Complying with the GDPR and the ePrivacy Regulation may cause us to incur substantial operational costs or require us to change our business practices. Despite our efforts to bring practices into compliance , we may not be successful in our efforts to achieve compliance either due to internal or external factors, such as resource allocation limitations or a lack of vendor cooperation. Non-compliance could result in proceedings against us by governmental entities, customers, data subjects or others. We may also experience difficulty retaining or obtaining new European or multi-national customers due to the legal requirements, compliance cost, potential risk exposure and uncertainty for these entities, and we may experience significantly increased liability with respect to these customers pursuant to the terms set forth in our engagements with them. While we utilize a data center in the European Economic Area to maintain certain customer data (which may include personal data) originating from the EU in the European Economic Area, we may find it necessary to establish additional systems and processes to maintain such data in the European Economic Area, which may involve substantial expense and distraction from other aspects of our business.

Transferring personal information across international borders is complex and subject to legal and regulatory requirements as well as active litigation and enforcement in a number of jurisdictions around the world, each of which could have an adverse impact to our ability to process and transfer personal data as part of our business operations. For example, European data transfers outside the European Economic Area are highly regulated and litigated. The mechanisms that we and many other companies rely upon for European data transfers (e.g., the Privacy Shield and Standard Contractual Clauses) have been the subject of recent judicial decisions by the Court of Justice of the European Union resulting in the invalidation of the Privacy Shield, and revisions to the Standard Contractual Clauses as a means to legitimize transfer of personal data outside the EU. We are closely monitoring the impact of these recent developments in EU data transfer regulation and other developments related to the remaining valid transfer mechanisms available for transferring personal data in other countries that have similar trans-border data flow requirements and adjusting our practices accordingly. The invalidation of the Privacy Shield and the adoption of new Standard Contractual Clauses have resulted in some changes in the obligations required to provide our services in the EU and could expose us to potential sanctions and fines for non-compliance. Further, Brexit has created uncertainty with regard to data transfer regulation in the UK. We believe that the limited data required in order to use our products mitigates these risks, and we will continue to monitor best practices for European data transfer. Accordingly, we may need to invest in additional technical, legal and organizational safeguards in the future to avoid disruptions to data flows within our business and to and from our customers and service providers.

Domestic laws in this area are also complex and developing rapidly. Many state legislatures have adopted legislation that regulates how businesses operate online, including measures relating to privacy, data security and data breaches. Laws in all 50 states require businesses to provide notice to customers whose personally identifiable information has been disclosed as a result of a data breach. The laws are not consistent, and compliance in the event of a widespread data breach is costly. States are also constantly amending existing laws, requiring attention to frequently changing regulatory requirements. For example, California enacted the CCPA, which became effective on January 1, 2020. The CCPA gives California residents expanded rights to access and delete their personal information, opt out of certain personal information sharing and receive detailed information about how their personal information is used. The CCPA provides for civil penalties for violations, as well as a private right of action for data breaches that is expected to increase data breach litigation. In addition, on November 3, 2020, California voters approved a new privacy law, the California Privacy Rights Act (the "CPRA"), which significantly modifies the CCPA, including by expanding consumers' rights with respect to certain personal information and creating a new state agency to oversee implementation and enforcement efforts. Many of the CPRA's provisions will become effective on January 1, 2023. The CCPA, CPRA, and other state data regulation may increase our compliance costs and potential liability.

Because the interpretation and application of many privacy and data protection laws along with contractually imposed industry standards are uncertain, it is possible that these laws may be interpreted and applied in a manner that is inconsistent with our existing data management practices or the features of our products and product capabilities. If so, in addition to the possibility of fines, lawsuits, regulatory investigations, imprisonment of company officials and public censure, other claims and penalties, significant costs for remediation and damage to our reputation, we could be required to fundamentally change our business activities and practices or modify our products and product capabilities, any of which could have an adverse effect on our business. Any inability to adequately address privacy and security concerns, even if unfounded, or comply with applicable privacy and data security laws, regulations and policies, could result in additional cost and liability to us, damage our reputation, inhibit sales and adversely affect our business. Furthermore, the costs of compliance with, and other burdens imposed by, the laws, regulations and policies that are applicable to the businesses of our customers may limit the use and adoption of, and reduce the overall demand for, our products. Privacy and data security concerns, whether valid or not valid, may inhibit market adoption of our products, particularly in certain industries and foreign countries. If we are not able to adjust to changing laws, regulations and standards related to the internet, our business may be harmed.

We may be sued by third parties for alleged infringement, misappropriation or other violation of their intellectual property and proprietary rights.

There is considerable patent and other intellectual property development activity in our industry. Our success depends, in part, on our ability to develop and commercialize our products without infringing, misappropriating or otherwise violating the intellectual property or proprietary rights of others. From time to time, our competitors or other third parties have claimed and in the future could claim that we are infringing, misappropriating or otherwise violating their intellectual property or proprietary rights, we have been and in the future may become subject to intellectual property disputes and we may be found to be infringing, misappropriating or otherwise violating such rights. A claim may also be made relating to technology that we acquire or license from third parties.

We may be unaware of the intellectual property or proprietary rights of others that may cover some or all of our products. Regardless of merit, any claims or litigation could cause us to incur significant expenses and, if successfully asserted against us, could require that we pay substantial damages, costs and/or ongoing royalty payments, prevent us from offering our products, require us to obtain a license, which may not be available on commercially reasonable terms or at all, require us to re-design our products, which could by costly, time-consuming or impossible or require that we comply with other unfavorable terms. If any of our customers are sued, we would in general be required to defend and/or settle the litigation on their behalf. In addition, if we are unable to obtain licenses or modify our products to make them non-infringing, we might have to refund a portion of license fees prepaid to us and terminate those agreements, which could further exhaust our resources. In addition, we have paid, and may in the future pay, substantial settlement amounts or royalties on future product sales to resolve claims or litigation, whether or not legitimately or successfully asserted against us. Even if we were to prevail in the actual or potential claims or litigation against us, any claim or litigation regarding our intellectual property and proprietary rights could be costly and time-consuming and divert the attention of our management and key personnel from our business operations. Such disputes, with or without merit, could also cause potential customers to refrain from purchasing our products or otherwise cause us reputational harm.

We do not currently have a large patent portfolio, which could prevent us from deterring patent infringement claims through our own patent portfolio, and our competitors and others may now and in the future have significantly larger and more mature patent portfolios than we have. Any litigation may also involve non-practicing entities, patent holding companies or other adverse patent owners. We cannot predict the outcome of lawsuits and cannot ensure that the results of any such actions will not have an adverse effect on our business, financial condition or results of operations.

We rely on third-party software and intellectual property licenses.

Our products include software and other intellectual property and proprietary rights licensed from third parties. It may be necessary in the future to seek or renew licenses relating to various aspects of our products. We have the expectation, based on experience and standard industry practice, that such licenses generally can be obtained on commercially reasonable terms. However, there can be no assurance that the necessary licenses would be available on commercially reasonable terms, if at all. Our inability to obtain certain licenses or other rights or to obtain such licenses or rights on favorable terms could have a material adverse effect on our business, operating results and financial conditions. In any such case, we may be required to seek licenses to other software or intellectual property or proprietary rights from other parties and re-design our products to function with such technology, or develop replacement technology ourselves, which could result in increased costs and product delays. We may also be forced to limit the features available in our current or future products. Moreover, incorporating intellectual property or proprietary rights licensed from third parties on a nonexclusive basis in our products, including our software could limit our ability to protect our intellectual property and proprietary rights in our products and our ability to restrict third parties from developing similar or competitive technology using the same third-party intellectual property or proprietary rights.

If we are unable to obtain, maintain, protect or enforce our intellectual property and proprietary rights, our competitive position could be harmed or we could be required to incur significant expenses.

Our ability to compete effectively is dependent in part upon our ability to obtain, maintain, protect and enforce our intellectual property and other proprietary rights, including proprietary technology. We establish and protect our intellectual property and proprietary rights, including our proprietary information and technology through a combination of licensing agreements, third-party nondisclosure agreements, confidentiality procedures and other contractual provisions, as well as through patent, trademark, trade dress, copyright, trade secret and other intellectual property laws in the United States and similar laws in other countries. However, the steps we take to obtain, maintain, protect and enforce our intellectual property and proprietary rights may be inadequate. There can be no assurance that these protections will be available in all cases or will be adequate to prevent our competitors or other third parties from copying, reverse engineering, accessing or otherwise obtaining and using our technology, intellectual property or proprietary rights or products without our permission. The laws of some foreign countries, including countries in which our products are sold, may not be as protective of intellectual property and proprietary rights as those in the United States, and mechanisms for enforcement of intellectual property and proprietary rights may be inadequate. There can be no assurance that our competitors will not independently develop technologies that are substantially equivalent or superior to our technology or design around our intellectual property and proprietary rights. In each case, our ability to compete could be significantly impaired.

In addition, third parties may seek to challenge, invalidate or circumvent our patents, trademarks, copyrights, trade secrets or other intellectual property and proprietary rights, or any applications for any of the foregoing, including through administrative processes such as re-examination, inter partes review, interference and derivation proceedings and equivalent proceedings in foreign jurisdictions (e.g., opposition proceedings) or litigation. The legal standards relating to the validity, enforceability and scope of protection of intellectual property and proprietary rights are uncertain and still evolving. There can be no assurance that our patent applications will result in issued patents or whether the examination process will require us to narrow the scope of the claims sought. In addition, our issued patents, and any patents issued from our pending or future patent applications or licensed to us in the future may not provide us with competitive advantages, may be successfully challenged, invalidated or circumvented by third parties, or may not prove to be enforceable in actions brought against alleged infringers. The value of our intellectual property and proprietary rights could also diminish if others assert rights therein or ownership thereof, and we may be unable to successfully resolve any such conflicts in our favor or to our satisfaction.

To prevent substantial unauthorized use of our intellectual property and proprietary rights, it may be necessary to prosecute actions for infringement, misappropriation and/or other violation of our intellectual property and proprietary rights against third parties. Any such action may be time-consuming and could result in significant costs and diversion of our resources and management's attention, and there can be no assurance that we will be successful in such action, even when our rights have been infringed, misappropriated or otherwise violated. Further, our efforts to enforce our intellectual property and proprietary rights may be met with defenses, counterclaims and countersuits attacking the validity and enforceability of our intellectual property and proprietary rights, and if such defenses, counterclaims or countersuits are successful, we could lose valuable intellectual property and proprietary rights.

Furthermore, many of our current and potential competitors have the ability to dedicate substantially greater resources to enforce their intellectual property and proprietary rights than we do. Accordingly, despite our efforts, we may not be able to prevent third parties from infringing, misappropriating or otherwise violating our intellectual property and proprietary rights. Although we enter into confidentiality and invention assignment agreements with our employees and consultants and enter into confidentiality agreements with other third parties, including customers and third-party service providers, we cannot guarantee that we have entered into such agreements with each party that has or may have had access to our proprietary information, know-how and trade secrets. Moreover, no assurance can be given that these agreements will be effective in controlling access to, distribution, use, misuse, misappropriation, reverse engineering or disclosure of our proprietary information, know-how and trade secrets. Further, these agreements may not prevent our competitors from independently developing technologies that are substantially equivalent or superior to our products and platform capabilities. These agreements may be breached, and we may not have adequate remedies for any such breach.

Our use of open source software could impose limitations on our ability to commercialize our products or subject us to litigation or other actions.

Our products contain software modules licensed for use from third-party authors under open source licenses, including MIT, Berkley Software Distribution and others, and we expect to continue to incorporate open source software in our products in the future. 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, misappropriation or other violation claims or the quality of the code. Some open source licenses contain requirements that we make available the source code of modifications or derivative works we create based upon, incorporating or using the type of open source software we use and that we license such modifications or derivative works under the terms of the applicable open source licenses. If we fail to comply, or are alleged to have failed to comply, with the terms and conditions of our open source licenses, we could be required to incur significant legal expenses defending such allegations, subject to significant damages, enjoined from the sale of our proprietary products and required to comply with onerous conditions or restrictions on our proprietary products, any of which could be disruptive to our business.

Moreover, if we combine our proprietary products with open source software in a certain manner, we could, under certain of the open source licenses, be required to release the source code of our proprietary products to the public or offer our products to users at no cost. This could allow our competitors to create similar products with lower development effort and time and ultimately could result in a loss of sales for us. We cannot ensure that we have not incorporated open source software in our software in a manner that is inconsistent with the terms of the applicable license or our current policies, and we may inadvertently use open source in a manner that we do not intend or that could expose us to claims for breach of contract or intellectual property infringement, misappropriation or other violation.

The terms of many open source licenses have not been interpreted by U.S. courts, and there is a risk that such licenses could be construed in a manner that could impose unanticipated conditions or restrictions on our ability to commercialize our products. In such an event, we could be required to seek licenses from third parties in order to continue offering our products, re-engineer our products, discontinue the sale of our products in the event re-engineering cannot be accomplished on a timely basis or make generally available, in source code form, all or a portion of our proprietary source code, any of which could materially and adversely affect our business and operating results.

Risks Related to Laws and Regulations

We provide our products to state and local governments and to a lesser extent federal government agencies, and heavily regulated organizations in the U.S. and in foreign jurisdictions; as a result, we face risks related to the procurement process budget decisions driven by statutory and regulatory determinations, termination of contracts and compliance with government contracting requirements.

We sell our products and provide limited services to a number of state and local government entities (including, primarily, educational institutions) and, in limited instances, the U.S. government. We additionally have customers who operate in heavily-regulated organizations who procure our software products both through our partners and directly, and we have made, and may continue to make, significant investments to support future sales opportunities in these sectors. Doing business with government entities presents a variety of risks. Among other risks, the procurement process for governments and their agencies is highly competitive, can be time-consuming, requires us to incur significant up-front time and expense and subjects us to additional compliance risks and costs, without any assurance that we (or a third-party reseller) will win a contract. Beyond this, demand for our products and services may be impacted by public sector budgetary cycles and funding availability, impacts of COVID-19, and funding in any given fiscal cycle may be reduced or delayed, including in connection with an extended federal government shutdown, which could adversely impact demand for our products and services. In addition, public sector and heavily-regulated customers may have contractual, statutory or regulatory rights to terminate current contracts with us or our third-party distributors or resellers for convenience or due to a default. If a contract is terminated for convenience, we may only be able to collect fees for products or services delivered prior to termination and settlement expenses. If a contract is terminated due to a default, we may be liable for excess costs incurred by the customer for procuring alternative products or services or be precluded from doing further business with government entities. Further, entities providing services to governments are required to comply with a variety of complex laws, regulations and contractual provisions relating to the formation, administration, or performance of government contracts that give public sector customers substantial rights and remedies, many of which are not typically found in commercial contracts. These may include rights with respect to price protection, the accuracy of information provided to the government, contractor compliance with supplier diversity policies and other terms that are particular to government contracts, such as termination rights. These rules may apply to us and/or third parties through whom we resell our products and services and whose practices we may not control, where such parties' non-compliance could impose repercussions with respect to contractual and customer satisfaction issues. Federal, state and local governments routinely investigate and audit contractors for compliance with these requirements. If, as a result of an audit or review, it is determined that we have failed to comply with these requirements, we may be subject to civil and criminal penalties and administrative sanctions, including termination of contracts, forfeiture of profits, cost associated with the triggering of price reduction clauses, fines and suspensions or debarment from future government business, and we may suffer harm to our reputation.

Our customers also include a number of non-U.S. governments. Similar procurement, budgetary, contract and audit risks that apply in the context of U.S. government contracting also apply to our doing business with these entities, particularly in certain emerging markets where our customer base is less established. In addition, compliance with complex regulations and contracting provisions in a variety of jurisdictions can be expensive and consume significant management resources. In certain jurisdictions, our ability to win business may be constrained by political and other factors unrelated to our competitive position in the market. Additionally, many of our current and prospective customers, such as those in the financial services and health care industries, are highly regulated and may be required to comply with more stringent regulations in connection with subscribing to and implementing our services. Each of these difficulties could result in substantial compliance burdens and could materially adversely affect our business and results of operations.

We are subject to export controls and economic sanctions laws, and our customers and channel partners are subject to import controls that could subject us to liability if we are not in full compliance with applicable laws.

Certain of our products are subject to U.S. export controls and we would be permitted to export such products to certain countries outside the U.S. only by first obtaining an export license from the U.S. government, or by utilizing an existing export license exception, or after clearing U.S. government agency review. Obtaining the necessary export license or accomplishing a U.S. government review for a particular export may be time-consuming and may result in the delay or loss of sales opportunities. Furthermore, U.S. export control laws and economic sanctions, including economic and trade sanctions regulations administered by the U.S. Treasury Department's Office of Foreign Assets Control, prohibit the sale or supply of our products and services to U.S. embargoed or sanctioned countries, regions, governments, persons, and entities.

Although we take precautions to prevent our solutions from being provided in violation of U.S. export control and economic sanctions laws, our solutions may have been in the past, and could in the future be, provided inadvertently in violation of such laws. If we were to fail to comply with U.S. export law requirements, U.S. customs regulations, U.S. economic sanctions or other applicable U.S. laws, we could be subject to substantial civil and criminal penalties, including fines, incarceration for responsible employees and managers and the possible loss of export or import privileges. U.S. export controls, sanctions and regulations apply to our channel partners as well as to us. Any failure by our channel partners to comply with such laws, regulations or sanctions could have negative consequences, including reputational harm, government investigations and penalties.

Changes in our products or changes in export and import regulations may create delays in the introduction of our products into international markets, prevent our customers with international operations from deploying our products globally or, in some cases, prevent the export or import of our products to certain countries, governments or persons altogether. In addition, any change in export or import regulations, economic sanctions or related legislation, shift in the enforcement or scope of existing regulations, or change in the countries, governments, persons or technologies targeted by such regulations, could result in decreased use of our products by, or in our decreased ability to export or sell our products to, existing or potential customers with international operations. Any decreased use of our products or limitation on our ability to export or sell our products would likely adversely affect our business, financial condition and operating results.

We are subject to anti-corruption, anti-bribery and similar laws, and non-compliance with such laws can subject us to criminal penalties or significant fines and harm our business and reputation.

We are subject to anti-corruption and anti-bribery and similar laws, such as the U.S. Foreign Corrupt Practices Act of 1977, as amended (the "FCPA"), the U.S. domestic bribery statute contained in 18 U.S.C. § 201, the U.S. Travel Act, the USA PATRIOT Act, the U.K. Bribery Act 2010 and other anti-corruption, anti-bribery and anti-money laundering laws in countries in which we conduct activities. Anti-corruption and anti-bribery laws have been enforced aggressively in recent years and are interpreted broadly and prohibit companies and their employees and agents from promising, authorizing, making, offering, soliciting, or accepting, directly or indirectly, improper payments or other improper benefits to or from any person whether in the public or private sector. As we increase our international sales and business, our risks under these laws may increase. Noncompliance with these laws could subject us to investigations, sanctions, settlements, prosecution, other enforcement actions, disgorgement of profits, significant fines, damages, other civil and criminal penalties or injunctions, adverse media coverage and other consequences. Any investigations, actions or sanctions could adversely affect our business, results of operations and financial condition.

Our international operations may give rise to potentially adverse tax consequences.

Our corporate structure and associated transfer pricing policies anticipate future growth into the international markets. The amount of taxes we pay in different jurisdictions may depend on the application of the tax laws of the various jurisdictions, including the United States, to our international business activities, changes in tax rates, new or revised tax laws or interpretations of existing tax laws and policies and our ability to operate our business in a manner consistent with our corporate structure and intercompany arrangements. The taxing authorities of the jurisdictions in which we operate may challenge our methodologies for pricing intercompany transactions, which are generally required to be computed on an arm's-length basis pursuant to intercompany arrangements or disagree with our determinations as to the income and expenses attributable to specific jurisdictions. If such a challenge or disagreement were to occur, and our position was not sustained, we could be required to pay additional taxes, interest and penalties, which could result in one-time tax charges, higher effective tax rates, reduced cash flows and lower overall profitability of our operations. Our financial statements could fail to reflect adequate reserves to cover such a contingency.

As we continue to develop and grow our business globally, our success will depend in large part on our ability to anticipate and effectively manage these risks. The expansion of our existing international operations and entry into additional international markets will require significant management attention and financial resources. Our failure to successfully manage our international operations and the associated risks could limit the future growth of our business.

Changes in tax laws or regulations in the various tax jurisdictions we are subject to that are applied adversely to us or our customers could increase the costs of our products and harm our business.

New income, sales, use or other tax laws, statutes, rules, regulations, or ordinances could be enacted at any time. Those enactments could harm our domestic and international business operations, and our business and financial performance. Further, existing tax laws, statutes, rules, regulations or ordinances could be interpreted, changed, modified or applied adversely to us. These events could require us or our customers to pay additional tax amounts on a prospective or retroactive basis, as well as require us or our customers to pay fines and/or penalties and interest for past amounts deemed to be due. If we raise our prices to offset the costs of these changes, existing and potential future customers may elect not to purchase our products in the future. Additionally, new, changed, modified or newly interpreted or applied tax laws could increase our customers' and our compliance, operating and other costs, as well as the costs of our products. Further, these events could decrease the capital we have available to operate our business. Any or all of these events could harm our business and financial performance.

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

In general, under Section 382 of the United States Internal Revenue Code of 1986, as amended (the "Code"), a corporation that undergoes an "ownership change" is subject to annual limitations on its ability to utilize its pre-change net operating losses ("NOLs") to offset future taxable income. Our ability to utilize the Company's current U.S. federal NOLs may be limited under Section 382 of the Code. If we undergo an ownership change, our ability to utilize NOLs could be further limited by Section 382 of the Code. Future changes in our stock ownership, many of which are outside of our control, could result in an ownership change under Section 382 of the Code. Furthermore, our ability to utilize NOLs of companies that we have acquired or may acquire in the future may be subject to limitations. For these reasons, we may not be able to utilize a material portion of the NOLs, even if we were to achieve profitability.

Our NOL carryforwards may be unavailable to offset future taxable income because of restrictions under U.S. tax law. NOLs generated in taxable years ending on or prior to December 31, 2017 are only permitted to be carried forward for 20 taxable years under applicable U.S. federal tax law. Under the Tax Cuts and Jobs Act (the “Tax Act”), as amended by the Coronavirus Aid, Relief, and Economic Security Act (the “CARES Act”), our federal NOLs generated in taxable years ending after December 31, 2017 may be carried forward indefinitely and NOLs arising in taxable years beginning after December 31, 2017 and before January 1, 2021 may be carried back to each of the five taxable years preceding the tax year of such loss, but NOLs arising in taxable years beginning after December 31, 2020 may not be carried back. In addition, under the Tax Act, as modified by the CARES Act, for taxable years beginning after December 31, 2020, the deductibility of federal NOLs generated in taxable years beginning after December 31, 2017 is limited to 80% of current year taxable income. It is uncertain if and to what extent various states will conform to the Tax Act, as modified by the CARES Act.

Risks Related to Our Financial Reporting and Capital Resources

Seasonality may cause fluctuations in our revenue.

We believe there are seasonal factors that may cause us to record higher revenue in some quarters compared with others. We believe this variability is largely due to our customers’ budgetary and spending patterns, as many customers spend the unused portions of their discretionary budgets prior to the end of their fiscal years. For example, we have historically recorded our highest level of total revenue in our fourth quarter, which we believe corresponds to the fourth quarter of a majority of our enterprise customers. We historically receive a higher number of orders from education customers in the summer months to coincide with their fiscal year end. As our rate of growth has slowed, seasonal or cyclical variations in our operations may become more pronounced, and our business, results of operations, and financial position may be adversely affected.

Our quarterly operating results and other metrics may vary significantly and be unpredictable, which could cause the trading price of our stock to decline.

Our operating results and other metrics have historically varied from period to period, and we expect that they will continue to do so as a result of a number of factors, many of which are outside of our control and may be difficult to predict, including:

- the impact of COVID-19 on our customers’ budgets and their ability to purchase or renew at similar volumes to prior periods;
- the level of demand for our products and services, including our newly-introduced products and services;
- the timing and use of new subscriptions and renewals of existing subscriptions;
- the timing and success of new product announcements and introductions by us and our competitors and the timing and success of device releases and software updates by Apple;
- our ability to maintain scalable internal systems for reporting, order processing, license fulfillment, product delivery, purchasing, billing and general accounting, among other functions;
- the extent to which customers subscribe for additional products, license additional products or increase the number use cases;
- significant security breaches of, technical difficulties with, or interruptions to, the delivery and use of our offerings;
- customer budgeting cycles and seasonal buying patterns where our customers often time their purchases and renewals of our products to coincide with their fiscal year end, which is typically December 31 for our enterprise customers;
- any changes in the competitive landscape of our industry, including consolidation among our competitors, customers, partners or resellers;
- timing of costs and expenses during a quarter;

- deferral of orders in anticipation of new products or enhancements announced by us or our competitors;
- price competition;
- changes in renewal rates and terms in any quarter;
- costs related to the acquisition of businesses, talent, technologies or intellectual property by us, including potentially significant amortization costs and possible write-downs;
- litigation-related costs, settlements or adverse litigation judgments;
- any disruption in our sales channels or termination of our relationship with channel and other strategic partners;
- general economic conditions, both domestically and in our foreign markets, and related changes to currency exchange rates;
- insolvency or credit difficulties confronting our customers, affecting their ability to purchase or pay for our products; and
- future accounting pronouncements or changes in our accounting policies.

Any one of the factors above or the cumulative effect of some of the factors referred to above may result in significant fluctuations in our financial and other operating results, including fluctuations in our key metrics. This variability and unpredictability could result in our failing to meet the expectations of securities analysts or investors for any period. If we fail to meet or exceed such expectations for these or any other reasons, the market price of our shares could fall substantially and we could face costly lawsuits, including securities class action suits.

We may fail to meet or exceed the expectations of securities analysts and investors, and the market price for our common stock could decline. If one or more of the securities analysts who cover us change their recommendation regarding our stock adversely, the market price for our common stock could decline. Additionally, our stock price may be based on expectations, estimates, or forecasts of our future performance that may be unrealistic or may not be achieved. Further, our stock price may be affected by financial media, including press reports and blogs.

Changes in accounting principles and guidance could result in unfavorable accounting charges or effects.

We prepare our consolidated financial statements in accordance with U.S. generally accepted accounting principles (“GAAP”). These principles are subject to interpretation by the SEC and various bodies formed to create and interpret appropriate accounting principles and guidance. A change in these principles or guidance, or in their interpretations, may have a material effect on our reported results, as well as our processes and related controls, and may retroactively affect previously reported results. For example, during February 2016, the Financial Accounting Standards Board (“FASB”) issued Accounting Standards Update (“ASU”) No. 2016-02, *Leases (Topic 842)* (“ASU 2016-02”). The updated standard requires the recognition of a liability for lease obligations and a corresponding right-of-use asset on the balance sheet and disclosures of certain information regarding leasing arrangements. We adopted the new lease standard on January 1, 2021. See Part II, Item 8, “Financial Statements and Supplementary Data — Summary of significant accounting policies” for more information.

Our revenue recognition and other factors may impact our financial results in any given period and make them difficult to predict.

Under ASU No. 2014-09, *Revenue from Contracts with Customers (Topic 606)* (“ASC 606”), we recognize revenue when our performance obligations have been satisfied in an amount that reflects the consideration that we expect to receive in exchange for those performance obligations. Our subscription revenue includes revenue from SaaS subscription and support and maintenance arrangements, which is recognized ratably over the contract period. Subscription revenue also includes sales of on-premise subscriptions. License revenue includes revenue from on-premise perpetual licenses. We recognize license revenue and sales of on-premise subscriptions up-front provided all revenue recognition criteria have been satisfied. Our services revenue consists of professional services and training provided to our customers, for which revenue is recognized as the services are performed. Our application of ASC 606 with respect to the nature of future contractual arrangements could impact the forecasting of our revenue for future periods, as both the mix of products and services we will sell in a given period, as well as the size of contracts, is difficult to predict.

Consequently, a shortfall in sales of our SaaS subscription and support and maintenance arrangements in any quarter may not significantly reduce our subscription revenues for that quarter but may negatively affect subscription revenues in future quarters. Accordingly, the effect of significant downturns in sales of our SaaS subscription and support and maintenance arrangements may not be fully reflected in our results of operations until future periods. We may be unable to adjust our cost structure to compensate for this potential shortfall in subscription revenues. Our revenue recognition model for our SaaS subscription and support and maintenance arrangements also makes it difficult for us to rapidly increase our revenues through additional sales in any period, as a significant amount of our revenues are recognized over the applicable agreement term.

Furthermore, the presentation of our financial results requires us to make estimates and assumptions that may affect revenue recognition. In some instances, we could reasonably use different estimates and assumptions and changes in estimates may occur from period to period. See Part II, Item 7, “Management’s Discussion and Analysis of Financial Condition and Results of Operations — Critical Accounting Estimates — Revenue Recognition.”

Given the foregoing factors, comparing our revenue and operating results on a period-to-period basis may not be meaningful, and our past results may not be indicative of our future performance.

Impairment of goodwill and other intangible assets would result in a decrease in earnings.

We have in the past, and may in the future, acquire intangible assets. Current accounting rules require that goodwill and other intangible assets with indefinite useful lives that are not amortized be tested for impairment at least annually. These rules also require that intangible assets with definite useful lives be amortized over their respective estimated useful lives to their estimated residual values and reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. Events and circumstances considered in determining whether the carrying value of amortizable intangible assets and goodwill may not be recoverable include, but are not limited to, significant changes in performance relative to expected operating results, significant changes in the use of the assets, significant negative industry or economic trends, significant impacts to the economy (such as COVID-19), or a significant decline in our stock price and/or market capitalization for a sustained period of time. To the extent such evaluation indicates that the useful lives of intangible assets are different than originally estimated, the amortization period is reduced or extended and the quarterly amortization expense is increased or decreased. Any impairment charges or changes to estimated amortization periods could have a material adverse effect on our financial results.

We have identified a material weakness in our internal control over financial reporting and, if we are unable to remediate this material weakness, we may not be able to accurately or timely report our financial condition or results of operations, which may adversely affect investor confidence in us and, as a result, the value of our common stock.

As disclosed in Part II, Item 9A, “Controls and Procedures,” we have identified a material weakness in internal control over financial reporting. A material weakness is a deficiency, or combination of deficiencies, in internal control over financial reporting, such that there is a reasonable possibility that a material misstatement of a company’s annual or interim financial statements will not be prevented or detected on a timely basis. Because the control deficiency described below could have resulted in a material misstatement of our annual or interim financial statements, we determined that this deficiency constitutes a material weakness. In connection with the preparation of our financial statements for the quarter ended June 30, 2021, we identified misstatements in our accounting related to certain commissions that were incorrectly capitalized in prior periods. The misstatements resulted from a deficiency in the controls over the commissions process. We did not design or maintain effective controls to identify commissions that should have been expensed as incurred rather than capitalized in accordance with GAAP. Specifically, we did not have controls over (i) the communication of commission plan changes between the sales and accounting teams to identify and correctly account for commission plan changes in the financial statements and (ii) reviewing the evaluation of various terms in the commission plans to the relevant accounting guidance. As a result, sales and marketing expenses were understated and deferred contract costs were overstated in prior periods. This material weakness resulted in the revision of our previously issued consolidated financial statements as of and for the years ended December 31, 2020, 2019 and 2018 and for each of the quarters during the years ended December 31, 2020 and 2019 and the quarter ended March 31, 2021.

Our management is committed to remediating this material weakness and has implemented several steps to enhance our internal controls and commissions processes. Our steering committee, anchored by the Chief Financial Officer and Chief Operating Officer, has hired a third-party consultant to help us standardize and automate our commissions processes. The third-party consultant has implemented recommendations to standardize and automate our commission processes. Therefore, we intend to implement these new internal controls in 2022 with the intention of remediation later in the year. The material weakness will not be considered remediated until a sustained period of time has passed to allow management to test the design and operational effectiveness of the corrective actions. Until the material weakness is remediated, we plan to continue to perform additional analyses and other procedures to ensure that our consolidated financial statements are prepared in accordance with GAAP. In addition, we may discover additional material weaknesses that require additional time and resources to remediate and we may decide to take additional measures to address the material weaknesses or modify the remediation steps described above.

The existence of any material weakness, including our existing material weakness regarding capitalization of commissions, or significant deficiency requires management to devote significant time and incur significant expense to remediate any such material weaknesses or significant deficiencies and management may not be able to remediate any such material weaknesses or significant deficiencies in a timely manner. The existence of any material weakness in our internal control over financial reporting could also result in errors in our financial statements that could require us to restate our financial statements, cause us to fail to meet our reporting obligations and cause shareholders to lose confidence in our reported financial information, all of which could materially and adversely affect our business and stock price.

We are subject to SEC rules and regulations regarding our internal control over financial reporting. If we fail to maintain effective internal control over financial reporting and disclosure controls and procedures or identify material weaknesses in our internal control over financial reporting, we may not be able to accurately report our financial results, or report them in a timely manner.

The Sarbanes-Oxley Act of 2002 ("SOX") requires that we maintain effective internal control over financial reporting and disclosure controls and procedures. In particular, we must perform system and process evaluation, document our controls and perform testing of our key control over financial reporting to allow management and our independent public accounting firm to report on the effectiveness of our internal control over financial reporting, as required by Section 404 of SOX.

The process of designing and implementing internal control over financial reporting required to comply with Section 404 of the SOX has been and will continue to be time consuming, costly and complicated and has and will require significant accounting expense and management effort. We will continue to dedicate management effort and other internal resources, invest in more robust technology, and engage outside consultants to assess and document the adequacy of internal control over financial reporting, continue steps to improve control processes as appropriate, validate through testing that controls are functioning as documented and implement a continuous reporting and improvement process for internal control over financial reporting and to compile the system and process documentation necessary to perform the evaluation needed to comply with Section 404. However, we cannot assure you that in future periods, after we remediate the current material weakness, our independent registered public accounting firm will be able to attest to the effectiveness of our internal control over financial reporting. We may not be able to remediate any material weaknesses that may be identified, or to complete our evaluation, testing and any required remediation in a timely fashion and 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.

If our senior management continues to be unable to conclude in future periods that we have effective internal control over financial reporting or to certify the effectiveness of such controls or if our independent registered public accounting firm cannot render an unqualified opinion on management's assessment and the effectiveness of our internal control over financial reporting, we could be subject to regulatory scrutiny, a loss of public and investor confidence, and to litigation from investors and stockholders, which could have a material adverse effect on our business and our stock price. In addition, if we do not maintain adequate financial and management personnel, processes and controls, we may not be able to manage our business effectively or accurately report our financial performance on a timely basis, which could cause a decline in our common stock price, adversely affect our results of operations and financial condition, and/or restrict our future access to the capital markets.

Our indebtedness could adversely affect our business and growth prospects.

As of December 31, 2021, we had total current and long-term indebtedness of $363.0 million, including (i) $362.0 million outstanding aggregate principal amount of the Convertible Senior Notes due 2026 (the "2026 Notes"), (ii) no borrowings outstanding under our 2020 Revolving Credit Facility, and (iii) $1.0 million of outstanding letters of credit outstanding under our 2020 Revolving Credit Facility. In addition, as of December 31, 2021, we had $149.0 million of additional borrowing capacity under our 2020 Revolving Credit Facility. Our indebtedness, or any additional indebtedness we may incur, could require us to divert funds identified for other purposes for debt service and impair our liquidity position. If we cannot generate sufficient cash flow from operations to service our debt, we may need to refinance our debt, dispose of assets, or issue equity to obtain necessary funds. We do not know whether we will be able to take any of these actions on a timely basis, on terms satisfactory to us or at all.

Our existing and future indebtedness, the cash flow needed to satisfy such indebtedness and the covenants governing such indebtedness, could have important consequences, including:

- limiting funds otherwise available for financing our capital expenditures by requiring us to dedicate a portion of our cash flows from operations to the repayment of debt and the interest on this debt;
- limiting our ability to incur additional indebtedness;
- limiting our ability to capitalize on significant business opportunities;
- making us more vulnerable to rising interest rates; and
- making us more vulnerable in the event of a downturn in our business.

Fluctuations in interest rates can increase borrowing costs. Increases in interest rates may directly impact the amount of interest we are required to pay and reduce earnings accordingly. In addition, developments in tax policy, such as the disallowance of tax deductions for interest paid on outstanding indebtedness, could have an adverse effect on our liquidity and our business, financial conditions and results of operations. Further, our existing debt agreements contain customary affirmative and negative covenants and certain restrictions on operations that could impose operating and financial limitations and restrictions on us, including restrictions on our ability to enter into particular transactions and to engage in other actions that we may believe are advisable or necessary for our business.

We expect to use cash flow from operations to meet current and future financial obligations, including funding our operations, debt service requirements and capital expenditures. The ability to make these payments depends on our financial and operating performance, which is subject to prevailing economic, industry, and competitive conditions and to certain financial, business, economic, and other factors beyond our control.

Despite our current debt levels, we may still incur substantially more debt or take other actions which would intensify the risks discussed above.

Despite our current consolidated debt levels, we may be able to incur substantial additional debt in the future, subject to the restrictions contained in our debt instruments, some of which may be secured debt. We are not restricted under the terms of the indenture governing the 2026 Notes (the “2026 Notes Indenture”) from incurring additional debt, securing existing or future debt, recapitalizing our debt or taking a number of other actions that are not limited by the terms of the 2026 Notes Indenture that could have the effect of diminishing our ability to make payments on our debt, including the 2026 Notes, when due. The 2020 Credit Agreement restricts our ability to incur certain additional indebtedness, including secured indebtedness, but if the 2020 Credit Agreement matures or is repaid, we may not be subject to such restrictions under the terms of any subsequent indebtedness.

We may not have the ability to raise the funds necessary to settle conversions of the 2026 Notes in cash or to repurchase the 2026 Notes upon a fundamental change, and our future debt may contain limitations on our ability to pay cash upon conversion or repurchase of the 2026 Notes.

Holders of the 2026 Notes will have the right, subject to certain conditions and limited exceptions, to require us to repurchase all or a portion of their 2026 Notes upon the occurrence of a fundamental change at a fundamental change repurchase price equal to 100% of the principal amount of the 2026 Notes to be repurchased, plus accrued and unpaid interest, if any, as provided in the 2026 Notes Indenture. In addition, upon conversion of the 2026 Notes, unless we elect to deliver solely shares of our common stock to settle such conversion (other than paying cash in lieu of delivering any fractional share), we will be required to make cash payments in respect of the 2026 Notes being converted as provided in the 2026 Notes Indenture. However, we may not have enough available cash or be able to obtain financing at the time we are required to make repurchases of 2026 Notes surrendered therefor or pay cash with respect to 2026 Notes being converted. In addition, our ability to repurchase the 2026 Notes or to pay cash upon conversions of the 2026 Notes may be limited by law, by regulatory authority or by agreements governing our future indebtedness. Our failure to repurchase 2026 Notes at a time when the repurchase is required by the 2026 Notes Indenture or to pay any cash payable on future conversions of the 2026 Notes as required by the 2026 Notes Indenture would constitute a default under the 2026 Notes Indenture. A default under the 2026 Notes Indenture or the fundamental change itself could also lead to a default under agreements governing our future indebtedness. If the repayment of the related indebtedness were to be accelerated after any applicable notice or grace periods, we may not have sufficient funds to repay the indebtedness and repurchase the 2026 Notes or make cash payments upon conversions thereof.

The conditional conversion feature of the 2026 Notes, if triggered, may adversely affect our financial condition and operating results.

In the event the conditional conversion feature of the 2026 Notes is triggered, holders of such notes will be entitled to convert their 2026 Notes at any time during specified periods at their option, described in the 2026 Notes Indenture. If one or more holders elect to convert their notes, unless we elect to satisfy our conversion obligation by delivering solely shares of our common stock (other than paying cash in lieu of delivering any fractional share), we would be required to settle a portion or all of our conversion obligation through the payment of cash, which could adversely affect our liquidity. In addition, even if holders do not elect to convert their notes, we could be required under applicable accounting rules to reclassify all or a portion of the outstanding principal of the 2026 Notes as a current rather than long-term liability, which would result in a material reduction of our net working capital.

Conversion of the 2026 Notes may dilute the ownership interest of our shareholders or may otherwise depress the price of our common stock.

The conversion of some or all of the 2026 Notes may dilute the ownership interests of our shareholders. Upon conversion of the 2026 Notes, we have the option to pay or deliver, as the case may be, cash, shares of our common stock, or a combination of cash and shares of our common stock. If we elect to settle our conversion obligation in shares of our common stock or a combination of cash and shares of our common stock, any sales in the public market of our common stock issuable upon such conversion could adversely affect prevailing market prices of our common stock. In addition, the existence of the 2026 Notes may encourage short selling by market participants because the conversion of the 2026 Notes could be used to satisfy short positions, or anticipated conversion of the 2026 Notes into shares of our common stock could depress the price of our common stock.

Changes in the accounting treatment for convertible debt securities that may be settled in cash, such as the 2026 Notes, could have a material effect on our reported financial results.

In August 2020, the FASB issued ASU No. 2020-06, *Debt — Debt with Conversion and Other Options (Subtopic 470-20) and Derivatives and Hedging — Contracts in Entity's Own Equity (Subtopic 815-40): Accounting for Convertible Instruments and Contracts in an Entity's Own Equity* ("ASU 2020-06"), which amends the accounting standards for convertible debt instruments that may be settled entirely or partially in cash upon conversion. ASU 2020-06 eliminates requirements to separately account for liability and equity components of such convertible debt instruments and eliminates the ability to use the treasury stock method for calculating diluted earnings per share for convertible instruments whose principal amount may be settled using shares. Instead, ASU 2020-06 requires (i) the entire amount of the security to be presented as a liability on the balance sheet and (ii) application of the "if-converted" method for calculating diluted earnings per share. Under the "if-converted" method, diluted earnings per share will generally be calculated assuming that all the 2026 Notes were converted solely into shares of common stock at the beginning of the reporting period, unless the result would be anti-dilutive, which could adversely affect our diluted earnings per share. However, if the principal amount of the convertible debt security being converted is required to be paid in cash and only the excess is permitted to be settled in shares, the if-converted method will produce a similar result as the "treasury stock" method prior to the adoption of ASU 2020-06 for such convertible debt security.

We early adopted ASU 2020-06, and as such we do not expect to bifurcate the liability and equity components of the 2026 Notes on our balance sheet and we expect to use the if-converted method of calculating diluted earnings per share. In order to qualify for the alternative treatment of calculating diluted earnings per share under the if-converted method, we would have to irrevocably fix the settlement method for conversions to combination settlement with a specified dollar amount of at least $1,000 per $1,000 principal amount of the 2026 Notes, which would impair our flexibility to settle conversions of notes, require us to settle conversions in cash in an amount at least equal to the principal amount of notes converted and could adversely affect our liquidity.

We cannot be sure whether other changes may be made to the current accounting standards related to the 2026 Notes, or otherwise, that could have a material effect on our reported financial results.

Certain provisions in the 2026 Notes Indenture may delay or prevent an otherwise beneficial takeover attempt of us.

Certain provisions in the 2026 Notes Indenture may make it more difficult or expensive for a third party to acquire us. For example, the 2026 Notes Indenture will require us, except as provided in that indenture, to repurchase the 2026 Notes for cash upon the occurrence of a fundamental change and, in certain circumstances, to increase the conversion rate for a holder that converts its notes in connection with a make-whole fundamental change. A takeover of us may trigger the requirement that we repurchase the 2026 Notes and/or increase the conversion rate, which could make it more costly for a potential acquirer to engage in such takeover. Such additional costs may have the effect of delaying or preventing a takeover of us that would otherwise be beneficial to investors.

We entered into certain hedging positions that may affect the value of the 2026 Notes and the volatility and value of our common stock.

In connection with the issuance of the 2026 Notes, we entered into certain hedging positions with certain financial institutions (the "option counterparties"). These hedging positions are expected generally to reduce potential dilution of our common stock on any conversion of the 2026 Notes or offset any cash payments we are required to make in excess of the principal amount of such converted 2026 Notes, as the case may be, with such reduction or offset subject to a cap.

The option counterparties or their respective affiliates may modify their hedge positions by entering into or unwinding various derivatives with respect to our common stock or purchasing or selling our common stock in secondary market transactions prior to the maturity of the 2026 Notes (and are likely to do so during any observation period related to a conversion of 2026 Notes or following any repurchase of 2026 Notes by us on any fundamental change repurchase event or otherwise). This activity could cause or avoid an increase or a decrease in the market price of our common stock or the 2026 Notes. In addition, if any such hedging positions fail to become effective, the operation counterparties or their respective affiliates may unwind their hedge positions, which could adversely affect the value of our common stock.

We are subject to counterparty risk with respect to the capped call transactions.

The option counterparties are financial institutions, and we will be subject to the risk that any or all of them might default under the capped call transactions. Our exposure to the credit risk of the option counterparties will not be secured by any collateral. Past global economic conditions have resulted in the actual or perceived failure or financial difficulties of many financial institutions. If an option counterparty becomes subject to insolvency proceedings, we will become an unsecured creditor in those proceedings with a claim equal to our exposure at that time under the capped call transactions with such option counterparty. Our exposure will depend on many factors but, generally, an increase in our exposure will be correlated to an increase in the market price and in the volatility of our common stock. In addition, upon a default by an option counterparty, we may suffer more dilution than we currently anticipate with respect to our common stock. We can provide no assurance as to the financial stability or viability of the option counterparties.

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

Our ability to make any future scheduled payments or to refinance any future outstanding debt obligations depends on our financial and operating performance, which will be affected by prevailing economic, industry and competitive conditions and by COVID-19 as well as financial, business and other factors beyond our control. We may not be able to maintain a sufficient level of cash flow from operating activities to permit us to pay the principal, premium, if any, and interest on our indebtedness. Any failure to make payments of interest and principal on any of our future outstanding indebtedness on a timely basis would harm our ability to incur additional indebtedness.

If our cash flows and capital resources are insufficient to fund any of our future debt service obligations, we may be forced to reduce or delay capital expenditures, sell assets, seek additional capital or seek to restructure or refinance our indebtedness. Any such refinancing could be at higher interest rates and may require us to comply with more onerous covenants. These alternative measures may not be successful and may not permit us to meet our scheduled debt service obligations. In the absence of such cash flows and resources, we could face substantial liquidity problems and might be required to sell material assets or operations to attempt to meet our debt service obligations. Our 2020 Credit Agreement includes certain restrictions on our ability to conduct asset sales and/or use the proceeds from asset sales for general corporate purposes. We may not be able to consummate these asset sales to raise capital or sell assets at prices and on terms that we believe are fair and any proceeds that we do receive may not be adequate to meet any debt service obligations then due. If we cannot meet our debt service obligations, the holders of our indebtedness may accelerate such indebtedness and, to the extent such indebtedness is secured, foreclose on our assets. In such an event, we may not have sufficient assets to repay all of our indebtedness.

The terms of the 2020 Credit Agreement restrict our current and future operations, particularly our ability to respond to changes or to take certain actions.

Our 2020 Credit Agreement contains a number of restrictive covenants that impose significant operating and financial restrictions on us and may limit our ability to engage in acts that may be in our long-term best interests, including restrictions on our ability to:

- incur certain additional indebtedness;
- pay dividends on or make distributions in respect of capital stock or repurchase or redeem capital stock;
- prepay, redeem, or repurchase certain indebtedness;
- make loans and investments;
- pay dividends on or make distributions in respect of capital stock or repurchase or redeem capital stock;
- prepay, redeem, or repurchase certain indebtedness;
- make loans and investments;
- sell or otherwise dispose of assets, including capital stock of restricted subsidiaries;
- incur liens;
- enter into transactions with affiliates;
- enter into agreements restricting the ability of our subsidiaries to pay dividends; and
- consolidate, merge or sell all or substantially all of our assets.

The restrictive covenants in the 2020 Credit Agreement require us to maintain specified financial ratios and satisfy other financial condition tests to the extent applicable. Our ability to meet those financial ratios and tests can be affected by events beyond our control.

A breach of the covenants or restrictions under the 2020 Credit Agreement could result in an event of default under such agreement. In the event the holders of our indebtedness accelerate the repayment, we may not have sufficient assets to repay that indebtedness or be able to borrow sufficient funds to refinance it. Even if we are able to obtain new financing, it may not be on commercially reasonable terms or on terms acceptable to us. As a result of these restrictions, we may be:

- limited in how we conduct our business;
- unable to raise additional debt or equity financing to operate during general economic or business downturns; or
- unable to compete effectively or to take advantage of new business opportunities.

These restrictions, along with similar restrictions that may be contained in agreements evidencing or governing other future indebtedness, may affect our ability to grow in accordance with our growth strategy.

Our failure to raise additional capital or generate cash flows necessary to expand our operations and invest in new technologies in the future could reduce our ability to compete successfully and harm our results of operations.

We may need to raise additional funds, and we may not be able to obtain additional debt or equity financing on favorable terms or at all. If we raise additional equity financing, our security holders may experience significant dilution of their ownership interests. If we engage in additional debt financing, we may be required to accept terms that restrict our ability to incur additional indebtedness, force us to maintain specified liquidity or other ratios or restrict our ability to pay dividends or make acquisitions. If we need additional capital and cannot raise it on acceptable terms, or at all, we may not be able to, among other things:

- develop and enhance our products;
- continue to expand our product development, sales and marketing organizations;
- hire, train and retain employees;
- respond to competitive pressures or unanticipated working capital requirements; or
- pursue acquisition opportunities.

In addition, our 2020 Credit Agreement also limits our ability to incur certain additional debt and therefore we may need to amend our 2020 Credit Agreement or issue additional equity to raise capital. If we issue additional equity, your interest in us will be diluted.

We may face exposure to foreign currency exchange rate fluctuations.

Today, our international contracts are denominated in U.S. dollars and local currencies, and the majority of our international costs are denominated in local currencies. Over time, it is possible that an increasing portion of our international contracts may be denominated in local currencies. Therefore, fluctuations in the value of the U.S. dollar and foreign currencies may affect our results of operations when translated into U.S. dollars. We do not currently engage in currency hedging activities to limit the risk of exchange rate fluctuations. However, in the future, we may use derivative instruments, such as foreign currency forward and option contracts, to hedge certain exposures to fluctuations in foreign currency exchange rates. The use of such hedging activities may not offset any or more than a portion of the adverse financial effects of unfavorable movements in foreign exchange rates over the limited time the hedges are in place. Moreover, the use of hedging instruments may introduce additional risks if we are unable to structure effective hedges with such instruments.

Risks Related to Ownership of Our Common Stock

Vista Equity Partners owns a large portion of our common stock and thus can influence certain of our corporate actions, and its interests may conflict with ours or yours in the future.

As of December 31, 2021, Vista Equity Partners ("Vista") beneficially owned approximately 45.5% of our common stock. Our bylaws provide that Vista has the right to designate the Chairman of our board of directors (our "Board") for so long as Vista beneficially owns at least 30% or more of the voting power of the then outstanding shares of our capital stock then entitled to vote generally in the election of directors. Even though Vista does not own shares of our stock representing a majority of the total voting power, for so long as Vista continues to own a significant percentage of our stock, Vista will still be able to significantly influence the composition of our Board, including the right to designate the Chairman of our Board, and the approval of actions requiring shareholder approval. Accordingly, for such period of time, Vista will have significant influence with respect to our management, business plans and policies, including the appointment and removal of our officers, decisions on whether to raise future capital and amending our charter and bylaws, which govern the rights attached to our common stock. In particular, for so long as Vista continues to own a significant percentage of our stock, Vista will be able to cause or prevent a change of control of us or a change in the composition of our Board, including the selection of the Chairman of our Board, and could preclude any unsolicited acquisition of us. The concentration of ownership could deprive you of an opportunity to receive a premium for your shares of common stock as part of a sale of us and ultimately might affect the market price of our common stock.

In addition, we are party to a director nomination agreement with Vista that provides Vista the right to designate: (i) all of the nominees for election to our Board for so long as Vista beneficially owns 40% or more of the total number of shares of our common stock it owned on the date of our initial public offering ("IPO"); (ii) a number of directors (rounded up to the nearest whole number) equal to 40% of the total directors for so long as Vista beneficially owns at least 30% and less than 40% of the total number of shares of our common stock it owned on the date of our IPO; (iii) a number of directors (rounded up to the nearest whole number) equal to 30% of the total directors for so long as Vista beneficially owns at least 20% and less than 30% of the total number of shares of our common stock it owned on the date of our IPO; (iv) a number of directors (rounded up to the nearest whole number) equal to 20% of the total directors for so long as Vista beneficially owns at least 10% and less than 20% of the total number of shares of our common stock it owned on the date of our IPO; and (v) one director for so long as Vista beneficially owns at least 5% and less than 10% of the total number of shares of our common stock it owned on the date of our IPO. The director nomination agreement also provides that Vista may assign such right to a Vista affiliate. The director nomination agreement prohibits us from increasing or decreasing the size of our Board without the prior written consent of Vista.

Vista and its affiliates engage in a broad spectrum of activities, including investments in the information and business services industry generally. In the ordinary course of their business activities, Vista and its affiliates may engage in activities where their interests conflict with our interests or those of our other shareholders, such as investing in or advising businesses that directly or indirectly compete with certain portions of our business or are suppliers or customers of ours. Our certificate of incorporation provides that none of Vista, any of its affiliates or any director who is not employed by us (including any non-employee director who serves as one of our officers in both his director and officer capacities) or its affiliates has any duty to refrain from engaging, directly or indirectly, in the same business activities or similar business activities or lines of business in which we operate. Vista also may pursue acquisition opportunities that may be complementary to our business, and, as a result, those acquisition opportunities may not be available to us. In addition, Vista may have an interest in pursuing acquisitions, divestitures and other transactions that, in its judgment, could enhance its investment, even though such transactions might involve risks to you.

An active, liquid trading market for our common stock may not be sustained, which may limit your ability to sell your shares.

An active trading market for our shares may not be sustained. The failure of an active and liquid trading market to continue to develop and sustain would likely have a material adverse effect on the value of our common stock. The market price of our common stock may decline, and you may not be able to sell your shares of our common stock at or above the price you paid, or at all. An inactive market may also impair our ability to raise capital to continue to fund operations by issuing shares and may impair our ability to acquire other companies or technologies by using our shares as consideration.

Provisions of our corporate governance documents could make an acquisition of us more difficult and may prevent attempts by our shareholders to replace or remove our current management, even if beneficial to our shareholders.

In addition to Vista's beneficial ownership of 45.5% of our common stock as of December 31, 2021, our certificate of incorporation and bylaws and the Delaware General Corporation Law (the "DGCL") contain provisions that could make it more difficult for a third party to acquire us, even if doing so might be beneficial to our shareholders. Among other things:

- these provisions allow us to authorize the issuance of undesignated preferred stock, the terms of which may be established and the shares of which may be issued without shareholder approval, and which may include supermajority voting, special approval, dividend, or other rights or preferences superior to the rights of shareholders;

- these provisions provide for a classified board of directors with staggered three-year terms;

- these provisions provide that, at any time when Vista beneficially owns, in the aggregate, less than 40% in voting power of our stock entitled to vote generally in the election of directors, directors may only be removed for cause, and only by the affirmative vote of holders of at least 66 2⁄3% in voting power of all the then-outstanding shares of our stock entitled to vote thereon, voting together as a single class;

- these provisions prohibit shareholder action by written consent from and after the date on which Vista beneficially owns, in the aggregate, less than 35% in voting power of our stock entitled to vote generally in the election of directors;

- these provisions provide that any amendment, alteration, rescission or repeal of our bylaws by our shareholders will require the affirmative vote of the holders of at least 66 2⁄3% in voting power of all the then-outstanding shares of our stock entitled to vote thereon, voting together as a single class; and

- these provisions establish advance notice requirements for nominations for elections to our Board or for proposing matters that can be acted upon by shareholders at shareholder meetings; provided, however, at any time when Vista beneficially owns, in the aggregate, at least 10% in voting power of our stock entitled to vote generally in the election of directors, such advance notice procedure will not apply to it.

Our certificate of incorporation contains a provision that provides us with protections similar to Section 203 of the DGCL, and prevents us from engaging in a business combination with a person (excluding Vista and any of its direct or indirect transferees and any group as to which such persons are a party) who acquires at least 15% of our common stock for a period of three years from the date such person acquired such common stock, unless Board or shareholder approval is obtained prior to the acquisition. These provisions could discourage, delay or prevent a transaction involving a change in control of our company. These provisions could also discourage proxy contests and make it more difficult for you and other shareholders to elect directors of your choosing and cause us to take other corporate actions you desire, including actions that you may deem advantageous, or negatively affect the trading price of our common stock. In addition, because our Board is responsible for appointing the members of our management team, these provisions could in turn affect any attempt by our shareholders to replace current members of our management team.

These and other provisions in our certificate of incorporation, bylaws and Delaware law could make it more difficult for shareholders or potential acquirers to obtain control of our Board or initiate actions that are opposed by our then-current Board, including delay or impede a merger, tender offer or proxy contest involving our company. The existence of these provisions could negatively affect the price of our common stock and limit opportunities for you to realize value in a corporate transaction.

Our 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 shareholders, which could limit our shareholders' ability to obtain a favorable judicial forum for disputes with us.

Pursuant to our certificate of incorporation, unless we consent in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware is 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 shareholders, (3) any action asserting a claim against us arising pursuant to any provision of the DGCL, our certificate of incorporation or our bylaws or (4) any other action asserting a claim against us that is governed by the internal affairs doctrine; provided that for the avoidance of doubt, the forum selection provision that identifies the Court of Chancery of the State of Delaware as the exclusive forum for certain litigation, including any "derivative action," will not apply to suits to enforce a duty or liability created by the Securities Act of 1933, as amended (the "Securities Act"), the Exchange Act or any other claim for which the federal courts have exclusive jurisdiction. Our certificate of incorporation further provides that any person or entity purchasing or otherwise acquiring any interest in shares of our capital stock is deemed to have notice of and consented to the provisions of our certificate of incorporation described above. The forum selection clause in our certificate of incorporation may have the effect of discouraging lawsuits against us or our directors and officers and may limit our shareholders' ability to obtain a favorable judicial forum for disputes with us. Alternatively, if a court were to find the choice of forum provision contained in our amended and restated certificate of incorporation to be inapplicable or unenforceable, we may incur additional costs associated with resolving such action in other jurisdictions, which could adversely affect our business, financial condition and results of operations.

Our operating results and stock price may be volatile, and the market price of our common stock may drop below the price you pay.

Our quarterly operating results are likely to fluctuate in the future. In addition, securities markets worldwide have experienced, and are likely to continue to experience, significant price and volume fluctuations. This market volatility, as well as general economic, market, or political conditions, could subject the market price of our shares to wide price fluctuations regardless of our operating performance. Our operating results and the trading price of our shares may fluctuate in response to various factors, including:

- market conditions in our industry or the broader stock market;
- sales of Apple devices, Apple's reputation, and enterprise adoption of Apple devices;
- actual or anticipated fluctuations in our quarterly financial and operating results;
- introduction of new products or services by us, Apple, or our competitors;
- issuance of new or changed securities analysts' reports or recommendations;
- sales, or anticipated sales, of large blocks of our stock;
- additions or departures of key personnel;

- regulatory or political developments;
- litigation and governmental investigations;
- changing economic conditions, including impacts from COVID-19;
- investors' perception of us;
- events beyond our control such as weather and war; and
- any default on our indebtedness.

These and other factors, many of which are beyond our control, may cause our operating results and the market price and demand for our shares to fluctuate substantially. Fluctuations in our quarterly operating results could limit or prevent investors from readily selling their shares and may otherwise negatively affect the market price and liquidity of our shares. In addition, in the past, when the market price of a stock has been volatile, holders of that stock have sometimes instituted securities class action litigation against the company that issued the stock. If any of our shareholders brought a lawsuit against us, we could incur substantial costs defending the lawsuit. Such a lawsuit could also divert the time and attention of our management from our business, which could significantly harm our profitability and reputation.

Substantial blocks of our total outstanding shares may be sold into the market. If there are substantial sales of shares of our common stock, the price of our common stock could decline.

The price of our common stock could decline if there are substantial sales of shares of our common stock particularly sales by our directors, executive officers, and significant shareholders, if there is a large number of shares of our common stock available for sale, or if there is the perception that these sales could occur. As of December 31, 2021, we had 119,426,064 shares of our common stock outstanding. All of the shares of common stock sold in our IPO and follow-on offerings are available for sale in the public market. In addition, we have registered shares of common stock that we may issue under our equity compensation plans. Such shares can be freely sold in the public market upon issuance. Shares held by directors, executive officers and other affiliates are subject to volume limitations under Rule 144 under the Securities Act and various vesting agreements. Further, the 2026 Notes may become in the future convertible at the option of their holders prior to their scheduled terms under certain circumstances. Any sales in the public market of the common stock issuable upon such conversion could adversely affect prevailing market prices of our common stock.

In connection with our IPO, we entered into a registration rights agreement with Vista. Vista is entitled to request that we register Vista's shares in the future, subject to the terms and conditions of the registration rights agreement, and our executive officers may also elect to participate in such offerings from time to time. Vista is also entitled to participate in certain of our registered offerings, subject to the restrictions in the registration rights agreement. We will pay Vista's expenses in connection with Vista's exercise of these rights. These registration rights would facilitate the resale of such securities into the public market, and any such resale would increase the number of shares of our common stock available for public trading.

The market price of the shares of our common stock could decline as a result of the sale of a substantial number of our shares of common stock in the public market or the perception in the market that the holders of a large number of such shares intend to sell their shares.

In the future, we may also issue our securities in connection with investments or acquisitions. The number of shares issued in connection with an investment or acquisition could constitute a material portion of our then-outstanding common stock.

Because we have no current plans to pay regular cash dividends on our common stock for the foreseeable future, you may not receive any return on investment unless you sell your common stock for a price greater than that which you paid for it.

We do not anticipate paying any regular cash dividends on our common stock for the foreseeable future. Any decision to declare and pay dividends in the future will be made at the discretion of our Board and will depend on, among other things, our results of operations, financial condition, cash requirements, contractual restrictions and other factors that our Board may deem relevant. In addition, our ability to pay dividends is, and may be, limited by covenants of our existing indebtedness and any future outstanding indebtedness we or our subsidiaries incur, including under our 2020 Credit Agreement. Therefore, any return on investment in our common stock is solely dependent upon the appreciation of the price of our common stock on the open market, which may not occur.

If securities or industry analysts do not publish research or reports about our business, if they adversely change their recommendations regarding our shares or if our results of operations do not meet their expectations, our stock price and trading volume could decline.

The trading market for our shares is influenced by the research and reports that industry or securities analysts publish about us or our business. We do not have any control over these analysts. If one or more of these analysts cease coverage of us or fail to publish reports on us regularly, we could lose visibility in the financial markets, which in turn could cause our stock price or trading volume to decline. Moreover, if one or more of the analysts who cover us downgrade our stock, or if our results of operations do not meet their expectations, our stock price could decline.

We may issue shares of preferred stock in the future, which could make it difficult for another company to acquire us or could otherwise adversely affect holders of our common stock, which could depress the price of our common stock.

Our certificate of incorporation authorizes us to issue one or more series of preferred stock. Our Board has the authority to determine the preferences, limitations, and relative rights of the shares of preferred stock and to fix the number of shares constituting any series and the designation of such series, without any further vote or action by our shareholders. Our preferred stock could be issued with voting, liquidation, dividend, and other rights superior to the rights of our common stock. The potential issuance of preferred stock may delay or prevent a change in control of us, discouraging bids for our common stock at a premium to the market price, and materially adversely affect the market price and the voting and other rights of the holders of our common stock.

General Risk Factors

The requirements of being a public company may strain our resources and distract our management, which could make it difficult to manage our business.

As a public company, we incur legal, accounting, and other expenses that we did not previously incur. We are subject to the reporting requirements of the Exchange Act and SOX, the listing requirements of NASDAQ, and other applicable securities rules and regulations. Compliance with these rules and regulations continue to increase our legal and financial compliance costs, make some activities more difficult, time-consuming, or costly and increase demand on our systems and resources. The Exchange Act requires that we file annual, quarterly, and current reports with respect to our business, financial condition, and results of operations. SOX requires, among other things, that we establish and maintain effective internal controls and procedures for financial reporting. Furthermore, the need to further develop and maintain the corporate infrastructure demanded of a public company may divert our management's attention from implementing our growth strategy, which could prevent us from improving our business, financial condition, and results of operations. We have made, and will continue to make, changes to our internal controls and procedures for financial reporting and accounting systems to meet our reporting obligations as a public company. However, the measures we take may not be sufficient to satisfy our obligations as a public company. In addition, these rules and regulations will increase our legal and financial compliance costs and will make some activities more time-consuming and costly. For example, we expect these rules and regulations to make it more difficult and more expensive for us to obtain director and officer liability insurance, and we may be required to incur substantial costs to maintain the same or similar coverage. These additional obligations could have a material adverse effect on our business, financial condition, and results of operations.

In addition, changing laws, regulations, and standards relating to corporate governance and public disclosure are creating uncertainty for public companies, increasing legal and financial compliance costs, and making some activities more time consuming. These laws, regulations, and standards are subject to varying interpretations, in many cases due to their lack of specificity, and, as a result, their application in practice may evolve over time as new guidance is provided by regulatory and governing bodies. This could result in continuing uncertainty regarding compliance matters and higher costs necessitated by ongoing revisions to disclosure and governance practices. We intend to invest resources to comply with evolving laws, regulations, and standards, and this investment may result in increased general and administrative expenses and a diversion of our management's time and attention from sales-generating activities to compliance activities. If our efforts to comply with new laws, regulations, and standards differ from the activities intended by regulatory or governing bodies due to ambiguities related to their application and practice, regulatory authorities may initiate legal proceedings against us and could have a material adversely effect on our business, financial condition, and results of operations.

Increasing scrutiny and changing expectations from investors, lenders, customers, government regulators, and other market participants with respect to our Environmental, Social and Governance ("ESG") policies and activities may impose additional costs on us or expose us to additional risks.

Companies across all industries and around the globe are facing increasing scrutiny relating to their ESG policies, initiatives, and activities by investors, lenders, customers, government regulators, and other market participants. Regulatory requirements related to ESG have been issued in the E.U., its Member States and other countries, particularly with respect to climate change, emission reduction, and environmental stewardship. In the U.S., amongst other regulatory efforts, in February 2021, the Acting Chair of the SEC issued a statement directing the Division of Corporation Finance to enhance its focus on climate-related disclosure in public company filings, and in March 2021, the SEC announced the creation of a Climate and ESG Task Force in the Division of Enforcement. We expect regulatory requirements related to ESG matters to continue to expand globally and increase our costs of compliance. We risk damage to our brand and reputation, impacts to our ability to secure government contracts, or limited access to capital markets and loans if we fail to adapt to, or comply with, investor, lender, customer, or other stakeholder expectations and standards and potential government regulation with respect to ESG matters, including in areas such as diversity and inclusion, environmental stewardship, support for local communities, and corporate governance and transparency.

Catastrophic events may disrupt our business.

Natural disasters, pandemics, or other catastrophic events may cause damage or disruption to our operations, international commerce, and the global economy, thus harming our business. In the event of a major earthquake, hurricane, or catastrophic event such as fire, power loss, pandemics, telecommunications failure, cyberattack, war, or terrorist attack, we may be unable to continue our operations and may endure system interruptions, reputational harm, delays in our application development, lengthy interruptions in our products, breaches of data security, and loss of critical data, all of which could adversely affect our business, results of operations, and financial condition. In addition, the insurance and incident response capabilities we maintain may not be adequate to cover or mitigate our losses resulting from disasters or other business interruptions.

Global economic conditions may harm our industry, business, and results of operations.

We operate globally and as a result our business and revenues are impacted by global macroeconomic conditions. Global financial developments seemingly unrelated to us or the software industry may harm us. From time to time, the United States and other key international economies have been impacted by geopolitical and economic instability, high levels of credit defaults globally, inflationary cycles, international trade disputes, falling demand for a variety of goods and services, high levels of persistent unemployment and wage and income stagnation in some geographic markets, restricted credit, poor liquidity, reduced corporate profitability, volatility in credit, equity and foreign exchange markets, bankruptcies, international trade agreements, trade restrictions, COVID-19, and overall uncertainty with respect to the economy. These conditions can arise suddenly and affect the rate of information technology spending and could adversely affect our customers' ability or willingness to purchase our services, delay prospective customers' purchasing decisions, reduce the value or duration of their subscriptions, or affect renewal rates, all of which could harm our operating results. Geopolitical events could directly or indirectly affect our business, including, because such political uncertainty and events adversely impact our or Apple's business.

In addition, the effects, if any, of global financial conditions on our business can be difficult to distinguish from the effects on our business from product, pricing, and other developments in the markets specific to our products and our relative competitive strength. If we make incorrect judgments about our business for this reason our business and results of operations could be adversely affected.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

Our corporate headquarters are in Minneapolis, MN, where we lease 102,937 square feet of office space under a lease that expires in February of 2030. We have additional office locations in the United States and in various international countries where we lease a total of 164,992 square feet. These additional office locations in the United States include Eau Claire, WI; New York City, NY; San Francisco, CA; and Austin, TX. Our international offices are located in Poland, the Netherlands, Australia, Japan, Hong Kong, Taiwan, the United Kingdom, Sweden, and the Czech Republic. We believe that our facilities are adequate for our current needs.

Item 3. Legal Proceedings

The information set forth in “Note 8 — Commitments and contingencies” to the consolidated financial statements in Part II, Item 8 of this Annual Report on Form 10-K is incorporated herein by reference.

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 for Our Common Stock

Our common stock began trading on the NASDAQ Global Select Market under the symbol “JAMF” on July 24, 2020. Prior to that date, there was no public market for our common stock.

Holders of Record

As of December 31, 2021, there were 10 holders of record of our common stock, including Cede & Co, a nominee for The Depository Trust Company (“DTC”), which holds shares of our common stock on behalf of an indeterminate number of beneficial owners. All of the shares of common stock held by brokerage firms, banks, and other financial institutions as nominees for beneficial owners are deposited into participant accounts at DTC and are considered to be held of record by Cede & Co. as one stockholder. Because many of our shares of common stock are held by brokers and other institutions on behalf of stockholders, we are unable to estimate the total number of beneficial stockholders represented by these record holders.

Dividend Policy

We currently intend to retain all available funds and any future earnings to fund the development and growth of our business and, therefore, we do not anticipate paying any cash dividends in the foreseeable future. Additionally, our ability to pay dividends on our common stock is limited by restrictions on the ability of our subsidiaries to pay dividends or make distributions to us. Any future determination to pay dividends is at the discretion of our Board, subject to compliance with covenants in current and future agreements governing our and our subsidiaries’ indebtedness, and will depend on our results of operations, financial condition, capital requirements, and other factors that our Board may deem relevant.

Securities Authorized for Issuance Under Equity Compensation Plans

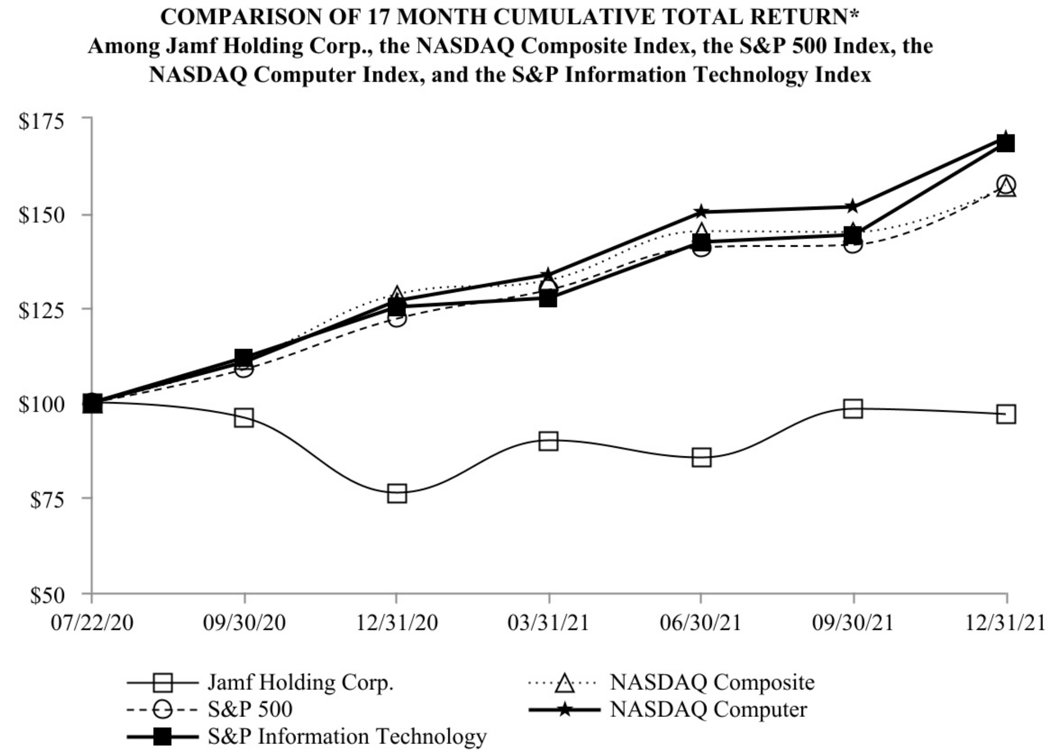
The information required by this item will be set forth in the Proxy Statement, which will be filed no later than 120 days after the end of our fiscal year ended December 31, 2021 and is incorporated in this report by reference.

Stock Performance Graph

The following performance graph and related information shall not be deemed to be "soliciting material" or to be "filed" for purposes of Section 18 of the Exchange Act, and shall not be incorporated by reference into any document filed by us with the SEC under the Exchange Act or the Securities Act, whether made before or after the date of this Annual Report on Form 10-K, regardless of any general incorporation language in such filing, except as shall be expressly set forth by specific reference in such filing.

The following performance graph and related information shows a comparison of the cumulative total return for our common stock, the NASDAQ Composite Index, the S&P 500 Index, the NASDAQ Computer Index, and the S&P Information Technology Index between July 22, 2020 (the date our common stock commenced trading on the NASDAQ) through December 31, 2021. We added the S&P 500 Index and the S&P Information Technology Index to this comparison after an analysis of peer company disclosures and plan to compare Jamf's total return to these two indices going forward. All values assume an initial investment of $100 and reinvestment of any dividends. The comparisons are based on historical data and are not indicative of, nor intended to forecast, the future performance of our common stock.

The closing price of our common stock on December 31, 2021, the last trading day of our 2021 fiscal year, was $38.01.



*$100 invested on 7/22/20 in stock or 6/30/20 in index, including reinvestment of dividends.
Fiscal year ending December 31.

Unregistered Sales of Equity Securities

We had no sales of unregistered equity securities during the period covered by this Annual Report on Form 10-K that were not previously reported in a Current Report on Form 8-K or Quarterly Report on Form 10-Q.

Issuer Purchases of Equity Securities

None.

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

The following discussion and analysis summarizes the significant factors affecting the consolidated operating results, financial condition, liquidity and cash flows of our company as of and for the periods presented below. The following discussion and analysis should be read in conjunction with our consolidated financial statements and the related notes included elsewhere in this Annual Report on Form 10-K. The discussion contains forward-looking statements that are based on the beliefs of management, as well as assumptions made by, and information currently available to, our management. Actual results could differ materially from those discussed in or implied by forward-looking statements as a result of various factors, including those discussed below and elsewhere in this Annual Report on Form 10-K, particularly in the sections entitled "Risk Factors" and "Forward-Looking Statements."

Overview

We are the standard in Apple Enterprise Management, and our cloud software platform is the only vertically-focused Apple infrastructure and security platform of scale in the world. We help IT and security teams confidently protect the devices, data, and applications used by their workforce, while providing employees with consumer-simple, privacy-protecting technology. With Jamf's software, devices can be deployed to employees brand new in the shrink-wrapped box, set up automatically and personalized at first power-on and administered continuously throughout the lifecycle of the device.

Jamf was founded in 2002, around the same time that Apple was leading an industry transformation. Apple transformed the way people access and utilize technology through its focus on creating a superior consumer experience. With the release of revolutionary products like the Mac, iPod, iPhone, and iPad, Apple built the world's most valuable brand and became ubiquitous in everyday life.

We have built our company through a primary focus on being the leading solution for Apple in the enterprise because we believe that due to Apple's broad range of devices, combined with the changing demographics of today's workforce and their strong preference for Apple, that Apple will become the number one device ecosystem in the enterprise by the end of this decade. We believe that the enterprise management provider that is best at Apple will one day be the enterprise leader, and that Jamf is best positioned for that leadership. Through our long-standing relationship with Apple, we have accumulated significant Apple technical experience and expertise that give us the ability to fully and quickly leverage and extend the capabilities of Apple products, operating systems, and services. This expertise enables us to fully support new innovations and operating system releases the moment they are made available by Apple. This focus has allowed us to create a best-in-class user experience in the enterprise.

We sell our SaaS solutions via a subscription model, through a direct sales force, online, and indirectly via our channel partners, including Apple. Our multi-dimensional go-to-market model and cloud-deployed offering enable us to reach all organizations around the world, large and small, with our software solutions. As a result, we continue to see rapid growth and expansion of our customer base as Apple continues to gain momentum in the enterprise.

On July 1, 2021, we completed our acquisition of Wandera, a leader in zero trust cloud security and access for mobile devices, extending our leadership in Apple Enterprise Management. The acquisition uniquely positions us to help IT and security teams protect devices, data, and applications while extending the intended Apple experience through the most robust and scalable Apple Enterprise Management platform in the market. We initially financed the acquisition with a combination of cash on hand and borrowings under the 2021 Term Loan Facility (which borrowings were repaid in September 2021 with the proceeds from the 2026 Notes). See "Note 5 — Acquisitions" and "Note 9 — Debt" to the consolidated financial statements included in Part II, Item 8 of this Annual Report on Form 10-K for more information on the acquisition and debt financing.

Response to COVID-19

Our COVID-19 approach is focused on promoting employee choice, health and safety, serving our customers, and ensuring business continuity. We carefully assess, and reassess, safe working conditions for our offices on a case-by-case basis to ensure that we implement appropriate protective measures, such as capacity restrictions, based on local government and health organization guidance. We believe that we have the opportunity to be a leader in a new approach to work, which is rooted in a flexible and hybrid model enabled by a digital-first mindset that puts employee choice, health, and safety first. We believe our internal cloud-first technology platforms have allowed for a seamless transition to a hybrid working environment without any material impacts to our business thus far, highlighting the resilience of our business model. Our product portfolio and platform has enabled our commercial customers to continue with their efforts to work in a hybrid environment, our K-12 and higher-education customers to deliver distance learning, and our health-care customers to provide quality care via a telehealth model, a solution that was conceptualized and released *during* the current pandemic. We believe that a business like ours is well-suited to navigate the shift to hybrid work environments, while the underlying demand for our core products remains relatively unchanged.

Although to date we have not suffered an adverse effect from the COVID-19 pandemic, the extent to which the COVID-19 pandemic ultimately affects our business continues to depend on future developments in the United States and around the world, which are highly uncertain and cannot be predicted, including new information which may emerge concerning virus variants and the actions required to contain and treat the virus, vaccine effectiveness, and macro-economic effects, such as supply and labor shortages and inflationary pressures. Although the ultimate impact of the COVID-19 pandemic on our business and financial results remains uncertain, a continued and prolonged public health crisis such as the COVID-19 pandemic could have a material negative impact on our business, operating results and financial condition. See “Risk Factors — Risks Associated with Our Business, Operations, and Industry — The COVID-19 pandemic could materially adversely affect our business, operating results, financial condition, and prospects” for additional information.

Key Factors Affecting Our Performance

Our historical financial performance has been, and we expect our financial performance in the future to be, driven by our ability to:

Attract new customers. Our ability to attract new customers is dependent upon a number of factors, including the effectiveness of our pricing and solutions, the features and pricing of our competitors’ offerings, the effectiveness of our marketing efforts, the effectiveness of our channel partners in selling, marketing and deploying our software solutions, and the growth of the market for devices and services for SMBs and enterprises. Sustaining our growth requires continued adoption of our platform by new customers. We intend to continue to invest in building brand awareness as we further penetrate our addressable markets. We intend to expand our customer base by continuing to make significant and targeted investments in our direct sales and marketing to attract new customers and to drive broader awareness of our software solutions.

Expand within our customer base. Our ability to increase revenue within our existing customer base is dependent upon a number of factors, including their satisfaction with our software solutions and support, the features and pricing of our competitors’ offerings, and our ability to effectively enhance our platform by developing new products and features and addressing additional use cases. Often our customers will begin with a small deployment and then later expand their usage more broadly within the enterprise as they realize the benefits of our platform. We believe that our “land and expand” business model allows us to efficiently increase revenue from our existing customer base. We intend to continue to invest in enhancing awareness of our software solutions, creating additional use cases, and developing more products, features, and functionality, which we believe are important factors to expand usage of our software solutions by our existing customer base. We believe our ability to retain and expand usage of our software solutions by our existing customer base is evidenced by our dollar-based net retention rate.

Sustain product innovation and technology leadership. Our success is dependent on our ability to sustain product innovation and technology leadership in order to maintain our competitive advantage. We believe that we have built a highly differentiated platform and we intend to further extend the adoption of our platform through additional innovation. While sales of subscriptions to our Jamf Pro product account for most of our revenue, we intend to continue to invest in building additional products, features and functionality that expand our capabilities and facilitate the extension of our platform to new use cases. Our future success is dependent on our ability to successfully develop, market and sell additional products to both new and existing customers. For example, in 2018, we introduced Jamf Connect to provide users with a seamless connection to corporate resources using a single identity and in 2019 we introduced Jamf Protect to extend Apple's security and privacy model to enterprise teams by creating unprecedented visibility into MacOS fleets through customized remote monitoring and threat detection and prevention. In July 2021, we completed our acquisition of Wandera, which enhances our Apple Enterprise Management Platform and strengthens our position in security and mobile with expansion opportunities. Wandera solutions include Jamf Threat Defense, Jamf Data Policy and Jamf Private Access, which uniquely position us to address trends in digital transformation, remote work and ZTNA.

Continue investment in growth. Our ability to effectively invest for growth is dependent upon a number of factors, including our ability to offset anticipated increases in operating expenses with revenue growth, our ability to spend our research and development budget efficiently or effectively on compelling innovation and technologies, our ability to accurately predict costs and our ability to maintain our corporate culture as our headcount expands. We plan to continue investing in our business so we can capitalize on our market opportunity. We intend to grow our sales team to target expansion within our midmarket and enterprise customers and to attract new customers. We expect to continue to make focused investments in marketing to drive brand awareness and enhance the effectiveness of our customer acquisition model. We also intend to continue to add headcount to our research and development team to develop new and improved products, features, and functionality. Although these investments may increase our operating expenses and, as a result, adversely affect our operating results in the near term, we believe they will contribute to our long-term growth.

Continue international expansion. Our international growth in any region will depend on our ability to effectively implement our business processes and go-to-market strategy, our ability to adapt to market or cultural differences, the general competitive landscape, our ability to invest in our sales and marketing channels, the maturity and growth trajectory of devices and services by region and our brand awareness and perception. We plan to continue making investments in our international sales and marketing channels to take advantage of this market opportunity while refining our go-to-market approach based on local market dynamics. While we believe global demand for our platform will increase as international market awareness of Jamf grows, our ability to conduct our operations internationally will require considerable management attention and resources and is subject to the particular challenges of supporting a growing business in an environment of multiple languages, cultures, customs, legal and regulatory systems (including with respect to data transfer and privacy), alternative dispute systems, and commercial markets. In addition, global demand for our platform and the growth of our international operations is dependent upon the rate of market adoption of Apple products in international markets. Our acquisition of Wandera, a global company with key offices in London, Brno and San Francisco, further expands our international presence.

Enhance our offerings via our partner network. Our success is dependent not only on our independent efforts to innovate, scale, and reach more customers directly but also on the success of our partners to continue to gain share in the enterprise. With a focus on the user and being the bridge between critical technologies — with Apple and Microsoft as two examples — we feel we can help other market participants deliver more to enterprise users with the power of Jamf. We will continue to invest in the relationships with our existing, critical partners, nurture and develop new relationships and do so globally. We will continue to invest in developing “plus one” solutions and workflows that help tie our software solutions together with those delivered by others.

Key Business Metrics

In addition to our GAAP financial information, we review several operating and financial metrics, including the following key metrics, to evaluate our business, measure our performance, identify trends affecting our business, formulate business plans, and make strategic decisions.

Number of Devices

We believe our ability to grow the number of devices on our software platform provides a key indicator of the growth of our business and our future business opportunities. We define a device at the end of any particular period as a device owned by a customer, which device has at least one Jamf product pursuant to an active subscription or support and maintenance agreement or that has a reasonable probability of renewal. We define a customer at the end of any particular period as an entity with at least one active subscription or support and maintenance agreement as of the measurement date or that has a reasonable probability of renewal. A single organization with separate subsidiaries, segments or divisions that use our platform may represent multiple customers as we treat each entity, subsidiary, segment or division that is invoiced separately as a single customer. In cases where customers subscribe to our platform through our channel partners, each end customer is counted separately. A single customer may have multiple Jamf products on a single device, but we still would only count that as one device.

The number of devices on our software platform was 26.6 million and 20.4 million as of December 31, 2021 and 2020, respectively, representing a 30% year-over-year growth rate. The increase in number of devices reflects our growth across industries, products, and geographies, as well as the Wandera acquisition in the third quarter of 2021.

Annual Recurring Revenue

ARR represents the annualized value of all subscription and support and maintenance contracts as of the end of the period. ARR mitigates fluctuations due to seasonality, contract term and the sales mix of subscriptions for term-based licenses and SaaS. ARR does not have any standardized meaning and is therefore unlikely to be comparable to similarly titled measures presented by other companies. ARR should be viewed independently of revenue and deferred revenue and is not intended to be combined with or to replace either of those items. ARR is not a forecast and the active contracts at the end of a reporting period used in calculating ARR may or may not be extended or renewed by our customers.

Our ARR was $412.5 million and $285.3 million as of December 31, 2021 and 2020, respectively, which is an increase of 45% year-over-year. The growth in our ARR is primarily driven by our high device expansion rates, our new logo acquisition, the upselling and cross selling of products into our installed base, and the acquisition of Wandera.

Dollar-Based Net Retention Rate

To further illustrate the "land and expand" economics of our customer relationships, we examine the rate at which our customers increase their subscriptions for our software solutions. Our dollar-based net retention rate measures our ability to increase revenue across our existing customer base through expanded use of our software solutions, offset by customers whose subscription contracts with us are not renewed or renew at a lower amount.

We calculate dollar-based net retention rate as of a period end by starting with the ARR from the cohort of all customers as of 12 months prior to such period end ("Prior Period ARR"). We then calculate the ARR from these same customers as of the current period end ("Current Period ARR"). Current Period ARR includes any expansion and is net of contraction or attrition over the last 12 months but excludes ARR from new customers in the current period. We then divide the total Current Period ARR by the total Prior Period ARR to arrive at the dollar-based net retention rate.

Our dollar-based net retention rates were 120% and 117% for the trailing twelve months ended December 31, 2021 and 2020, respectively. Our dollar-based net retention rates are based on our Jamf legacy business and do not include Wandera since they have not been a part of our business for the full trailing twelve months. Our high dollar-based net retention rates are primarily attributable to an expansion of devices and our ability to cross-sell our new solutions to our installed base, particularly Jamf Connect and Jamf Protect.

Components of Results of Operations

Revenues

We recognize revenue under ASC 606 when or as performance obligations are satisfied. We derive revenue primarily from sales of SaaS subscriptions and support and maintenance contracts, and to a lesser extent, sales of on-premise subscriptions and perpetual licenses and services.

Subscription. Subscription revenue consists of sales of SaaS subscriptions and support and maintenance contracts. We sell our software solutions primarily with a one-year contract term. We typically invoice SaaS subscription fees and support and maintenance fees annually in advance and recognize revenue ratably over the term of the applicable agreement, provided that all other revenue recognition criteria have been satisfied. In the fourth quarter of 2020, we reclassified the license portion of on-premise subscription revenue from license revenue to subscription revenue in the consolidated statements of operations on a retroactive basis. See additional information in "Note 1 — Basis of presentation and description of business" to the consolidated financial statements included in Part II, Item 8 of this Annual Report on Form 10-K. The license portion of on-premise subscription revenue is recognized upfront, assuming all revenue recognition criteria are satisfied. See "Critical Accounting Policies" for more information. In addition, beginning in the third quarter 2021, we have updated how we deliver our Jamf Connect product resulting in a change in revenue recognition, with less revenue recognized upfront as on-premise subscription revenue. This revenue will now be recognized ratably over the term of the subscription, in line with the majority of our revenue. We expect subscription revenue to increase over time as we expand our customer base because sales to new customers are expected to be primarily SaaS subscriptions.

License. License revenue consists of revenue from on-premise perpetual licenses of our Jamf Pro product sold primarily to existing customers. We recognize license revenue upfront, assuming all revenue recognition criteria are satisfied. We expect license revenue to decrease because sales to new customers are primarily cloud-based subscription arrangements and therefore reflected in subscription revenue.

Services. Services revenues consist primarily of professional services provided to our customers to configure and optimize the use of our software solutions, as well as training services related to the operation of our software solutions. Our services are priced on a fixed fee basis and generally invoiced in advance of the service being delivered. Revenue is recognized as the services are performed. We expect services revenues to decrease as a percentage of total revenue as the demand for our services is not expected to grow at the same rate as the demand for our subscription solutions.

Cost of Revenues

Cost of subscription. Cost of subscription revenue consists primarily of employee compensation costs for employees associated with supporting our subscription and support and maintenance arrangements, our customer success function, and third-party hosting fees related to our cloud services. Employee compensation and related costs include cash compensation and benefits to employees and associated overhead costs. We expect cost of subscription revenue to increase in absolute dollars, but to remain relatively consistent as a percentage of subscription revenue, relative to the extent of the growth of our business.

Cost of services. Cost of services revenue consists primarily of employee compensation costs directly associated with delivery of professional services and training, costs of third-party integrators, and other associated overhead costs. We expect cost of services revenue to decrease in absolute dollars relative to the decrease of our services business.

Gross Profit

Gross profit, or revenue less cost of revenue, has been and will continue to be affected by various factors, including the mix of cloud-based subscription customers, the costs associated with supporting our cloud solution, the extent to which we expand our customer support team and the extent to which we can increase the efficiency of our technology and infrastructure though technological improvements. We expect our gross profit to increase in absolute dollars.

Operating Expenses

Sales and Marketing. Sales and marketing expenses consist primarily of employee compensation costs, sales commissions, costs of general marketing and promotional activities, travel-related expenses, and allocated overhead. Sales commissions as well as associated payroll taxes and retirement plan contributions that are incremental to the acquisition of customer contracts are deferred and amortized over the period of benefit, which is estimated to be generally 5 years. We expect our sales and marketing expenses to increase on an absolute dollar basis as we expand our sales personnel and marketing efforts. Sales commissions as well as associated payroll taxes and retirement plan contributions (together, contract costs) that are incremental to the acquisition of customer contracts are capitalized.

Research and development. Research and development expenses consist primarily of personnel costs and allocated overhead. We will continue to invest in innovation so that we can offer our customers new solutions and enhance our existing solutions. See “Business — Research and Development” for more information. We expect such investment to increase on an absolute dollar basis as our business grows.

General and Administrative. General and administrative expenses consist primarily of employee compensation costs for corporate personnel, such as those in our executive, human resource, facilities, accounting and finance, legal and compliance, and information technology departments. In addition, general and administrative expenses include acquisition-related expenses which primarily consist of third-party expenses, such as legal and accounting fees, and adjustments to contingent consideration. General and administrative expenses also include costs incurred in secondary offerings. We expect our general and administrative expenses to increase on a dollar basis as our business grows, particularly as we continue to invest in technology infrastructure and expand our operations globally. Also, we incur additional general and administrative expenses as a result of operating as a public company, including costs to comply with the rules and regulations applicable to companies listed on a national securities exchange, costs related to compliance and reporting obligations pursuant to the rules and regulations of the SEC, and increased expenses for insurance, investor relations, and accounting expenses.

Amortization. Amortization expense consists of amortization of acquired intangible assets.

Interest Expense, Net

Interest expense, net primarily consists of interest charges on our outstanding debt and amortization of capitalized debt issuance costs, as well as interest income earned on our cash and cash equivalents. In the third quarter of 2021, we reclassified the unused commitment fee on our line of credit from general and administrative expenses to interest expense, net on a prospective basis. The impact to prior period financial statements was not material.

Loss on Extinguishment of Debt

Upon closing of the IPO, we repaid $205.0 million of the principal amount of the 2017 Term Loan Facility and recorded a loss on extinguishment of debt of $5.2 million for the prepayment penalty and write off of debt issuance costs. In the third quarter of 2021, we repaid the principal amount of the 2021 Term Loan Facility and recorded debt extinguishment costs of $0.4 million for the write-off of remaining debt issuance costs.

Foreign Currency Transaction Gain (Loss)

Foreign currency transaction gains (losses) includes gains and losses from transactions denominated in a currency other than the Company's functional currency.

Income Tax (Provision) Benefit

Income tax (provision) benefit consists primarily of income taxes related to U.S. federal and state income taxes and income taxes in foreign jurisdictions in which we conduct business.

Other Income

Other income consists primarily of sublease rental income. The sublease was terminated in the second quarter of 2020.

Results of Operations

The following table sets forth our consolidated statements of operations data for the periods indicated:

	Years Ended December 31,		
	2021	2020	2019
		(in thousands)	
Consolidated Statement of Operations Data:			
Revenue:			
Subscription	$ 344,243	$ 248,879	$ 175,118
Services	16,122	14,519	19,014
License	6,023	5,734	9,833
Total revenue	366,388	269,132	203,965
Cost of revenue:			
Cost of subscription[(1)(2)(3)(4)] (exclusive of amortization expense shown below)	63,441	39,529	31,457
Cost of services[(1)(2)(3)] (exclusive of amortization expense shown below)	10,898	10,726	14,239
Amortization expense	16,018	10,753	10,266
Total cost of revenue	90,357	61,008	55,962
Gross profit	276,031	208,124	148,003
Operating expenses:			
Sales and marketing[(1)(2)(3)(4)]	148,192	98,885	73,103
Research and development[(1)(2)(3)(4)]	82,541	52,513	42,898
General and administrative[(1)(2)(3)(4)]	96,206	51,603	31,509
Amortization expense	25,294	22,575	22,416
Total operating expenses	352,233	225,576	169,926
Loss from operations	(76,202)	(17,452)	(21,923)
Interest expense, net	(2,478)	(10,741)	(21,423)
Loss on extinguishment of debt	(449)	(5,213)	—
Foreign currency transaction loss	(849)	(722)	(1,252)
Other income, net	—	91	220
Loss before income tax benefit	(79,978)	(34,037)	(44,378)
Income tax benefit	4,789	9,955	10,033
Net loss	$ (75,189)	$ (24,082)	$ (34,345)

(1) Includes stock-based compensation as follows:

	Years Ended December 31,		
	2021	2020	2019
	(in thousands)		
Cost of revenue:			
Subscription	$ 3,755	$ 732	$ 194
Services	594	139	—
Sales and marketing	10,938	1,748	460
Research and development	10,512	1,533	394
General and administrative	10,006	2,591	1,413
	$ 35,805	$ 6,743	$ 2,461

(2) Includes payroll taxes related to stock-based compensation as follows:

	Years Ended December 31,		
	2021	2020	2019
	(in thousands)		
Cost of revenue:			
Subscription	$ 122	$ —	$ —
Services	24	—	—
Sales and marketing	431	—	—
Research and development	335	—	—
General and administrative	615	—	—
	$ 1,527	$ —	$ —

(3) Includes depreciation expense as follows:

	Years Ended December 31,		
	2021	2020	2019
	(in thousands)		
Cost of revenue:			
Subscription	$ 1,134	$ 985	$ 902
Services	169	207	246
Sales and marketing	2,342	1,966	1,688
Research and development	1,277	1,149	1,121
General and administrative	835	876	443
	$ 5,757	$ 5,183	$ 4,400

(4) Includes acquisition-related expense as follows:

	Years Ended December 31,		
	2021	2020	2019
	(in thousands)		
Cost of revenue:			
Subscription	$ 88	$ —	$ —
Sales and marketing	180	—	—
Research and development	1,088	—	—
General and administrative	5,032	5,200	1,392
	$ 6,388	$ 5,200	$ 1,392

General and administrative also includes acquisition-related earnout of $6.0 million, $(1.0) million, and $0.2 million for the years ended December 31, 2021, 2020, and 2019, respectively. The acquisition-related earnout was an expense for the year ended December 31, 2021 compared to a benefit for the year ended December 31, 2020 reflecting the change in fair value of the Digita Security LLC ("Digita") acquisition contingent liability due to growth in sales of our Jamf Protect product. General and administrative also includes the full settlement of a $5.0 million legal-related matter for the year ended December 31, 2021.

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

	Years Ended December 31,		
	2021	2020	2019
	(as a percentage of total revenue)		
Consolidated Statement of Operations Data:			
Revenue:			
Subscription	94 %	93 %	86 %
Services	4	5	9
License	2	2	5
Total revenue	100	100	100
Cost of revenue:			
Cost of subscription (exclusive of amortization expense shown below)	17	15	15
Cost of services (exclusive of amortization expense shown below)	3	4	7
Amortization expense	5	4	5
Total cost of revenue	25	23	27
Gross profit	75	77	73
Operating expenses:			
Sales and marketing	40	37	36
Research and development	23	20	21
General and administrative	26	19	15
Amortization expense	7	8	11
Total operating expenses	96	84	83
Loss from operations	(21)	(6)	(11)
Interest expense, net	(1)	(4)	(11)
Loss on extinguishment of debt	—	(2)	—
Foreign currency transaction loss	—	—	(1)
Other income, net	—	—	—
Loss before income tax benefit	(22)	(12)	(23)
Income tax benefit	1	4	5
Net loss	(21)%	(8)%	(18)%

A discussion regarding our results of operations for the year ended December 31, 2021 compared to the year ended December 31, 2020 is presented below. A discussion regarding our results of operations for the year ended December 31, 2020 compared to the year ended December 31, 2019 can be found in Exhibit 99.1 titled, "Updates to the Company's Annual Report on Form 10-K for the Year Ended December 31, 2020", of our Form 8-K, filed with the SEC on August 27, 2021, which is available free of charge on the SEC's website at www.sec.gov and our investor relations website at ir.jamf.com.

Comparison of the Years Ended December 31, 2021 and 2020

Revenue

	Years Ended December 31,		Change	
	2021	2020	$	%
	(in thousands, except percentages)			
SaaS subscription and support and maintenance	$ 313,950	$ 223,655	$ 90,295	40 %
On-premise subscription	30,293	25,224	5,069	20
Subscription revenue	344,243	248,879	95,364	38
Professional services	16,122	14,519	1,603	11
Perpetual licenses	6,023	5,734	289	5
Non-subscription revenue	22,145	20,253	1,892	9
Total revenue	$ 366,388	$ 269,132	$ 97,256	36 %

Total revenue increased by $97.3 million, or 36%, for the year ended December 31, 2021 compared to the year ended December 31, 2020. Overall revenue increased primarily as a result of higher subscription revenue, as well as higher services revenue. Subscription revenue accounted for 94% of total revenue for the year ended December 31, 2021 compared to 93% for the year ended December 31, 2020. The increase in subscription revenue was driven by device expansion, the addition of new customers and cross-selling, as well as the contribution of approximately $10.6 million of revenue from Wandera in the second half of 2021, partially offset by the impact from a change in revenue recognition related to our Jamf Connect product resulting from updates to how we deliver the product. Services revenue increased $1.6 million, or 11%, as a result of higher revenue from training courses, which was impacted by COVID-19 in the prior year period.

Cost of Revenue and Gross Margin

	Years Ended December 31,		Change	
	2021	2020	$	%
	(in thousands, except percentages)			
Cost of revenue:				
Cost of subscription (exclusive of amortization expense shown below)	$ 63,441	$ 39,529	$ 23,912	60 %
Cost of services (exclusive of amortization expense show below)	10,898	10,726	172	2
Amortization expense	16,018	10,753	5,265	49
Total cost of revenue	$ 90,357	$ 61,008	$ 29,349	48 %
Gross margin	75%	77%		

Cost of revenue increased by $29.3 million, or 48%, for the year ended December 31, 2021 compared to the year ended December 31, 2020 driven by an increase in cost of subscription revenue and amortization expense. Cost of subscription revenue increased $23.9 million primarily due to an increase of $9.4 million in employee compensation costs related to higher headcount to support the growth in our subscription customer base and the Wandera acquisition, an increase of $9.9 million in third party hosting fees as we increased capacity to support our growth and the Wandera acquisition, a $3.1 million increase in stock-based compensation expense and related payroll taxes, and an increase of $0.4 million in computer hardware and software costs to support the growth of the business. Amortization expense increased $5.3 million primarily reflecting the increase in intangible assets due to the Wandera acquisition.

Total gross margin was 75% and 77% for the years ended December 31, 2021 and 2020, respectively. The decline in total gross margin was due to the increase in total cost of revenue described above as well as an impact to revenue due to a change in revenue recognition related to our Jamf Connect product resulting from updates to how we deliver the product.

Operating Expenses

	Years Ended December 31,		Change	
	2021	2020	$	%
	(in thousands, except percentages)			
Operating expenses:				
Sales and marketing	$ 148,192	$ 98,885	$ 49,307	50 %
Research and development	82,541	52,513	30,028	57
General and administrative	96,206	51,603	44,603	86
Amortization expense	25,294	22,575	2,719	12
Operating expenses	$ 352,233	$ 225,576	$ 126,657	56 %

Sales and Marketing. Sales and marketing expenses increased by $49.3 million, or 50%, for the year ended December 31, 2021 compared to the year ended December 31, 2020 primarily due to an increase of $31.8 million in employee compensation costs driven by higher headcount due to growth in the business and the Wandera acquisition, a $3.2 million increase in marketing costs, an increase of $2.0 million in computer hardware and software costs to support the growth of the business, a $9.6 million increase in stock-based compensation expense and related payroll taxes, and a $1.3 million increase in facilities expense. Marketing costs increased primarily due to increases in demand generation programs, advertising, and brand awareness campaigns focused on new customer acquisition.

Research and Development. Research and development expenses increased by $30.0 million, or 57%, for the year ended December 31, 2021 compared to the year ended December 31, 2020 primarily due to an increase of $15.7 million in employee compensation costs driven by higher headcount due to growth in the business and the Wandera acquisition, an increase of $3.3 million in outside services, an increase of $1.0 million in computer hardware and software costs to support the growth of the business, a $1.1 million increase in acquisition-related expenses, and a $9.3 million increase in stock-based compensation expense and related payroll taxes.

General and Administrative. General and administrative expenses increased by $44.6 million, or 86%, for the year ended December 31, 2021 compared to the year ended December 31, 2020. The increase was primarily due to an increase of $14.2 million in employee compensation costs driven by higher headcount to support our continued growth and the Wandera acquisition, $3.7 million in additional expenses as a result of operating as a public company, an increase of $2.7 million in computer hardware and software costs to support the growth of the business, a $8.0 million increase in stock-based compensation expense and related payroll taxes, an increase of $3.2 million in outside services, an increase of $5.0 million for the settlement of a legal-related matter, and a $7.0 million increase in acquisition-related earnout.

Amortization Expense. Amortization expense increased by $2.7 million, or 12%, for the year ended December 31, 2021 compared to the year ended December 31, 2020 primarily reflecting the increase in intangible assets due to the Wandera acquisition.

Interest Expense, Net

	Years Ended December 31,		Change	
	2021	2020	$	%
	(in thousands, except percentages)			
Interest expense, net	$ 2,478	$ 10,741	$ (8,263)	(77)%

Interest expense, net decreased by $8.3 million, or 77%, for the year ended December 31, 2021 compared to the year ended December 31, 2020 reflecting the repayment of the 2017 Term Loan Facility in the third quarter of 2020, partially offset by interest expense related to borrowings under the 2021 Term Loan Facility and interest charges on the 2026 Notes.

Loss on Extinguishment of Debt

	Years Ended December 31,		Change	
	2021	2020	$	%
	(in thousands, except percentages)			
Loss on extinguishment of debt	$ 449	$ 5,213	$ (4,764)	(91)%

Loss on extinguishment of debt of $0.4 million for the year ended December 31, 2021 consists of the write off of debt issuance costs upon the early repayment of the 2021 Term Loan Facility. Loss on extinguishment of debt of $5.2 million for the year ended December 31, 2020 consists of a prepayment penalty of $2.0 million and write off of debt issuance costs of $3.2 million in connection with the early repayment of the 2017 Term Loan Facility.

Foreign Currency Transaction Loss

	Years Ended December 31,		Change	
	2021	2020	$	%
	(in thousands, except percentages)			
Foreign currency transaction loss	$ 849	$ 722	$ 127	18 %

Foreign currency transaction loss increased by $0.1 million, or 18%, for the year ended December 31, 2021 compared to the year ended December 31, 2020.

Other Income, Net

	Years Ended December 31,		Change	
	2021	2020	$	%
	(in thousands, except percentages)			
Other income, net	$ —	$ 91	$ (91)	(100)%

The decrease in Other income, net for the year ended December 31, 2021 was due to the termination of our sublease in the second quarter of 2020.

Income Tax Benefit

	Years Ended December 31,		Change	
	2021	2020	$	%
	(in thousands, except percentages)			
Income tax benefit	$ 4,789	$ 9,955	$ (5,166)	(52)%

Income tax benefit was $4.8 million and $10.0 million for the years ended December 31, 2021 and 2020, respectively. The effective tax rates for the years ended December 31, 2021 and 2020 were 6.0% and 29.2%, respectively. The effective tax rate for the year ended December 31, 2021 was lower than the prior year period due to the domestic valuation allowance, the application of Section 162(m) of the Internal Revenue Code, and stock option activity. The effective tax rate for the year ended December 31, 2021 was impacted by $1.7 million of discrete income tax benefit.

Non-GAAP Financial Measures

In addition to our results determined in accordance with GAAP, we believe the non-GAAP measures of Non-GAAP Gross Profit, Non-GAAP Gross Profit Margin, Non-GAAP Operating Income, Non-GAAP Operating Income Margin, Non-GAAP Net Income (Loss), and Adjusted EBITDA are useful in evaluating our operating performance. We believe that non-GAAP financial information, when taken collectively, may be helpful to investors because it provides consistency and comparability with past financial performance and assists in comparisons with other companies, some of which use similar non-GAAP information to supplement their GAAP results. The non-GAAP financial information is presented for supplemental informational purposes only, and should not be considered a substitute for financial information presented in accordance with GAAP, and may be different from similarly-titled non-GAAP measures used by other companies. A reconciliation is provided below for each non-GAAP financial measure to the most directly comparable financial measure stated in accordance with GAAP. Investors are encouraged to review the related GAAP financial measures and the reconciliation of these non-GAAP financial measures to their most directly comparable GAAP financial measures. In 2021, we began excluding payroll taxes related to stock-based compensation from our non-GAAP measures as these expenses are tied to the exercise or vesting of underlying equity awards and the price of our common stock at the time of vesting or exercise. As a result, these taxes may vary in any particular period independent of the financial and operating performance of our business. Payroll taxes related to stock-based compensation were not material prior to 2021.

Non-GAAP Gross Profit

Non-GAAP Gross Profit and Non-GAAP Gross Profit Margin are supplemental measures of operating performance that are not prepared in accordance with GAAP and that do not represent, and should not be considered as, alternatives to gross profit or gross profit margin, as determined in accordance with GAAP. We define Non-GAAP Gross Profit as gross profit, adjusted for amortization expense, stock-based compensation expense, acquisition-related expense, and payroll taxes related to stock-based compensation. We define Non-GAAP Gross Profit Margin as Non-GAAP Gross Profit as a percentage of total revenue.

We use Non-GAAP Gross Profit and Non-GAAP Gross Profit Margin to understand and evaluate our core operating performance and trends and to prepare and approve our annual budget. We believe Non-GAAP Gross Profit and Non-GAAP Gross Profit Margin are useful measures to us and to our investors to assist in evaluating our core operating performance because it provides consistency and direct comparability with our past financial performance and between fiscal periods, as the metric eliminates the effects of variability of stock-based compensation expense and amortization of acquired intangible assets, which are non-cash expenses that may fluctuate for reasons unrelated to overall operating performance. While the amortization expense of acquired intangible assets is excluded from Non-GAAP Gross Profit, the revenue related to acquired intangible a is reflected in Non-GAAP Gross Profit as these assets contribute to our revenue generation.

Non-GAAP Gross Profit and Non-GAAP Gross Profit Margin have limitations as analytical tools, and you should not consider them in isolation, or as substitutes for analysis of our results as reported under GAAP. Because of these limitations, Non-GAAP Gross Profit and Non-GAAP Gross Profit Margin should not be considered as replacements for gross profit or gross profit margin, as determined by GAAP, or as measures of our profitability. We compensate for these limitations by relying primarily on our GAAP results and using non-GAAP measures only for supplemental purposes.

A reconciliation of Non-GAAP Gross Profit to gross profit, the most directly comparable GAAP measure, is as follows:

	Years Ended December 31,		
	2021	2020	2019
	(in thousands)		
Gross profit	$ 276,031	$ 208,124	$ 148,003
Amortization expense	16,018	10,753	10,266
Stock-based compensation	4,349	871	194
Acquisition-related expense	88	—	—
Payroll taxes related to stock-based compensation	146	—	—
Non-GAAP Gross Profit	$ 296,632	$ 219,748	$ 158,463
Non-GAAP Gross Profit Margin	81%	82%	78%

Non-GAAP Operating Income

Non-GAAP Operating Income and Non-GAAP Operating Income Margin are supplemental measures of operating performance that are not prepared in accordance with GAAP and that do not represent, and should not be considered as, alternatives to operating loss or operating loss margin, as determined in accordance with GAAP. We define Non-GAAP Operating Income as operating loss, adjusted for amortization expense, stock-based compensation expense, acquisition-related expense, acquisition-related earnout, costs associated with our secondary offerings, payroll taxes related to stock-based compensation, and legal settlement. We define Non-GAAP Operating Income Margin as Non-GAAP Operating Income as a percentage of total revenue.

We use Non-GAAP Operating Income and Non-GAAP Operating Income Margin to understand and evaluate our core operating performance and trends, to prepare and approve our annual budget, and to develop short-term and long-term operating plans. We believe that Non-GAAP Operating Income and Non-GAAP Operating Income Margin facilitate comparison of our operating performance on a consistent basis between periods, and when viewed in combination with our results prepared in accordance with GAAP, help provide a broader picture of factors and trends affecting our results of operations. While the amortization expense of acquired intangible assets is excluded from Non-GAAP Operating Income, the revenue related to acquired intangible assets is reflected in Non-GAAP Operating Income as these assets contribute to our revenue generation.

Non-GAAP Operating Income and Non-GAAP Operating Income Margin have limitations as analytical tools, and you should not consider them in isolation, or as substitutes for analysis of our results as reported under GAAP. Because of these limitations, Non-GAAP Operating Income and Non-GAAP Operating Income Margin should not be considered as replacements for operating loss or operating loss margin, as determined by GAAP, or as measures of our profitability. We compensate for these limitations by relying primarily on our GAAP results and using non-GAAP measures only for supplemental purposes.

A reconciliation of Non-GAAP Operating Income to operating loss, the most directly comparable GAAP measure, is as follows:

	Years Ended December 31,		
	2021	2020	2019
	(in thousands)		
Operating loss	$ (76,202)	$ (17,452)	$ (21,923)
Amortization expense	41,312	33,328	32,682
Stock-based compensation	35,805	6,743	2,461
Acquisition-related expense	6,388	5,200	1,392
Acquisition-related earnout	6,037	(1,000)	200
Offering costs	594	670	—
Payroll taxes related to stock-based compensation	1,527	—	—
Legal settlement	5,000	—	—
Non-GAAP Operating Income	$ 20,461	$ 27,489	$ 14,812
Non-GAAP Operating Income Margin	6%	10%	7%

Non-GAAP Net Income (Loss)

Non-GAAP Net Income (Loss) is a supplemental measure of operating performance that is not prepared in accordance with GAAP and that does not represent, and should not be considered as, an alternative to net loss, as determined in accordance with GAAP. We define Non-GAAP Net Income (Loss) as net loss, adjusted for amortization expense, stock-based compensation expense, foreign currency transaction loss, loss on extinguishment of debt, amortization of debt issuance costs, acquisition-related expense, acquisition-related earnout, costs associated with our secondary offerings, payroll taxes related to stock-based compensation, legal settlement, discrete tax items, and benefit for income taxes.

We use Non-GAAP Net Income (Loss) to understand and evaluate our core operating performance and trends, to prepare and approve our annual budget, and to develop short-term and long-term operating plans. We believe that Non-GAAP Net Income (Loss) facilitates comparison of our operating performance on a consistent basis between periods, and when viewed in combination with our results prepared in accordance with GAAP, helps provide a broader picture of factors and trends affecting our results of operations. While the amortization expense of acquired intangible assets is excluded from Non-GAAP Net Income (Loss), the revenue related to acquired intangible assets is reflected in Non-GAAP Net Income (Loss) as these assets contribute to our revenue generation.

Non-GAAP Net Income (Loss) has limitations as an analytical tool, and you should not consider it in isolation, or as a substitute for analysis of our results as reported under GAAP. Because of these limitations, Non-GAAP Net Income (Loss) should not be considered as a replacement for net loss, as determined by GAAP, or as a measure of our profitability. We compensate for these limitations by relying primarily on our GAAP results and using non-GAAP measures only for supplemental purposes.

A reconciliation of Non-GAAP Net Income (Loss) to net loss, the most directly comparable GAAP measure, is as follows:

	Years Ended December 31,		
	2021	2020	2019
	(in thousands)		
Net loss	$ (75,189)	$ (24,082)	$ (34,345)
Amortization expense	41,312	33,328	32,682
Stock-based compensation	35,805	6,743	2,461
Foreign currency transaction loss	849	722	1,252
Loss on extinguishment of debt	449	5,213	—
Amortization of debt issuance costs	1,002	—	—
Acquisition-related expense	6,388	5,200	1,392
Acquisition-related earnout	6,037	(1,000)	200
Offering costs	594	670	—
Payroll taxes related to stock-based compensation	1,527	—	—
Legal settlement	5,000	—	—
Discrete tax items	(1,655)	(3,879)	53
Benefit for income taxes[1]	(3,361)	(9,662)	(8,634)
Non-GAAP Net Income (Loss)	$ 18,758	$ 13,253	$ (4,939)

[1] For the year ended December 31, 2021, our annual effective tax rate was materially different from our statutory rate due to changes in the domestic valuation allowance. Therefore, we used a tax rate of 6.2% for the fourth quarter of 2021, which reflects the annual effective tax rate catch-up for the first through third quarters due to the impact of the Wandera acquisition, resulting in a tax rate of 6.0% for the year ended December 31, 2021. For the years ended December 31, 2020 and 2019, we used our annual effective tax rates, which were not materially different from the statutory rates.

Adjusted EBITDA

Adjusted EBITDA is a supplemental measure of operating performance that is not prepared in accordance with GAAP and that does not represent, and should not be considered as, an alternative to net loss, as determined in accordance with GAAP. We define Adjusted EBITDA as net loss, adjusted for interest expense, net, benefit for income taxes, depreciation and amortization expense, stock-based compensation expense, foreign currency transaction loss, loss on extinguishment of debt, acquisition-related expense, acquisition-related earnout, costs associated with our secondary offerings, payroll taxes related to stock-based compensation, and legal settlement.

We use Adjusted EBITDA to understand and evaluate our core operating performance and trends, to prepare and approve our annual budget, and to develop short-term and long-term operating plans. We believe that Adjusted EBITDA facilitates comparison of our operating performance on a consistent basis between periods, and when viewed in combination with our results prepared in accordance with GAAP, helps provide a broader picture of factors and trends affecting our results of operations.

Adjusted EBITDA has limitations as an analytical tool, and you should not consider it in isolation, or as a substitute for analysis of our results as reported under GAAP. Because of these limitations, Adjusted EBITDA should not be considered as a replacement for net loss, as determined by GAAP, or as a measure of our profitability. We compensate for these limitations by relying primarily on our GAAP results and using non-GAAP measures only for supplemental purposes.

A reconciliation of Adjusted EBITDA to net loss, the most directly comparable GAAP measure, is as follows:

	Years Ended December 31,		
	2021	2020	2019
	(in thousands)		
Net loss	$ (75,189)	$ (24,082)	$ (34,345)
Interest expense, net	2,478	10,741	21,423
Benefit for income taxes	(4,789)	(9,955)	(10,033)
Depreciation expense	5,757	5,183	4,400
Amortization expense	41,312	33,328	32,682
Stock-based compensation	35,805	6,743	2,461
Foreign currency transaction loss	849	722	1,252
Loss on extinguishment of debt	449	5,213	—
Acquisition-related expense	6,388	5,200	1,392
Acquisition-related earnout	6,037	(1,000)	200
Offering costs	594	670	—
Payroll taxes related to stock-based compensation	1,527	—	—
Legal settlement	5,000	—	—
Adjusted EBITDA	$ 26,218	$ 32,763	$ 19,432

Liquidity and Capital Resources

General

As of December 31, 2021, our principal sources of liquidity were cash and cash equivalents totaling $177.2 million, which were held for general corporate purposes, which may include working capital, capital expenditures, and potential acquisitions and strategic transactions, as well as the available balance of the 2020 Revolving Credit Facility, described in Note 9 to the consolidated financial statements included in Part II, Item 8 of this Annual Report on Form 10-K. Our cash equivalents are comprised of money market funds and/or U.S. Treasuries with original or remaining maturities at the time of purchase of three months or less. Our positive cash flows from operations enable us to make continued investments in supporting the growth of our business. We expect that our operating cash flows, in addition to our cash and cash equivalents, will enable us to continue to make such investments in the future.

We are a holding company, and we derive all of our operating income from our subsidiaries. As a result, our cash flow is dependent on the performance of our subsidiaries and the ability of those entities to distribute funds to us. See Item 5, “Market for Registrant’s Common Equity, Related Stockholder Matters, and Issuer Purchases of Equity Securities — Dividend Policy ” for a discussion of our dividend policy, including restrictions on our ability to pay dividends and distributions to us.

A majority of our customers pay in advance for subscriptions and support and maintenance contracts, a portion of which is recorded as deferred revenue. Deferred revenue consists of the unearned portion of billed fees for our subscriptions, which is later recognized as revenue in accordance with our revenue recognition policy. As of December 31, 2021, we had deferred revenue of $282.1 million, of which $223.0 million was recorded as a current liability and is expected to be recorded as revenue in the next 12 months, provided all other revenue recognition criteria have been met.

On July 1, 2021, we completed our acquisition of Wandera for total consideration of $409.3 million. The total consideration consisted of an initial payment of $359.3 million at close and deferred consideration of $50.0 million that was paid in $25.0 million increments on October 1, 2021 and December 15, 2021. We initially financed the acquisition with cash on hand and proceeds from the Company’s $250.0 million 2021 Term Loan Facility. On July 1, 2021, we entered into the Credit Agreement Amendment, which amended our existing 2020 Credit Agreement. The Credit Agreement Amendment provided for a new 364-day term loan facility in an aggregate principal amount of $250.0 million on substantially the same terms and conditions as our existing 2020 Credit Agreement. The Company repaid the principal amount of the 2021 Term Loan Facility on September 23, 2021 with proceeds from the issuance and sale of the 2026 Notes. As of December 31, 2021, there were no amounts outstanding under the 2020 Credit Agreement, other than $1.0 million in outstanding letters of credit.

On September 17, 2021, we completed our private offering of the 2026 Notes and received net proceeds of approximately $361.4 million after deducting the initial purchasers' discounts and commissions and the offering expenses paid by us. The 2026 Notes bear interest at a rate of 0.125% per year, payable semiannually in arrears on March 1st and September 1st of each year, beginning on March 1, 2022. We used (i) approximately $250.0 million of the net proceeds from the offering of the 2026 Notes to repay the Company's 2021 Term Loan Facility and to pay any associated prepayment penalties and accrued and unpaid interest to the date of repayment and (ii) approximately $36.0 million of the net proceeds from the offering of the 2026 Notes to fund the cost of entering into the Capped Calls, and will use the remainder of the net proceeds for general corporate purposes, which may include working capital, capital expenditures, and potential acquisitions and strategic transactions.

Future Liquidity and Capital Resource Requirements

We believe our cash and cash equivalents, the 2020 Revolving Credit Facility, and cash provided by sales of our software solutions and services will be sufficient to meet our working capital and capital expenditure needs as well as our debt service requirements for at least the next 12 months and meet our known long-term cash requirements. Our future capital requirements will depend on many factors including our growth rate, the timing and extent of spending to support development efforts, the expansion of sales and marketing activities, the introduction of new and enhanced products and services offerings, and the continuing market acceptance of our products. In the future, we may use cash to acquire or invest in complementary businesses, services, and technologies, including intellectual property rights.

Our principal commitments consist of obligations under our 2026 Notes, contractual agreements for hosting services and other support software and operating leases for office space. Our obligations under our 2026 Notes are discussed above, as well as in "Note 9 — Debt" to the consolidated financial statements included in Part II, Item 8 of this Annual Report on Form 10-K. As of December 31, 2021, future interest payments on our 2026 Notes are $0.4 million for 2022 and a total of $1.9 million for 2023 through 2026. As of December 31, 2021, we have a total of $25.9 million of purchase and lease commitments due in 2022. Additionally, we have a total of $20.4 million of purchase and lease commitments for the years ending December 31, 2023 through 2026. See "Note 7 — Leases" and "Note 8 — Commitments and contingencies" to the consolidated financial statements included in Part II, Item 8 of this Annual Report on Form 10-K for further information on our purchase and lease commitments.

Cash Flows

The following table presents a summary of our consolidated cash flows from operating, investing, and financing activities:

	Years Ended December 31,		
	2021	2020	2019
		(in thousands)	
Net cash provided by operating activities	$ 65,165	$ 52,801	$ 11,846
Net cash used in investing activities	(387,418)	(6,876)	(47,363)
Net cash provided by financing activities	305,528	115,964	28,652
Effect of exchange rate changes on cash and cash equivalents	(993)	604	—
Net (decrease) increase in cash and cash equivalents	(17,718)	162,493	(6,865)
Cash and cash equivalents, beginning of period	194,868	32,375	39,240
Cash and cash equivalents, end of period	$ 177,150	$ 194,868	$ 32,375
Cash paid for interest	$ 967	$ 12,649	$ 20,693
Cash paid for purchases of equipment and leasehold improvements	9,755	4,368	7,190

Operating Activities

For the year ended December 31, 2021, net cash provided by operating activities was $65.2 million reflecting our net loss of $75.2 million, adjusted for non-cash charges of $104.0 million and net cash inflows of $36.4 million from changes in our operating assets and liabilities. Non-cash charges primarily consisted of depreciation and amortization of property and equipment and intangible assets, share-based compensation, amortization of deferred contract costs, non-cash lease expense, and a $6.0 million adjustment to contingent consideration, partially offset by deferred taxes. The primary drivers of net cash inflows from changes in operating assets and liabilities included an increase of $71.2 million in deferred revenue due to growth in subscription revenues and an increase of $6.4 million in accounts payable and accrued liabilities due to growth of the business. These changes were partially offset by an increase of $24.8 million in deferred contract costs due to an increase in capitalized costs, an increase of $9.3 million in prepaid expenses and other assets, and an increase of $6.5 million in trade accounts receivable.

For the year ended December 31, 2020, net cash provided by operating activities was $52.8 million reflecting our net loss of $24.1 million, adjusted for non-cash charges of $48.4 million and net cash inflows of $28.5 million from changes in our operating assets and liabilities. Non-cash charges primarily consisted of depreciation and amortization of property and equipment and intangible assets, amortization of deferred contract costs, amortization of debt issuance costs, provision for bad debt expense and returns, loss on extinguishment of debt, and share-based compensation, partially offset by deferred taxes and a $1.0 million adjustment to our Digita earnout. The primary drivers of net cash inflows from changes in operating assets and liabilities included a $64.9 million increase in deferred revenue, an increase in accounts payable and accrued liabilities of $9.5 million, and an increase in other liabilities of $1.9 million, partially offset by a $20.4 million increase in deferred contract costs, a $23.1 million increase in accounts receivable, and a $3.6 million increase in prepaid expenses and other assets.

Investing Activities

During the year ended December 31, 2021, net cash used in investing activities was $387.4 million primarily driven by the acquisition of Wandera for $349.7 million, net of cash acquired, $25.0 million paid for the deferred consideration associated with the Wandera acquisition, and purchases of $9.8 million in equipment and leasehold improvements for updates to office space and hardware and software.

During the year ended December 31, 2020, net cash used in investing activities was $6.9 million driven by purchases of $4.4 million in equipment and leasehold improvements to support our higher headcount with additional office space and hardware and software and our acquisition of Mondada in 2020 for $2.5 million, net of cash acquired.

Financing Activities

Net cash provided by financing activities of $305.5 million during the year ended December 31, 2021 was primarily due to proceeds of $373.8 million from the issuance and sale of the 2026 Notes and proceeds of $10.7 million from the exercise of stock options, partially offset by $36.0 million paid for the purchase of the Capped Calls, $25.0 million paid for the deferred consideration associated with the Wandera acquisition, $13.1 million paid for debt issuance costs, and $4.2 million paid for the contingent consideration associated with the Digita acquisition.

Net cash provided by financing activities of $116.0 million during the year ended December 31, 2020 was due to proceeds of $326.3 million from the IPO after deducting underwriting discounts and commissions, $3.0 million of proceeds from the exercise of stock options, and $2.2 million of proceeds from the private placement, partially offset by the repayment of $205.0 million principal amount of our 2017 Term Loan Facility, the payment of debt extinguishment costs of $2.0 million, the payment of offering costs of $7.3 million, and the payment of debt issuance costs of $1.3 million related to the 2020 Credit Agreement.

Indemnification Agreements

In the ordinary course of business, we enter into agreements of varying scope and terms pursuant to which we agree to indemnify customers, channel partners, vendors, lessors, business partners and other parties with respect to certain matters, including, but not limited to, losses arising out of the breach of such agreements, services to be provided by us or from intellectual property infringement, misappropriation or other violation claims made by third parties. See “Risk Factors — We have indemnity provisions under our contracts with our customers, channel partners, and other third parties, which could have a material adverse effect on our business.” In addition, we have entered into indemnification agreements with our directors and certain officers that will require us, among other things, to indemnify them against certain liabilities that may arise by reason of their status or service as directors, officers or employees. No demands have been made upon us to provide indemnification under such agreements and there are no claims that we are aware of that could have a material effect on our consolidated balance sheets, consolidated statements of operations and comprehensive loss, or consolidated statements of cash flows.

JOBS Act

The Jumpstart Our Business Startups Act of 2012 (the “JOBS Act”) permits an emerging growth company to take advantage of an extended transition period to comply with new or revised accounting standards applicable to public companies. On June 30, 2021, the last day of our second fiscal quarter in 2021, the market value of our common stock held by non-affiliates exceeded $700.0 million. Accordingly, the Company was deemed a large accelerated filer as of December 31, 2021, and, therefore, we no longer qualify as an emerging growth company and can no longer take advantage of the extended timeline to comply with new or revised accounting standards applicable to public companies beginning with this Annual Report on Form 10-K.

Critical Accounting Estimates

Our discussion and analysis of financial condition and results of operations are based upon our consolidated financial statements. The preparation of our financial statements in accordance with GAAP requires us to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenue, and expenses. We base our estimates on experience and other assumptions that we believe are reasonable under the circumstances, and we evaluate these estimates on an ongoing basis. Actual results may differ from those estimates, impacting our reported results of operations and financial condition.

Our critical accounting policies are those that materially affect our consolidated financial statements and involve difficult, subjective, or complex judgments by management. A thorough understanding of these critical accounting policies is essential when reviewing our consolidated financial statements. We believe that the critical accounting policies listed below are the most difficult management decisions as they involve the use of significant estimates and assumptions as described above. Refer to “Note 2 — Summary of significant accounting policies” to the consolidated financial statements included in Part II, Item 8 of this Annual Report on Form 10-K for more detailed information regarding our critical accounting policies.

Revenue recognition

We derive revenue from the sales of software licenses and maintenance, hosted software, and related professional services. We recognize revenue in accordance with ASC 606, which provides a five-step model for recognizing revenue from contracts with customers as follows:

- Identify the contract with a customer
- Identify the performance obligations in the contract
- Determine the transaction price
- Allocate the transaction price to the performance obligations in the contract
- Recognize revenue when or as performance obligations are satisfied

Our contracts with customers often include promises to transfer multiple products and services to a customer. Determining whether products and services are considered distinct performance obligations that should be accounted for separately versus together may require significant judgment.

When our contracts with customers contain multiple performance obligations, the contract transaction price is allocated on a relative stand-alone selling price (“SSP”) basis to each performance obligation. The Company typically determines SSP based on observable selling prices of its products and services. In instances where SSP is not directly observable, such as with software licenses that are never sold on a stand-alone basis, SSP is determined using information that may include market conditions and other observable inputs. In addition, for software products where the pricing is also determined to be highly variable or highly uncertain, SSP is established using the residual approach. However, the Company does not currently use the residual approach for any of its performance obligations, as pricing was not determined to be highly variable or highly uncertain. SSP is typically established as ranges and the Company typically has more than one SSP range for individual products and services due to the stratification of those products and services by customer class, channel type, and purchase quantity, among other circumstances. The SSP is reassessed periodically or when facts and circumstances change.

Deferred contract costs

Sales commissions, as well as associated payroll taxes and retirement plan contributions (together, contract costs), that are incremental to the acquisition of customer contracts are capitalized using a portfolio approach as deferred contract costs in the consolidated balance sheets when the period of benefit is determined to be greater than one year.

The Company has elected to apply the practical expedient to expense contract costs as incurred when the expected amortization period is one year or less. The judgments made in determining the amount of costs incurred include the portion of the commissions that are expensed in the current period versus the portion of the commissions that are recognized over the expected period of benefit, which often extends beyond the contract term as we do not pay a commission upon renewal of the service contracts. Contract costs are allocated to each performance obligation within the contract and amortized on a straight-line basis over the expected benefit period of the related performance obligations. We have determined that the expected period of benefit is generally 5 years based on evaluation of a number of factors, including customer attrition rates, weighted-average useful lives of our customer relationship and developed technology intangible assets, and market factors, including overall competitive environment and technology life of competitors.

Stock-based compensation

The Company applies the provisions of ASC 718, *Compensation — Stock Compensation* (“ASC 718”) in its accounting and reporting for stock-based compensation. In accordance with ASC 718, the Company recognizes compensation expense for all stock-based awards granted to our employees and non-employee directors in the consolidated statements of operations based on the estimated fair value of the awards on the date of grant. We use the Black-Scholes option pricing model to estimate the fair value of service-based options and purchase rights granted under the Jamf Holding Corp. 2021 Employee Stock Purchase Plan (the “2021 ESPP”). We use the fair market value of our common stock on the date of grant to estimate the fair value of restricted stock units (“RSUs”). We recognize compensation expense for service-based options and RSUs on a straight-line basis over the applicable vesting period. We recognize compensation expense for the purchase rights granted under the 2021 ESPP on a straight-line basis over the offering period. Forfeitures are accounted for as they occur.

The Company also grants performance-based awards (also referred to as return target options) to certain executives that vest and become exercisable when Vista’s realized cash return on its investment in the Company equals or exceeds $1.515 billion upon a change in control of the Company (the “Termination Event”). The terms of the agreement do not specify a performance period for the occurrence of the Termination Event. The contractual term of the awards is 10 years. The Company uses a Modified Black-Scholes option pricing model, which uses Level 3 inputs for fair value measurement, to estimate the fair value.

In conjunction with the IPO, the vesting conditions of the performance-based awards were modified to also vest following an IPO and registration and sale of shares by Vista provided that Vista achieves a cash return on its equity investment in the Company equaling or exceeding $1.515 billion. In accordance with ASC 718, we calculated the fair value of these options on the modification date. The value of these options on the date of modification as of June 30, 2020 was $33.0 million. As the awards are not currently considered probable of meeting the vesting requirements, no expense has been recognized, and the timing of any future expense recognition is unknown.

Application of these approaches involves the use of estimates, judgment, and assumptions that are highly complex and subjective, including those regarding our future expected revenue, expenses, cash flows, discount rates, market multiples, the selection of comparable public companies, and the probability of future events.

Income taxes

Deferred tax assets and liabilities are recognized principally for the expected tax consequences of temporary differences between the tax basis of assets and liabilities and their reported amounts, using currently enacted tax rates. The measurement of a deferred tax asset is reduced, if necessary, by a valuation allowance if it is more likely than not that some portion or all of the deferred tax asset will not be realized. Significant judgment is required in evaluating the need for and magnitude of appropriate valuation allowances. The realization of our deferred tax assets is dependent on generating future taxable income and the reversal of existing temporary differences. Changes in tax laws and assumptions with respect to future taxable income could result in adjustment to these allowances.

The Company recognizes a tax benefit for uncertain tax positions only if the Company believes it is more likely than not that the position will be upheld on audit based solely on the technical merits of the tax position. The Company evaluates uncertain tax positions after the consideration of all available information.

Business combinations

When the Company acquires a business, the purchase price is allocated to the assets acquired and liabilities assumed based on their estimated fair values as of the date of acquisition. The allocation of the purchase price requires management to make significant estimates in determining the fair value of assets acquired and liabilities assumed, especially with respect to intangible assets. These estimates are inherently uncertain and unpredictable. During the measurement period, which may be up to one year from the acquisition date, adjustments to the fair value of the assets acquired and liabilities assumed may be recorded with the corresponding offset to goodwill. Upon the conclusion of the measurement period or final determination of the fair value of the assets acquired or liabilities assumed, whichever comes first, any subsequent adjustments are recorded to the consolidated statements of operations. Acquisition-related costs are expensed as incurred.

Goodwill

Goodwill represents the excess of the purchase price over the fair value of net assets acquired in business combinations. The Company evaluates goodwill for impairment in accordance with ASC Topic 350, *Goodwill and Other Intangible Assets* (“ASC 350”), which requires goodwill to be either qualitatively or quantitatively assessed for impairment annually (or more frequently if impairment indicators arise) for each reporting unit. The Company has one reporting unit. The Company performs its annual impairment testing of goodwill as of October 1st of each year and in interim periods if events occur that would indicate that it is more likely than not the fair value of the reporting unit is less than carrying value. If the Company’s reporting unit carrying amount exceeds its fair value an impairment charge will be recorded based on that difference. The impairment charge will be limited to the amount of goodwill currently recognized in the Company’s single reporting unit. There is inherent subjectivity involved in estimating future cash flows, which can have a material impact on the amount of any potential impairment. Changes in estimates of future cash flows could result in a write-down of the asset in a future period.

Other intangibles, net

Intangible assets with finite lives include trademarks, customer relationships, developed technology, non-competes, and order backlog. These assets are amortized over their estimated useful lives, which range from two to twelve years, on a straight-line basis. Intangible assets with finite lives are tested for impairment whenever events or circumstances indicate that the carrying amount of an asset (asset group) may not be recoverable. An impairment loss is recognized when the carrying amount of an asset exceeds the estimated undiscounted cash flows generated by the asset. The amount of the impairment loss recorded is calculated by the excess of the asset’s carrying value over its fair value. There is inherent subjectivity involved in estimating future cash flows, which can have a material impact on the amount of any potential impairment. Changes in estimates of future cash flows could result in a write-down of the asset in a future period.

Recent Accounting Pronouncements

For a description of our recently adopted accounting pronouncements and recently issued accounting standards not yet adopted, see “Note 2 — Summary of significant accounting policies” to the consolidated financial statements included in Part II, Item 8 of this Annual Report on Form 10-K.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

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 a result of exposure due to potential changes in inflation or interest rates. We do not hold financial instruments for trading purposes.

Foreign Currency Exchange Risk

The functional currency of our foreign subsidiaries, except for Wandera Ltd. and its subsidiaries, is the U.S. dollar. The functional currency of Wandera is the British Pound (“GBP”). Most of our sales are denominated in U.S. dollars, and therefore our revenue is not currently subject to significant foreign currency risk. Our operating expenses are denominated in the currencies of the countries in which our operations are located, which are primarily in the U.S., United Kingdom, Czech Republic, Poland, and the Netherlands. Our consolidated results of operations and cash flows are, therefore, subject to fluctuations due to changes in foreign currency exchange rates and may be adversely affected in the future due to changes in foreign exchange rates. To date, we have not entered into any hedging arrangements with respect to foreign currency risk or other derivative financial instruments. During the years ended December 31, 2021 and 2020, a hypothetical 10% change in foreign currency exchange rates applicable to our business would not have had a material impact on our consolidated results of operations and cash flows.

Impact of Inflation

While inflation may impact our net revenue and costs of revenue, we believe the effects of inflation, if any, on our results of operations and financial condition have not been significant. However, there can be no assurance that our results of operations and financial condition will not be materially impacted by inflation in the future.

Item 8. Financial Statements and Supplementary Data

INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

Report of Independent Registered Public Accounting Firm

To the Shareholders and the Board of Directors of Jamf Holding Corp.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Jamf Holding Corp. (the Company) as of December 31, 2021 and 2020, the related consolidated statements of operations, comprehensive loss, 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, comprehensive loss, and its cash flows for each of the three years in the period ended December 31, 2021, in conformity with U.S. generally accepted accounting principles.

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 issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework), and our report dated March 1, 2022 expressed an adverse opinion thereon.

Adoption of New Accounting Standards

ASU No. 2016-02

As discussed in Note 2 to the consolidated financial statements, the Company changed its method of accounting for leases in 2021 due to the adoption of ASU No. 2016-02, Leases (Topic 842), as amended, effective January 1, 2021, using the using the optional transition method to the modified retrospective approach.

Basis for Opinion

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

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the 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 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 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 financial statements. We believe that our audits provide a reasonable basis for our opinion.

Critical Audit Matters

The critical audit matters communicated below are matters arising from the current period audit of the financial statements that were communicated or required to be communicated to the audit committee and that: (1) relate to accounts or disclosures that are material to the 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 matters below, providing separate opinions on the critical audit matters or on the accounts or disclosures to which they relate.

Acquisition of Wandera

Description of the Matter	As discussed in Note 5 to the consolidated financial statements, during 2021, the Company completed its acquisition of Wandera for total purchase consideration of $409.3 million. The transaction was accounted for in accordance with the acquisition method of accounting for business combinations. Auditing the Company's accounting for this business combination was complex due to the significant estimation required by management in determining the fair value of the acquired intangible assets, which principally consisted of developed technology and customer relationships. Management estimated the fair value of developed technology using the relief from royalty method and estimated the fair value of customer relationships using the multi-period excess earnings method. The significant estimation uncertainty was primarily due to the judgmental nature of the inputs to the valuation models used to measure the fair value of these intangible assets, as well as the sensitivity of the respective fair values to the underlying significant assumptions. The significant assumptions used in the relief from royalty method include revenue growth rates, obsolescence curve, and royalty rate. The significant assumptions used in the multi-period excess earnings method include revenue growth rates and customer attrition rate. These significant assumptions are considered highly subjective, as they are forward looking and could be affected by future economic and market conditions.
How We Addressed the Matter in Our Audit	We obtained an understanding, evaluated the design and tested the operating effectiveness of controls over the Company's process for accounting for acquired intangible assets. For example, we tested controls over management's review of the valuation of intangible assets, including the review of the valuation model and significant assumptions used in the valuation. To test the estimated fair value of the acquired developed technology and customer relationships intangible assets, our audit procedures included, among others, reading the purchase agreement and assessing the completeness of identified intangible assets, evaluating the Company's use of valuation methodologies, evaluating the prospective financial information and testing the completeness and accuracy of underlying data. We compared the significant assumptions, including prospective financial information, to the historical performance of the acquired entity and other comparable guideline companies within the same industry and considered the historical accuracy of management's estimates in other acquisitions. We also performed sensitivity analyses of the significant assumptions to evaluate the change in the fair value resulting from changes in the assumptions. We involved our valuation specialists to assist in the evaluation of the selection of the valuation models and testing certain significant assumptions used to value the acquired intangible assets.

Allocating revenue in contracts with multiple performance obligations and determining the standalone selling price

Description of the Matter	As described in Note 2 to the consolidated financial statements, the Company's contracts with customers often contain multiple performance obligations, which are accounted for separately if they are distinct. In such cases, the transaction price is allocated on a relative standalone selling price basis to each separate performance obligation. Management estimates the standalone selling prices for software license revenue using information that may include market conditions and other observable inputs. The Company analyzes standalone selling prices on a periodic basis to reevaluate changes to standalone selling price. Auditing the Company's software license revenue recognition is challenging because of judgments required in allocating the transaction price to distinct performance obligations based on relative standalone selling price. For example, contracts containing multiple products or services requires judgment in identifying the distinct performance obligations in the contract, and the appropriate timing of revenue recognition for such performance obligations. Management's estimates of the standalone selling prices for software licenses used to allocate the transaction price are sensitive to changes in management's business practices, such as pricing strategies. Such changes can have a significant impact on the determination of standalone selling price.

How We Addressed the Matter in Our Audit	We obtained an understanding, evaluated the design and tested the operating effectiveness of controls over the Company's processes to identify performance obligations, the estimation of the standalone selling price of each performance obligation, and the allocation of total consideration to be received over the contractual term to all performance obligations based on their relative standalone selling price. Our audit procedures included, among others, an evaluation of management's assessment of performance obligations. In conjunction with this assessment, we inspected a sample of customer contracts and reviewed management's identification of performance obligations. We then tested the period over which management determined the revenue associated with each performance obligation should be recognized, as well as the standalone selling prices assigned to those performance obligations for purposes of allocating the transaction price. In testing the Company's estimate of standalone selling prices, we evaluated the accuracy and completeness of the underlying data used in management's analysis. This evaluation included assessing the effect of the Company's pricing practices for various transactions sizes and volumes across different product types.
	Completeness and measurement of deferred contract costs
Description of the Matter	The Company has $42.7 million of deferred contract costs capitalized at December 31, 2021. As described in Note 2 to the consolidated financial statements, sales commissions as well as associated payroll taxes and retirement plan contributions that are incremental to the acquisition of customer contracts are capitalized as deferred contract costs in the consolidated balance sheets when the period of benefit is determined to be greater than one year. Auditing the deferred contract costs required complex auditor judgment and was especially challenging due to the material weakness identified by the Company and the impact it had on management's evaluation of completeness and measurement of these costs. The Company's process for calculating commissions is manual and complex in that the Company has a high volume of sales commission plans with various underlying criteria and inputs used to calculate amounts earned, and therefore subject to capitalization policy. The material weakness required an increased extent of audit effort to test the completeness and accuracy of inputs of the commission-eligible revenue contracts and related calculations of costs eligible for capitalization.
How We Addressed the Matter in Our Audit	We performed audit procedures that included, among others, assessing whether those costs capitalized were eligible costs and met the criteria of incremental and recoverable. For example, we tested a sample of deferred contract costs by reviewing and assessing the underlying commission plan and testing the measurement of capitalized costs by recalculating the amount earned based on sales and contract data. We validated that each commission earned and capitalized was an incremental cost to obtain a revenue contract. To respond to the material weakness, we performed incremental audit procedures, for instance, by increasing our sample size related to deferred contract costs. Our procedures also included reconciling the amount of deferred contract costs capitalized for the year to sales commissions paid throughout the year.

/s/ Ernst & Young LLP

We have served as the Company's auditor since 2017.

Minneapolis, Minnesota
March 1, 2022

Report of Independent Registered Public Accounting Firm

To the Shareholders and the Board of Directors of Jamf Holding Corp.

Opinion on Internal Control Over Financial Reporting

We have audited Jamf Holding Corp.'s internal control over financial reporting as of December 31, 2021, based on criteria established in Internal Control—Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 Framework) (the COSO criteria). In our opinion, because of the effect of the material weakness described below on the achievement of the objectives of the control criteria, Jamf Holding Corp. (the Company) has not maintained effective internal control over financial reporting as of December 31, 2021, based on the COSO criteria.

A material weakness is a deficiency, or combination of deficiencies, in internal control over financial reporting, such that there is a reasonable possibility that a material misstatement of the company's annual or interim financial statements will not be prevented or detected on a timely basis. The following material weakness has been identified and included in management's assessment. Management has identified a material weakness in controls related to the company's commissions accounting process.

As indicated in the accompanying 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 Wandera Inc., which is included in the 2021 consolidated financial statements of the Company and constituted 28% and 53% of total and net assets, respectively, as of December 31, 2021 and 3% and 15% of revenues and net loss, respectively, for the year then ended. 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 Wandera Inc.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the accompanying consolidated balance sheets of Jamf Holding Corp. as of December 31, 2021 and 2020, the related consolidated statements of operations, comprehensive loss, stockholders' equity, and cash flows for each of the three years in the period ended December 31, 2021, and the related notes. This material weakness was considered in determining the nature, timing and extent of audit tests applied in our audit of the 2021 consolidated financial statements.

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 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 the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit 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, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control Over Financial Reporting

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

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

/s/ Ernst & Young LLP

Minneapolis, Minnesota
March 1, 2022

JAMF HOLDING CORP.
CONSOLIDATED BALANCE SHEETS
(in thousands, except share and per share amounts)

	December 31,	
	2021	2020
Assets		
Current assets:		
Cash and cash equivalents	$ 177,150	$ 194,868
Trade accounts receivable, net of allowances of $391 and $530 at December 31, 2021 and 2020, respectively	79,143	69,056
Income taxes receivable	608	632
Deferred contract costs	12,904	8,284
Prepaid expenses	17,581	13,283
Other current assets	4,212	1,113
Total current assets	291,598	287,236
Equipment and leasehold improvements, net	18,045	15,130
Goodwill	845,734	541,480
Other intangible assets, net	264,593	202,878
Deferred contract costs, non-current	29,842	22,202
Other assets	30,608	5,359
Total assets	$ 1,480,420	$ 1,074,285
Liabilities and stockholders' equity		
Current liabilities:		
Accounts payable	$ 9,306	$ 6,967
Accrued liabilities	54,022	31,916
Income taxes payable	167	713
Deferred revenues	223,031	160,002
Total current liabilities	286,526	199,598
Deferred revenues, non-current	59,097	45,507
Deferred tax liability, net	8,700	5,087
Convertible senior notes, net	362,031	—
Other liabilities	25,640	13,079
Total liabilities	741,994	263,271
Commitments and contingencies (Note 8)		
Stockholders' equity:		
Preferred stock, $0.001 par value, 50,000,000 shares authorized at December 31, 2021 and 2020; no shares issued and outstanding at December 31, 2021 and 2020	—	—
Common stock, $0.001 par value, 500,000,000 shares authorized at December 31, 2021 and 2020; 119,426,064 and 116,992,472 shares issued and outstanding at December 31, 2021 and 2020, respectively	119	117
Additional paid-in capital	913,581	903,116
Accumulated other comprehensive loss	(7,866)	—
Accumulated deficit	(167,408)	(92,219)
Total stockholders' equity	738,426	811,014
Total liabilities and stockholders' equity	$ 1,480,420	$ 1,074,285

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

JAMF HOLDING CORP.
CONSOLIDATED STATEMENTS OF OPERATIONS
(in thousands, except share and per share amounts)

	Years Ended December 31, 2021	2020	2019
Revenue:			
Subscription	$ 344,243	$ 248,879	$ 175,118
Services	16,122	14,519	19,014
License	6,023	5,734	9,833
Total revenue	366,388	269,132	203,965
Cost of revenue:			
Cost of subscription (exclusive of amortization expense shown below)	63,441	39,529	31,457
Cost of services (exclusive of amortization expense shown below)	10,898	10,726	14,239
Amortization expense	16,018	10,753	10,266
Total cost of revenue	90,357	61,008	55,962
Gross profit	276,031	208,124	148,003
Operating expenses:			
Sales and marketing	148,192	98,885	73,103
Research and development	82,541	52,513	42,898
General and administrative	96,206	51,603	31,509
Amortization expense	25,294	22,575	22,416
Total operating expenses	352,233	225,576	169,926
Loss from operations	(76,202)	(17,452)	(21,923)
Interest expense, net	(2,478)	(10,741)	(21,423)
Loss on extinguishment of debt	(449)	(5,213)	—
Foreign currency transaction loss	(849)	(722)	(1,252)
Other income, net	—	91	220
Loss before income tax benefit	(79,978)	(34,037)	(44,378)
Income tax benefit	4,789	9,955	10,033
Net loss	$ (75,189)	$ (24,082)	$ (34,345)
Net loss per share, basic and diluted	$ (0.64)	$ (0.22)	$ (0.33)
Weighted-average shares used to compute net loss per share, basic and diluted	118,276,462	108,908,597	102,752,092

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

JAMF HOLDING CORP.
CONSOLIDATED STATEMENTS OF COMPREHENSIVE LOSS
(in thousands)

	Years Ended December 31,		
	2021	2020	2019
Net loss	$ (75,189)	$ (24,082)	$ (34,345)
Other comprehensive loss:			
Foreign currency translation adjustments	(7,866)	—	—
Total other comprehensive loss	(7,866)	—	—
Comprehensive loss	$ (83,055)	$ (24,082)	$ (34,345)

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

JAMF HOLDING CORP.
CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY
(in thousands, except share amounts)

	Stock Class Common Shares	Stock Class Common Amount	Additional Paid-In Capital	Accumulated Other Comprehensive Loss	Accumulated Deficit	Stockholders' Equity
Balance, December 31, 2018	**102,649,701**	**$ 103**	**$ 565,372**	**$ —**	**$ (33,792)**	**$ 531,683**
Exercise of stock options	168,391	—	923	—	—	923
Vesting of restricted stock units	25,520	—	—	—	—	—
Share-based compensation	—	—	2,461	—	—	2,461
Net loss	—	—	—	—	(34,345)	(34,345)
Balance, December 31, 2019	102,843,612	103	568,756	—	(68,137)	500,722
Issuance of common stock upon initial public offering, net of underwriting discounts and commissions, offering costs and tax	13,500,000	14	322,399	—	—	322,413
Private placement	85,880	—	2,233	—	—	2,233
Exercise of stock options	526,460	—	2,985	—	—	2,985
Vesting of restricted stock units	36,520	—	—	—	—	—
Share-based compensation	—	—	6,743	—	—	6,743
Net loss	—	—	—	—	(24,082)	(24,082)
Balance, December 31, 2020	116,992,472	117	903,116	—	(92,219)	811,014
Exercise of stock options	1,903,560	1	10,690	—	—	10,691
Vesting of restricted stock units	530,032	1	—	—	—	1
Share-based compensation	—	—	35,805	—	—	35,805
Purchase of capped calls	—	—	(36,030)	—	—	(36,030)
Foreign currency translation adjustment	—	—	—	(7,866)	—	(7,866)
Net loss	—	—	—	—	(75,189)	(75,189)
Balance, December 31, 2021	**119,426,064**	**$ 119**	**$ 913,581**	**$ (7,866)**	**$ (167,408)**	**$ 738,426**

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

JAMF HOLDING CORP.
CONSOLIDATED STATEMENTS OF CASH FLOWS
(in thousands)

	Years Ended December 31,		
	2021	2020	2019
Cash flows from operating activities			
Net loss	$ (75,189)	$ (24,082)	$ (34,345)
Adjustments to reconcile net loss to cash provided by operating activities:			
Depreciation and amortization expense	47,069	38,511	37,082
Amortization of deferred contract costs	12,534	7,953	5,236
Amortization of debt issuance costs	1,251	773	1,120
Non-cash lease expense	4,994	—	—
Provision for credit losses and returns	37	1,024	279
Loss on extinguishment of debt	449	5,213	—
Share-based compensation	35,805	6,743	2,461
Deferred tax benefit	(5,644)	(10,318)	(11,169)
Adjustment to contingent consideration	6,037	(1,000)	200
Other	1,419	(490)	(292)
Changes in operating assets and liabilities:			
Trade accounts receivable	(6,521)	(23,112)	(14,799)
Income tax receivable/payable	(611)	(766)	559
Prepaid expenses and other assets	(9,265)	(3,620)	(5,106)
Deferred contract costs	(24,795)	(20,398)	(14,045)
Accounts payable	2,069	4,026	1,000
Accrued liabilities	4,345	5,501	6,349
Deferred revenue	71,216	64,945	37,374
Other liabilities	(35)	1,898	(58)
Net cash provided by operating activities	65,165	52,801	11,846
Cash flows from investing activities			
Acquisitions, net of cash acquired	(352,711)	(2,512)	(40,173)
Payment of deferred consideration	(25,000)	—	—
Purchases of equipment and leasehold improvements	(9,755)	(4,368)	(7,190)
Proceeds from sale of equipment and leasehold improvements	48	4	—
Net cash used in investing activities	(387,418)	(6,876)	(47,363)
Cash flows from financing activities			
Proceeds from convertible senior notes	373,750	—	—
Proceeds from bank borrowings	250,000	—	40,000
Payment of bank borrowings	(250,000)	(205,000)	(10,000)
Payment for purchase of capped calls	(36,030)	—	—
Debt issuance costs	(13,134)	(1,264)	(1,550)
Payment of debt extinguishment costs	—	(2,050)	—
Proceeds from initial public offering, net of underwriting discounts and commissions	—	326,316	—
Cash paid for offering costs	(543)	(7,256)	(721)
Proceeds from private placement	—	2,233	—
Cash paid for contingent consideration	(4,206)	—	—
Payment of deferred consideration	(25,000)	—	—
Proceeds from the exercise of stock options	10,691	2,985	923
Net cash provided by financing activities	305,528	115,964	28,652
Effect of exchange rate changes on cash and cash equivalents	(993)	604	—
Net (decrease) increase in cash and cash equivalents	(17,718)	162,493	(6,865)
Cash and cash equivalents, beginning of period	194,868	32,375	39,240
Cash and cash equivalents, end of period	$ 177,150	$ 194,868	$ 32,375

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

JAMF HOLDING CORP.
CONSOLIDATED STATEMENTS OF CASH FLOWS (continued)
(in thousands)

	Years Ended December 31,		
	2021	**2020**	**2019**
Supplemental disclosures of cash flow information:			
Cash paid for:			
Interest	$ 967	$ 12,649	$ 20,693
Income taxes, net of refunds	1,334	1,394	596
Non-cash activities:			
Debt issuance costs accrued but not paid	50	—	—
Operating lease assets obtained in exchange for operating lease liabilities	1,470	—	—
Leasehold improvements acquired through lease incentives	—	—	2,672

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

JAMF HOLDING CORP.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

Note 1. Basis of presentation and description of business

Description of business

Jamf Holding Corp. and its wholly owned subsidiaries, collectively, are referred to as the "Company," "we," "us" or "our." We are the standard in Apple Enterprise Management, and our cloud software platform is the only vertically-focused Apple infrastructure and security platform of scale in the world. We help IT and security teams confidently protect the devices, data, and applications used by their workforce, while providing employees with consumer-simple, privacy-protecting technology. With Jamf's software, devices can be deployed to employees brand new in the shrink-wrapped box, set up automatically and personalized at first power-on and administered continuously throughout the lifecycle of the device. Our customers are located throughout the world.

Initial public offering

On July 24, 2020, the Company closed its IPO through which it issued and sold 13,500,000 shares of common stock at the IPO price of $26.00 per share (the "IPO Price"). In connection with the IPO, the Company raised approximately $319.0 million after deducting the underwriting discount and commissions of $24.7 million and offering expenses of $7.3 million. Upon completion of the IPO, authorized capital stock consisted of 500,000,000 shares of common stock, par value $0.001 per share, and 50,000,000 shares of undesignated preferred stock, par value $0.001 per share.

Concurrently with the Company's IPO, the Company issued and sold 85,880 shares of its common stock in a private placement to certain of its named executive officers, certain of its other employees and its independent directors at the IPO Price for aggregate consideration of approximately $2.2 million.

Upon closing of the IPO, the Company repaid $205.0 million of the principal amount of the 2017 Term Loan Facility and paid $3.4 million of accrued interest and $2.0 million of prepayment penalty. The Company also wrote off $3.2 million of remaining debt issuance costs upon repayment of the debt. The Company recorded a loss on debt extinguishment of $5.2 million for the prepayment penalty and write off of debt issuance costs in the third quarter of 2020.

Emerging growth company status

On June 30, 2021, the last day of our second fiscal quarter in 2021, the market value of our common stock held by non-affiliates exceeded $700.0 million. Accordingly, the Company was deemed a large accelerated filer as of December 31, 2021, and, therefore, we no longer qualify as an emerging growth company and can no longer take advantage of the extended timeline to comply with new or revised accounting standards applicable to public companies beginning with this Annual Report on Form 10-K.

Basis of presentation and principles of consolidation

The consolidated financial statements include the accounts of the Company and its wholly owned subsidiaries. All intercompany accounts and transactions have been eliminated in consolidation. The accompanying consolidated financial statements have been prepared in accordance with GAAP.

The consolidated financial statements and footnotes to the consolidated financial statements in this Annual Report on Form 10-K reflect the revisions previously made for immaterial errors related to certain commissions that were incorrectly capitalized in prior periods as well as various other immaterial errors. See Exhibit 99.1 titled, "Updates to the Company's Annual Report on Form 10-K for the Year Ended December 31, 2020", of our Form 8-K, filed with the SEC on August 27, 2021, for more information.

Use of estimates

The preparation of the consolidated financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, the disclosure of contingent assets and liabilities as of the reporting date, and the reported amounts of revenues and expenses during the reporting period. These estimates are based on management's best knowledge of current events and actions that the Company may undertake in the future and include, but are not limited to, revenue recognition, stock-based compensation, commissions, the fair values of assets acquired and liabilities assumed in business combinations, useful lives for finite-lived assets, recoverability of long-lived assets, the value of right-of-use assets and lease liabilities, allowance for expected credit losses, commitments and contingencies, and accounting for income taxes and related valuation allowances against deferred tax assets. Actual results could differ from those estimates.

Segment and geographic information

Our chief operating decision maker ("CODM") is our Chief Executive Officer, who reviews financial information presented on a consolidated basis for purposes of making operating decisions, assessing financial performance, and allocating resources. We operate our business as one operating segment and therefore we have one reportable segment.

Revenue by geographic region as determined based on the location where the sale originated was as follows:

	Years Ended December 31,		
	2021	**2020**	**2019**
	(in thousands)		
The Americas [1]	$ 271,047	$ 208,171	$ 156,001
Europe, the Middle East, India, and Africa	71,521	45,775	36,431
Asia Pacific	23,820	15,186	11,533
	$ 366,388	$ 269,132	$ 203,965

[1] The vast majority of the Americas is the United States.

Long-lived assets, which include equipment and leasehold improvements, net and operating lease right-of-use ("ROU") assets for purposes of this disclosure, by geographic region were as follows:

	December 31,	
	2021	**2020**
	(in thousands)	
The Americas	$ 30,459	$ 11,227
Europe, the Middle East, India, and Africa	6,839	2,310
Asia Pacific	2,347	1,593
	$ 39,645	$ 15,130

The United States held 77% and 74% of the total long-lived assets as of December 31, 2021 and 2020, respectively.

The Company adopted ASC Topic 842, *Leases* ("ASC 842") on January 1, 2021 and, therefore, did not have any operating lease ROU assets as of December 31, 2020. See Note 2 for more information.

Note 2. Summary of significant accounting policies

Net loss per share of common stock

Basic net loss per common share is calculated by dividing the net loss by the weighted-average number of common shares outstanding during the period without consideration for potentially dilutive securities. Diluted net loss per common share is calculated by dividing the net loss by the weighted-average number of common shares and potentially dilutive securities outstanding during the period. The potentially dilutive securities include outstanding stock options, unvested RSUs, shares related to the 2026 Notes, and shares issuable pursuant to the 2021 ESPP and are determined by applying either the treasury-stock method or the if-converted method, as applicable. Because we have reported a net loss for the years ended December 31, 2021, 2020, and 2019, the number of shares used to calculate diluted net loss per common share is the same as the number of shares used to calculate basic net loss per common share for those periods because the potentially dilutive shares would have been anti-dilutive if included in the calculation.

Cash and cash equivalents

The Company considers any highly liquid investments purchased with original or remaining maturities at the time of purchase of three months or less to be cash equivalents. The Company maintains cash in deposit accounts that, at times, may exceed federally insured limits. The Company has not experienced any losses in such accounts.

Trade receivables, net

Credit is extended to customers in the normal course of business, generally with 30-day payment terms. Trade receivables are recorded at the invoiced amount, net of allowances.

Effective January 1, 2021, upon adoption of ASU No. 2016-13, *Financial Instruments — Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments* (“ASU 2016-13”), the allowance for credit losses is based on an expected loss model that estimates losses over the expected life of the trade receivables. The Company estimates expected credit losses based on the Company’s historical loss information, current and future economic and market conditions, and ongoing review of customers’ account balances. Prior to the adoption of ASU 2016-13, the Company determined the allowance for doubtful accounts based on the delinquency of the account, the financial condition of the customer, and the Company’s collection experience.

The Company writes-off a receivable against the allowance when a determination is made that the balance is uncollectible and collection of the receivable is no longer being actively pursued. This determination is based on the delinquency of the account, the financial condition of the customer, and the Company’s collection experience.

Activity related to our allowance for credit losses for trade receivables was as follows:

	Years Ended December 31,		
	2021	2020	2019
		(in thousands)	
Balance, beginning of period	$ 530	$ 200	$ 60
Provision	143	824	279
Write-offs	(373)	(494)	(139)
Recoveries of amounts previously written off	91	—	—
Balance, end of period	$ 391	$ 530	$ 200

Equipment and leasehold improvements, net

Equipment and leasehold improvements are recorded at cost less accumulated depreciation. Expenditures for renewals and betterments that extend the life of such assets are capitalized. Depreciation is computed using the straight-line method over the estimated useful lives of the assets. These lives are three to five years for computers and server equipment, three years for software, five to seven years for furniture and fixtures, and the lesser of the lease term or the useful life of the leasehold improvements. Repair and maintenance costs are expensed as incurred. Differences between amounts received and the net carrying value of assets retired or disposed of are charged to income as incurred.

Equipment and leasehold improvements, net are tested for impairment whenever events or circumstances indicate that the carrying amount of an asset may not be recoverable. There were no impairment losses recognized during the years ended December 31, 2021, 2020, and 2019.

Business combinations

When the Company acquires a business, the purchase price is allocated to the assets acquired and liabilities assumed based on their estimated fair values as of the date of acquisition. The allocation of the purchase price requires management to make significant estimates in determining the fair value of assets acquired and liabilities assumed, especially with respect to intangible assets. These estimates are inherently uncertain and unpredictable. During the measurement period, which may be up to one year from the acquisition date, adjustments to the fair value of the assets acquired and liabilities assumed may be recorded with the corresponding offset to goodwill. Upon the conclusion of the measurement period or final determination of the fair value of the assets acquired or liabilities assumed, whichever comes first, any subsequent adjustments are recorded to the consolidated statements of operations. Acquisition-related costs are expensed as incurred.

Goodwill

The Company evaluates goodwill for impairment in accordance with ASC 350, which requires goodwill to be either qualitatively or quantitatively assessed for impairment annually (or more frequently if impairment indicators arise) for each reporting unit. The Company has one reporting unit. The Company performs its impairment testing of goodwill at least annually and more frequently if events occur that would indicate that it is more likely than not the fair value of the reporting unit is less than the carrying value. If the Company's reporting unit carrying amount exceeds its fair value, an impairment charge will be recorded based on that difference. The impairment charge will be limited to the amount of goodwill currently recognized in the Company's single reporting unit. The Company performed the annual assessment as of October 1, 2021, and no impairment was identified. No other interim impairment tests were deemed necessary.

Other intangibles, net

Intangible assets with finite lives include trademarks, customer relationships, developed technology, non-competes, and order backlog. These assets are amortized over their estimated useful lives, which range from two to twelve years, on a straight-line basis. Intangible assets with finite lives are tested for impairment whenever events or circumstances indicate that the carrying amount of an asset (asset group) may not be recoverable. An impairment loss is recognized when the carrying amount of an asset exceeds the estimated undiscounted cash flows generated by the asset. The amount of the impairment loss recorded is calculated by the excess of the asset's carrying value over its fair value. There were no impairment losses recognized during the years ended December 31, 2021, 2020, and 2019.

Intangible assets with indefinite lives include in-process research and development ("IPR&D"). These assets are not amortized, but are assessed for potential impairment annually or when circumstances indicate that the carrying amount may not be recoverable. There were no impairment losses recognized during the year ended December 31, 2021.

Operating leases

The Company adopted ASC 842 on January 1, 2021 using the optional transition method to the modified retrospective approach. Under this transition provision, results for reporting periods beginning on January 1, 2021 are presented under ASC 842 while prior period amounts continue to be reported and disclosed in accordance with the Company's historical accounting treatment under ASC Topic 840, *Leases* ("ASC 840").

The Company determines if an arrangement is or contains a lease at inception, which is the date on which the terms of the contract are agreed to and the agreement creates enforceable rights and obligations. Under ASC 842, a contract is or contains a lease when (i) explicitly or implicitly identified assets have been deployed in the contract and (ii) the customer obtains substantially all of the economic benefits from the use of that underlying asset and directs how and for what purpose the asset is used during the term of the contract. The Company also considers whether its service arrangements include the right to control the use of an asset.

The Company recognizes ROU assets and lease liabilities based on the present value of lease payments over the lease term at the commencement date of the lease (or January 1, 2021 for existing leases upon the adoption of ASC 842). The ROU assets also include any initial direct costs incurred and lease payments made at or before the commencement date and are reduced by any lease incentives. The Company made an accounting policy election under ASC 842 not to recognize ROU assets and lease liabilities for leases with a term of twelve months or less.

Future lease payments may include fixed rent escalation clauses or payments that depend on an index (such as the consumer price index). Subsequent changes to an index and other periodic market-rate adjustments to base rent are recorded in variable lease expense in the period incurred.

The Company made an accounting policy election to account for lease and non-lease components in its contracts as a single lease component for all asset classes. The non-lease components typically represent additional services transferred to the Company, such as common area maintenance for real estate, which are variable in nature and recorded in variable lease expense in the period incurred.

The Company uses its incremental borrowing rate to determine the present value of lease payments as the Company's leases do not have a readily determinable implicit discount rate. The incremental borrowing rate is the rate of interest the Company would have to pay to borrow on a collateralized basis over a similar term and amount in a similar economic environment. Judgement is applied in assessing factors such as Company specific credit risk, lease term, nature and quality of the underlying collateral, currency, and economic environment in determining the incremental borrowing rate to apply to each lease.

Debt issuance costs

Costs of debt financing are charged to expense over the lives of the related financing agreements. Remaining costs and the future period over which they would be charged to expense are reassessed when amendments to the related financing agreements or prepayments occur. Debt issuance costs for the Company's 2026 Notes are recognized as an offset to the liability and are amortized using the effective-interest method. Debt issuance costs for the Company's revolving line of credit are recognized in other assets and are amortized on a straight-line basis.

Stock split

On July 10, 2020, the Company effected a 110-for-1 stock split of its common stock. The par value of the common stock was not adjusted as a result of the stock split. Accordingly, all share and per share amounts for all periods presented in the accompanying consolidated financial statements and notes thereto have be adjusted retrospectively, where applicable, to reflect this stock split.

Offering costs

Prior to the IPO, the Company capitalized offering costs incurred in connection with the sale of common stock in the IPO, including legal, accounting, printing, and other IPO-related costs. Upon completion of the IPO, $7.3 million of deferred offering costs were reclassified to stockholders' equity and recorded against the proceeds from the offering. During the years ended December 31, 2021 and 2020, the Company incurred costs of $0.6 million and $0.7 million, respectively, in connection with the sale of common stock in secondary offerings after the IPO. The Company did not receive any proceeds as only certain selling shareholders participated in these offerings. These costs were expensed as incurred and included in general and administrative expenses in the consolidated statements of operations.

Foreign currency

Our reporting currency is the U.S. dollar. The functional currency of our foreign operations, except for Wandera Ltd. and its subsidiaries, is the U.S. dollar. The functional currency of Wandera Ltd. and its subsidiaries is the GBP. The assets, liabilities, revenues, and expenses of our foreign operations are remeasured in accordance with ASC Topic 830, *Foreign Currency Matters*. Remeasurement adjustments are recorded as foreign currency transaction gains (losses) in the consolidated statement of operations. Assets and liabilities of Wandera Ltd. and its subsidiaries are translated into U.S. dollars based upon exchange rates prevailing at the end of each period. Revenues and expenses of Wandera Ltd. and its subsidiaries are translated at weighted-average exchange rates on a monthly basis. The resulting translation adjustment is included in accumulated other comprehensive loss.

Stock-based compensation

In accordance with ASC 718, the Company recognizes compensation expense for all stock-based awards granted to our employees and non-employee directors in the consolidated statements of operations based on the estimated fair value of the awards on the date of grant. We use the Black-Scholes option pricing model to estimate the fair value of service-based options and purchase rights granted under the 2021 ESPP. We use the fair market value of our common stock on the date of grant to estimate the fair value of RSUs. We recognize compensation expense for service-based options and RSUs on a straight-line basis over the applicable vesting period. We recognize compensation expense for the purchase rights granted under the 2021 ESPP on a straight-line basis over the offering period. Forfeitures are accounted for as they occur.

The Company also grants performance-based awards (also referred to as return target options) to certain executives that vest and become exercisable when Vista's realized cash return on its investment in the Company equals or exceeds $1.515 billion upon the Termination Event. The terms of the agreement do not specify a performance period for the occurrence of the Termination Event. The contractual term of the awards is 10 years. The Company uses a Modified Black-Scholes option pricing model, which uses Level 3 inputs for fair value measurement, to estimate the fair value.

In conjunction with the IPO, the vesting conditions of the performance-based awards were modified to also vest following an IPO and registration and sale of shares by Vista provided that Vista achieves a cash return on its equity investment in the Company equaling or exceeding $1.515 billion. In accordance with ASC 718, we calculated the fair value of these options on the modification date. The value of these options on the date of modification as of June 30, 2020 was $33.0 million. As the awards are not currently considered probable of meeting the vesting requirements, no expense has been recognized, and the timing of any future expense recognition is unknown.

The Black-Scholes option pricing model requires the use of subjective assumptions as inputs. These assumptions include the following:

- *Expected Term* — The expected term of stock options represents the weighted-average period the stock options are expected to be outstanding. For time-based awards, the estimated expected term of the options granted is generally calculated as the vesting period plus the midpoint of the remaining contractual term as the Company does not have sufficient historical information to develop reasonable expectations surrounding future exercise patterns and post-vesting employment termination behavior. The expected term for the purchase rights issued under the 2021 ESPP is based on the duration of the offering period.

- *Expected Volatility* — For return target options modified during the year ended December 31, 2020 and return target options and service-based options granted during the year ended December 31, 2019, the expected stock price volatility assumption was determined by examining the historical volatility of a group of industry peers as the Company did not have substantive trading history for its common stock. For the purchase rights issued under the 2021 ESPP, the expected volatility was based on the Company's historical data.

- *Risk-Free Interest Rate* — The risk-free rate assumption was based on U.S. Treasury instruments with terms that were consistent with the expected term of the Company's stock options and offering period for the 2021 ESPP.

- *Expected Dividend* — The Company uses an expected dividend yield of zero as we do not currently pay dividends and have no plans to pay dividends in the foreseeable future.

- *Fair Value of Common Stock* — Following the IPO, the Company's shares are publicly traded, and the Company uses the applicable closing price of its common stock to determine fair value. Prior to the IPO, the fair value of the shares of common stock underlying the stock options had historically been the responsibility of and determined by the Company's Board. Because there was no public market for the Company's common stock prior to our IPO, the Board used independent third-party valuations of the Company's common stock, operating and financial performance, and general and industry-specific economic outlook, amongst other factors.

Income taxes

We account for income taxes in accordance with ASC Topic 740, *Income Taxes*, under which deferred tax liabilities and assets are recognized for the expected future tax consequences of temporary differences between financial statement carrying amounts and the tax basis of assets and liabilities, net operating loss, and tax credit carryforwards. Valuation allowances are established when necessary to reduce deferred tax assets to the amount expected to be realized.

We use a recognition threshold and measurement attribute for the financial statement recognition and measurement of a tax position taken or expected to be taken in a tax return. A tax position is recognized when it is more likely than not that the tax position will be sustained upon examination, including resolution of any related appeals or litigation processes. A tax position that meets the more-likely-than-not recognition threshold is measured at the largest amount of benefit that is greater than 50% likely of being realized upon ultimate settlement with a taxing authority. The standard also provides guidance on derecognition of tax benefits, classification on the balance sheet, interest and penalties, accounting in interim periods, disclosure, and transition.

Revenue recognition

The Company applies ASC 606 and follows the following five-step model to determine the appropriate amount of revenue to be recognized in accordance with ASC 606:

- Identify the contract with a customer

- Identify the performance obligations in the contract

- Determine the transaction price

- Allocate the transaction price to the performance obligations in the contract

- Recognize revenue when or as performance obligations are satisfied

The Company's revenue is primarily derived from sales of SaaS subscriptions, support and maintenance contracts, software licenses, and related professional services. The Company's products and services are marketed and sold directly, as well as indirectly through third-party resellers, to the end-user.

The Company assesses the contract term as the period in which the parties to the contract have enforceable rights and obligations. The contract term can differ from the stated term in contracts with certain termination or renewal rights, depending on whether there are substantive penalties associated with those rights. Customer contracts are generally standardized and non-cancelable for the duration of the stated contract term.

Nature of Products and Services

Subscription: Subscription includes SaaS subscription arrangements, which include a promise to allow customers to access software hosted by the Company over the contract period without allowing the customer to take possession of the software or transfer hosting to a third party. Subscription also includes support and maintenance, which includes when-and-if available software updates and technical support on our perpetual and on-premise subscription licenses. Because the subscription represents a stand-ready obligation to provide a series of distinct periods of access to the subscription, which are all substantially the same and that have the same pattern of transfer to the customer, subscriptions are accounted for as a series and revenue is recognized ratably over the contract term, beginning at the point when the customer is able to use and benefit from the subscription. Subscription also includes sales of on-premise subscription arrangements. Licenses for on-premise software provide the customer with a right to use the software as it exists when made available to the customer. Revenue from software licenses is recognized upon transfer of control to the customer, which is typically upon making the software available to the customer.

Services: Services, including training, are often sold as part of new software license or subscription contracts. These services are fulfilled by the Company and with the use of other vendors and do not significantly modify, integrate, or otherwise depend on other performance obligations included in the contracts. Services are generally performed over a one- to two-day period and, when sold as part of new software license or subscription contracts, at or near the outset of the related contract. When other vendors participate in the provisioning of the services, the Company recognizes the related revenue on a gross basis as the Company is the principal in these arrangements. Revenue related to services is recognized as the Company's performance obligation is fulfilled. Related fulfillment costs are recognized as incurred.

License: License includes sales of on-premise perpetual software. Licenses for on-premise software provide the customer with a right to use the software as it exists when made available to the customer. Revenue from software licenses is recognized upon transfer of control to the customer, which is typically upon making the software available to the customer.

Certain contracts may include explicit options to renew maintenance at a stated price. These options are generally priced in line with the SSP and therefore do not provide a material right to the customer. If the option provides a material right to the customer, then the material right is accounted for as a separate performance obligation, and the Company recognizes revenue when those future goods or services underlying the option are transferred or when the option expires.

Transaction Price

The transaction price is the amount of consideration to which the Company expects to be entitled in exchange for transferring goods and services to the customer. The transaction price is exclusive of amounts collected on behalf of third parties, such as sales tax and value-added tax.

Significant Judgments

When the Company's contracts with customers contain multiple performance obligations, the contract transaction price is allocated on a relative SSP basis to each performance obligation. The Company typically determines SSP based on observable selling prices of its products and services.

In instances where SSP is not directly observable, such as with software licenses that are never sold on a stand-alone basis, SSP is determined using information that may include market conditions and other observable inputs. SSP is typically established as ranges, and the Company typically has more than one SSP range for individual products and services due to the stratification of those products and services by customer class, channel type, and purchase quantity, among other circumstances. The SSP is reassessed periodically or when facts and circumstances change.

Disaggregation of Revenue

The Company separates revenue into subscription and non-subscription categories to disaggregate those revenues that are term-based and renewable from those that are one-time in nature. Revenue from subscription and non-subscription contractual arrangements were as follows:

	Years Ended December 31,		
	2021	2020	2019
	(in thousands)		
SaaS subscription and support and maintenance	$ 313,950	$ 223,655	$ 158,493
On-premise subscription	30,293	25,224	16,625
Subscription revenue	344,243	248,879	175,118
Professional services	16,122	14,519	19,014
Perpetual licenses	6,023	5,734	9,833
Non-subscription revenue	22,145	20,253	28,847
Total revenue	$ 366,388	$ 269,132	$ 203,965

Contract Balances

The timing of revenue recognition may not align with the right to invoice the customer. The Company records accounts receivable when it has the unconditional right to issue an invoice and receive payment regardless of whether revenue has been recognized. For multiyear agreements, the Company will either invoice the customer in full at the inception of the contract or annually at the beginning of each annual period. If revenue has not yet been recognized, then a contract liability (deferred revenue) is also recorded. Deferred revenue classified as current in the consolidated balance sheets is expected to be recognized as revenue within one year. Non-current deferred revenue will generally be fully recognized within five years. If revenue is recognized in advance of the right to invoice, a contract asset is recorded. The balances of contract assets, which are included in other current assets on the consolidated balance sheets, were $1.8 million, $0.9 million, and $0.5 million as of December 31, 2021, 2020, and 2019, respectively. As of December 31, 2021, the allowance for expected credit losses associated with contract assets was not material.

Contract liabilities consist of customer billings in advance of revenue being recognized. The Company invoices its customers for subscription, support and maintenance, and services in advance.

Changes in contract liabilities, including revenue earned during the period from the beginning contract liability balance and new deferrals of revenue during the period, were as follows:

	Years Ended December 31,		
	2021	2020	2019
	(in thousands)		
Balance, beginning of the period	$ 205,509	$ 140,449	$ 100,025
Acquisitions	5,200	—	—
Revenue earned	(160,002)	(127,915)	(85,471)
Deferral of revenue	231,421	192,975	125,895
Balance, end of the period	$ 282,128	$ 205,509	$ 140,449

There were no significant changes to our contract assets and liabilities during the years ended December 31, 2021, 2020, and 2019 outside of our sales activities.

In instances where the timing of revenue recognition differs from the timing of the right to invoice, the Company has determined that a significant financing component generally does not exist. The primary purpose of the Company’s invoicing terms is to provide customers with simplified and predictable ways of purchasing the products and services and not to receive financing from or provide financing to the customer. Additionally, the Company has elected the practical expedient that permits an entity not to recognize a significant financing component if the time between the transfer of a good or service and payment is one year or less.

Payment terms on invoiced amounts are typically 30 days. The Company does not offer rights of return for its products and services in the normal course of business and contracts generally do not include customer acceptance clauses.

Remaining Performance Obligations

Revenue allocated to remaining performance obligations represents contracted revenue that has not yet been recognized, which includes deferred revenue and noncancellable amounts to be invoiced. As of December 31, 2021, the Company had $333.5 million of remaining performance obligations, with 82% expected to be recognized as revenue over the succeeding 12 months, and the remainder generally expected to be recognized over the three years thereafter.

Deferred Contract Costs

Sales commissions, as well as associated payroll taxes and retirement plan contributions (together, contract costs), that are incremental to the acquisition of customer contracts are capitalized using a portfolio approach as deferred contract costs in the consolidated balance sheets when the period of benefit is determined to be greater than one year.

The Company has elected to apply the practical expedient to expense contract costs as incurred when the expected amortization period is one year or less. The judgments made in determining the amount of costs incurred include the portion of the commissions that are expensed in the current period versus the portion of the commissions that are recognized over the expected period of benefit, which often extends beyond the contract term as we do not pay a commission upon renewal of the service contracts. Contract costs are allocated to each performance obligation within the contract and amortized on a straight-line basis over the expected benefit period of the related performance obligations. Contract costs are amortized as a component of sales and marketing expenses in our consolidated statement of operations. We have determined that the expected period of benefit is generally five years based on evaluation of a number of factors, including customer attrition rates, weighted-average useful lives of our customer relationship and developed technology intangible assets, and market factors, including overall competitive environment and technology life of competitors. Total amortization of contract costs for the years ended December 31, 2021, 2020, and 2019 was $12.5 million, $8.0 million, and $5.2 million, respectively.

The Company periodically reviews these deferred costs to determine whether events or changes in circumstances have occurred that could affect the period of benefit of these deferred contract costs. There were no impairment losses recorded during the years ended December 31, 2021, 2020, or 2019.

Concentrations of Risk

For the year ended December 31, 2021, the Company had one distributor that accounted for more than 10% of total net revenues. Total receivables related to this distributor were $17.4 million as of December 31, 2021. For the year ended December 31, 2020, the Company had two distributors that each accounted for more than 10% of total net revenues. Total receivables related to these distributors were $19.8 million as of December 31, 2020. For the year ended December 31, 2019, the Company had one distributor that accounted for more than 10% of total net revenues. Total receivables related to this distributor were $6.0 million as of December 31, 2019. As of December 31, 2021 and 2020, one distributor accounted for 22% and 23%, respectively, of total receivables.

No single end customer accounted for more than 10% of total revenue for the years ended December 31, 2021, 2020, and 2019. No single end customer accounted for more than 10% of total receivables as of December 31, 2021 and 2020.

The Company hosts our cloud service from third-party data center facilities operated by AWS from several global locations. The Company has internal procedures to restore services in the event of disaster at any of its current data center facilities. Even with these procedures for disaster recovery in place, the Company’s subscription services could be significantly interrupted during the time period following a disaster at one of its sites and the subsequent restoration of services at another site.

Research and development costs and software development costs

All research and development costs are expensed as incurred in accordance with ASC Topic 730, *Research and Development*. Software development costs required to be capitalized under ASC Topic 985-20, *Costs of Software to be Sold,* *Leased or Marketed*, and under ASC Topic 350-40, *Internal-Use Software*, were not material for the years ended December 31, 2021, 2020, and 2019.

Advertising costs

Advertising costs are expensed as incurred and presented within sales and marketing in the consolidated statements of operations. Advertising costs were $17.0 million, $13.4 million, and $8.7 million for the years ended December 31, 2021, 2020, and 2019, respectively.

Interest expense, net

For the year ended December 31, 2021, interest expense from debt financing was $2.5 million. For the year ended December 31, 2020, interest expense from debt financing of $10.8 million is partially offset by interest income from cash investments of $0.1 million. For the year ended December 31, 2019, interest expense from debt financing of $21.9 million is partially offset by interest income from cash investments of $0.5 million.

Recently issued accounting pronouncements not yet adopted

From time to time, new accounting pronouncements are issued by the FASB or other standard setting bodies and adopted by us as of the specified effective date. Unless otherwise discussed, the impact of recently issued standards that are not yet effective will not have a material impact on our financial position or results of operations upon adoption.

Reference Rate Reform

In March 2020, the FASB issued ASU No. 2020-04, *Reference Rate Reform (Topic 848): Facilitation of the Effects of Reference Rate Reform on Financial Reporting* (“ASU 2020-04”), which provides entities with temporary optional financial reporting alternatives to ease the potential burden in accounting for reference rate reform and includes a provision that allows entities to account for a modified contract as a continuation of an existing contract. ASU 2020-04 is effective upon issuance and can be applied through December 31, 2022. The adoption of this standard is not expected to have a material impact on the Company’s consolidated financial statements.

Adoption of new accounting pronouncements

Business Combinations — Accounting for Contract Assets and Contract Liabilities from Contracts with Customers

In October 2021, the FASB issued ASU No. 2021-08, *Business Combinations (Topic 805), Accounting for Contract Assets and Contract Liabilities from Contracts with Customers* (“ASU 2021-08”), which requires contract assets and contract liabilities acquired in a business combination to be recognized and measured by the acquirer on the acquisition date in accordance with ASC 606. Generally, this new guidance will result in the acquirer recognizing contract assets and contract liabilities at the same amounts recorded by the acquiree. Historically, such amounts were recognized by the acquirer at fair value in accordance with acquisition accounting. The new guidance should be applied prospectively to acquisitions occurring on or after the effective date. The standard is effective for fiscal years beginning after December 15, 2022, including interim periods within those fiscal years. Early adoption is permitted, including in interim periods, for any financial statements that have not been issued. The Company early adopted the new standard on January 1, 2022. The adoption of the standard did not have any impact on the Company’s consolidated financial statements. We will apply the new guidance to future acquisitions.

Financial Instruments — Credit Losses

In June 2016, the FASB issued ASU 2016-13, which introduces a model based on expected losses to estimate credit losses for most financial assets and certain other instruments. In November 2019, the FASB issued ASU No. 2019-10, *Financial Instruments — Credit Losses (Topic 326), Derivatives and Hedging (Topic 815), and Leases (Topic 842): Effective Dates* (“ASU 2019-10”). The update allows the extension of the initial effective date for entities which have not yet adopted ASU 2016-02. As of December 31, 2021, we are a large accelerated filer and, therefore, we no longer qualify as an emerging growth company and can no longer take advantage of the extended timeline to comply with new or revised accounting standards applicable to public companies beginning with this Annual Report on Form 10-K. As such, the Company adopted ASU 2016-13 in the fourth quarter of 2021 with an effective date of January 1, 2021. The adoption of the standard did not have a material impact on the Company’s consolidated financial statements.

Leases

In February 2016, the FASB issued ASU 2016-02 to increase transparency and comparability among organizations related to their leasing arrangements. The update requires lessees to recognize most leases on their balance sheets, with the exception of short-term leases if a policy election is made, while recognizing lease expense on their income statements in a manner similar to current GAAP. The guidance also requires entities to disclose key quantitative and qualitative information about its leasing arrangements. The Company adopted the new lease standard on January 1, 2021 using the optional transition method to the modified retrospective approach. Under this transition provision, results for reporting periods beginning on January 1, 2021 are presented under ASC 842 while prior period amounts continue to be reported and disclosed in accordance with the Company's historical accounting treatment under ASC 840.

To reduce the burden of adoption and ongoing compliance with ASC 842, a number of practical expedients and policy elections are available under the new guidance. The Company elected the "package of practical expedients" permitted under the transition guidance, which among other things, did not require reassessment of whether contracts entered into prior to adoption are or contain leases, and allowed carryforward of the historical lease classification for existing leases. The Company has not elected to adopt the "hindsight" practical expedient, and therefore measured the ROU asset and lease liability using the remaining portion of the lease term at adoption on January 1, 2021.

Upon adoption, the Company recorded ROU assets and lease liabilities of approximately $25.0 million and $28.6 million, respectively, related to the Company's operating leases. The adoption of the new lease standard did not materially impact our consolidated statements of operations or consolidated statements of cash flows. See above and Note 7 for more information.

Debt with Conversion and Other Options and Contracts in Entity's Own Equity

In August 2020, the FASB issued ASU 2020-06, which simplifies the accounting for certain financial instruments with characteristics of liabilities and equity. Among other changes, the standard eliminates the beneficial conversion and cash conversion accounting models for convertible instruments. As a result, entities will account for a convertible debt instrument wholly as debt unless the instrument contains features that require bifurcation as a derivative in accordance with ASC Topic 815, *Derivatives and Hedging*, or a convertible debt instrument was issued at a substantial premium. In addition, the amendments also require the if-converted method to be applied for all convertible instruments when calculating diluted earnings per share. The standard is effective for fiscal years beginning after December 15, 2021, including interim periods within those fiscal years. Early adoption is permitted. The Company early adopted the new standard on January 1, 2021. The adoption of the standard did not have a material impact on the Company's consolidated financial statements.

Note 3. Financial instruments fair value

We report financial assets and liabilities and nonfinancial assets and liabilities that are recognized or disclosed at fair value in the consolidated financial statements on a recurring basis in accordance with ASC Topic 820, *Fair Value Measurement* ("ASC 820"). ASC 820 defines fair value as the price that would be received from selling an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. When determining the fair value measurements for assets and liabilities, which are required to be recorded at fair value, we consider the principal or most advantageous market in which we would transact and the market-based risk measurements or assumptions that market participants would use in pricing the asset or liability, such as inherent risk, transfer restrictions, and credit risk.

ASC 820 also establishes a fair value hierarchy, which prioritizes the inputs to valuation techniques used to measure fair value into three levels. Fair value represents the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. GAAP established a hierarchy framework to classify the fair value based on the observability of significant inputs to the measurement. The levels of the fair value hierarchy are as follows:

Level 1: Fair value is determined using an unadjusted quoted price in an active market for identical assets or liabilities.

Level 2: Fair value is estimated using inputs other than quoted prices included within Level 1 that are observable, either directly or indirectly.

Level 3: Fair value is estimated using unobservable inputs that are significant to the fair value of the assets or liabilities.

Assets and liabilities measured at fair value on a recurring basis

The Company invests in money market funds and U.S. Treasuries with original or remaining maturities at the time of purchase of three months or less, which are measured and recorded at fair value on a recurring basis. Money market funds are valued based on quoted market prices in active markets and classified within Level 1 of the fair value hierarchy. U.S. Treasuries include treasury bills that generally mature within 30 days and are classified within Level 1 of the fair value hierarchy.

In addition, the contingent consideration associated with the Digita and cmdReporter acquisitions are measured and recorded at fair value on a recurring basis. The estimated fair value of the contingent payments associated with the Digita acquisition is determined using a Monte Carlo simulation model, which uses Level 3 inputs, including assumptions about the probability of growth of subscription services and the related pricing of the services offered. Significant increases (decreases) in the probability of growth of subscription services as well as the related pricing of the services offered would have resulted in a higher (lower) fair value measurement. The estimated fair value of the contingent payments associated with the cmdReporter acquisition was determined using projected contract wins, which used Level 3 inputs, including assumptions about the probability of closing contracts based on their current stage in the sales process. See Note 5 for more information.

The fair value of these financial instruments were as follows:

	December 31, 2021			
	Level 1	**Level 2**	**Level 3**	**Total**
	(in thousands)			
Cash equivalents:				
Money market funds	$ 146,037	$ —	$ —	$ 146,037
Total cash equivalents	$ 146,037	$ —	$ —	$ 146,037
Contingent consideration:				
Accrued liabilities	$ —	$ —	$ 4,588	$ 4,588
Other liabilities	—	—	5,512	5,512
Total contingent consideration	$ —	$ —	$ 10,100	$ 10,100

	December 31, 2020			
	Level 1	**Level 2**	**Level 3**	**Total**
	(in thousands)			
Cash equivalents:				
Money market funds	$ 100,000	$ —	$ —	$ 100,000
U.S. Treasuries	25,000	—	—	25,000
Total cash equivalents	$ 125,000	$ —	$ —	$ 125,000
Contingent consideration:				
Other liabilities	$ —	$ —	$ 8,200	$ 8,200
Total contingent consideration	$ —	$ —	$ 8,200	$ 8,200

The carrying value of accounts receivable and accounts payable approximate their fair value due to their short maturities and are excluded from the tables above.

The following table provides a summary of the changes in contingent consideration, which is classified as Level 3:

	Years Ended December 31,		
	2021	2020	2019
	(in thousands)		
Balance, beginning of period	$ 8,200	$ 9,200	$ 9,000
Additions	359	—	—
Total (gains) losses included in:			
Net loss	6,037	(1,000)	200
Payments	(4,206)	—	—
Other [1]	(290)	—	—
Balance, end of period	$ 10,100	$ 8,200	$ 9,200

[1] See Note 5 for more information on the reduction to contingent consideration related to the cmdReporter acquisition.

The change in the fair value of the contingent consideration is included in general and administrative expenses in the consolidated statements of operations. The adjustment for the year ended December 31, 2021 primarily reflected updated assumptions about the probability of growth of subscription services.

Fair value measurements of other financial instruments

The following table presents the net carrying value and estimated fair value of the 2026 Notes, which are not recorded at fair value in the consolidated balance sheet:

	December 31, 2021	
	Net Carrying Value	Estimated Fair Value
	(in thousands)	
2026 Notes	$ 362,031	$ 398,044

As of December 31, 2021, the difference between the net carrying value of the 2026 Notes and the principal amount of $373.8 million represents the unamortized debt issuance costs of $11.7 million. See Note 9 for more information. The estimated fair value of the 2026 Notes, which is classified as Level 2, was determined based on quoted bid prices of the 2026 Notes in an over-the-counter market on the last trading day of the reporting period.

Note 4. Equipment and leasehold improvements

Equipment and leasehold improvements were as follows:

	December 31,	
	2021	2020
	(in thousands)	
Computers	$ 14,629	$ 10,529
Software	1,182	666
Furniture/fixtures	4,394	3,417
Leasehold improvements	11,123	10,669
Capital in progress	3,003	698
Equipment and leasehold improvements, gross	34,331	25,979
Less: accumulated depreciation	(16,286)	(10,849)
Equipment and leasehold improvements, net	$ 18,045	$ 15,130

Depreciation expense was $5.8 million, $5.2 million, and $4.4 million for the years ended December 31, 2021, 2020, and 2019, respectively.

Note 5. Acquisitions

Wandera

On July 1, 2021, the Company completed its acquisition of Wandera pursuant to the terms of the Agreement and Plan of Merger, dated as of May 5, 2021 (the “Merger Agreement”). Wandera is a leader in zero trust cloud security and access for mobile devices. As an Apple-first provider of unified cloud security, Wandera expands the Company’s security offering for the enterprise. Building on the Company’s existing capabilities, Wandera adds ZTNA, mobile threat defense, and data policy features to ensure mobile workers can simply and safely access the network resources they need while complying with organizational policies and reducing mobile charges. This acquisition uniquely positions the Company to help IT and security teams confidently protect the devices, data, and applications used by a mobile workforce, while extending the intended Apple experience through the Company’s robust and scalable Apple Enterprise Management platform.

Under the terms of the Merger Agreement, the Company acquired 100% of the voting equity interest in Wandera and paid total cash consideration of $409.3 million. The total consideration consisted of an initial payment of $359.3 million at close and deferred consideration of $50.0 million that was paid in $25.0 million increments on October 1, 2021 and December 15, 2021. The initial payment of $359.3 million included $0.7 million held back as partial security for post-closing true-up adjustments as well as indemnification claims made within one year of the acquisition date. The amount held back was released in the fourth quarter of 2021. The acquisition was initially financed with cash on hand and borrowings under the 2021 Term Loan Facility (as defined in Note 9 below).

Acquisition-related costs were expensed as incurred and were as follows:

	Year Ended December 31, 2021
	(in thousands)
Cost of revenue:	
Subscription	$ 88
Sales and marketing	180
Research and development	1,088
General and administrative	4,896
	$ 6,252

The Company accounted for the acquisition by applying the acquisition method of accounting for business combinations in accordance with ASC Topic 805, *Business Combinations* (“ASC 805”). Accordingly, the purchase price was allocated to the assets acquired and liabilities assumed based on their estimated fair values as of the date of acquisition. In accordance with GAAP, fair value is defined as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. Any residual purchase price is recorded as goodwill. The allocation of the purchase price required management to make significant estimates in determining the fair value of assets acquired and liabilities assumed, especially with respect to intangible assets. These estimates included, but were not limited to:

- future expected cash flows from subscription contracts and acquired developed technologies;
- historical and expected customer attrition rates and anticipated growth in revenue;
- royalty rates applied to acquired developed technology platforms;
  - obsolescence curves and other useful life assumptions, such as the period of time and intended use of acquired intangible assets in the Company’s product offerings;
- discount rates; and
- uncertain tax positions and tax-related valuation allowances.

The final purchase accounting allocations for the Wandera acquisition will be determined within one year from the acquisition date and depend on a number of factors, including finalization of income tax effects of the opening balance sheet. The actual fair values of Wandera’s tax assets and liabilities and resulting goodwill may differ materially from the adjustments set forth in this Form 10-K. The following table summarizes the preliminary allocation of the purchase price to the estimated fair values of the assets acquired and liabilities assumed and reflects measurement period adjustments through December 31, 2021 (in thousands):

Assets acquired:		
Cash and cash equivalents	$	9,605
Trade accounts receivable, net		3,882
Prepaid expenses		900
Other current assets		426
Equipment and leasehold improvements, net		58
Intangible assets acquired		102,050
Operating lease assets		1,474
Deferred tax asset		918
Liabilities assumed:		
Accounts payable		(788)
Accrued liabilities		(3,464)
Income taxes payable		(94)
Deferred revenue		(5,200)
Operating lease liabilities		(1,474)
Deferred tax liability		(9,374)
Goodwill		310,356
Total purchase consideration	$	409,275

During the fourth quarter of 2021, the Company recorded measurement period adjustments including an increase to other current assets of $0.4 million and an increase to deferred tax assets of $0.1 million, resulting in a decrease to goodwill of $0.5 million. The adjustments relate to new information obtained about facts and circumstances that existed as of the acquisition date. The increase to other current assets relates to UK refundable research and development tax credits.

The goodwill represents the excess of the purchase consideration over the fair value of the underlying net identifiable assets. The goodwill recognized in this acquisition is primarily attributable to expected synergies in sales opportunities across complementary products, customers and geographies, and cross-selling opportunities. The goodwill is not deductible for income tax purposes.

The estimated useful lives and fair values of the identifiable intangible assets acquired were as follows:

	Useful Life		Gross Value (in thousands)
Developed technology	6.5 years	$	60,500
Customer relationships	11.0 years		35,600
Order backlog	2.5 years		3,800
Non-competes	2.5 years		1,750
Trademarks	3.0 years		400
Total identifiable intangible assets		$	102,050

The weighted-average useful life of the intangible assets acquired is 7.8 years.

Developed technology represents the estimated fair value of the features underlying the Wandera products as well as the platform supporting Wandera customers. Customer relationships represent the estimated fair value of the underlying relationships with Wandera customers. Order backlog represents the estimated fair value of existing order backlog with Wandera customers. Non-competes represent the estimated fair value of non-compete agreements acquired from Wandera. Trademarks represent the estimated fair value of the Wandera brand.

Wandera contributed revenue and net loss of $10.6 million and $11.3 million, respectively, from the acquisition date through December 31, 2021, excluding the effects of the acquisition and integration costs.

The following unaudited pro forma information presents the combined results of Jamf and Wandera assuming the acquisition was completed on January 1, 2020. As required by ASC 805, these unaudited pro forma results are presented for informational purposes only and are not necessarily indicative of what the actual results of operations of the combined companies would have been had the acquisition occurred at the beginning of the period presented, nor are they indicative of future results of operations. The pro forma results below have been adjusted for the amortization of acquired intangibles, reduction of deferred revenue, deferred commissions, stock-based compensation expense, and additional interest expense. The pro forma results for the year ended December 31, 2021 have also been adjusted to exclude the impact of $6.3 million of acquisition-related costs (pre-tax) incurred by the Company that are directly attributable to the transaction. The adjustments do not reflect the effect of costs or synergies that would have been expected to result from the integration of the acquisition.

Pro forma consolidated revenues and net loss for the years ended December 31, 2021 and 2020, calculated as if Wandera had been acquired as of January 1, 2020, were as follows:

	Years Ended December 31,	
	2021	2020
	(in thousands)	
Revenues	$ 377,996	$ 288,666
Net loss	(83,383)	(44,671)

cmdReporter

On February 26, 2021, the Company entered into an asset purchase agreement with cmdSecurity Inc. (“cmdSecurity”) to acquire certain cmdSecurity assets, including cmdReporter, a suite of security and compliance tools purpose-built for macOS. With cmdReporter, the Company further extends the security capabilities of its expansive Apple Enterprise Management platform. cmdSecurity’s software complements the Company’s existing product offerings. The Company accounted for the acquisition by applying the acquisition method of accounting for business combinations in accordance with ASC 805. The final aggregate purchase price was approximately $3.4 million. The acquisition was funded by the Company’s cash on hand and included future contingent consideration due to the sellers. The goodwill represents the excess of the purchase consideration over the fair value of the underlying net identifiable assets. The goodwill recognized in this acquisition is primarily attributable to the cmdSecurity assembled workforce and was not material. The acquired intangible assets and goodwill are deductible for income tax purposes.

At the time of the acquisition, the contingent consideration was valued at $0.4 million, which was based on the acquired business signing new business or renewing acquired contracts during the 90 days following the close of the acquisition. As of December 31, 2021, the fair value of the contingent consideration was nil as $0.3 million was earned by the acquired business and the unearned portion of $0.1 million was written off during the second quarter of 2021. The Company did not make a cash payment for the earned portion of the liability as the sellers received the cash directly from the customers. As such, the reduction of the liability was offset by a reduction in accounts receivable. See Note 3 for more information on the fair value of the contingent consideration.

Substantially all of the purchase price consideration related to the fair value of the acquired separately identifiable intangibles assets, which related to acquired developed technology and IPR&D. The fair value of the identifiable intangible assets was estimated using the replacement cost method, whereby the components of the acquired intangibles were reviewed to determine the cumulative cost of development for each component, inclusive of a developer’s profit and an entrepreneurial incentive. The cumulative cost of development was not discounted to account for obsolescence factor as the replacement cost accounted for present day development. The acquired developed technology is amortized over its estimated weighted-average useful life, which was determined to be 5.0 years. The IPR&D is an indefinite lived intangible asset that is not amortized, but is evaluated at least annually for impairment. For more information on intangible assets, see Note 6.

Acquisition-related expenses were expensed as incurred and totaled $0.1 million for the year ended December 31, 2021. These expenses were recognized as acquisition costs in general and administrative expenses in the consolidated statement of operations.

The Company allocated the net purchase consideration to the net assets acquired based on their respective fair values at the time of the acquisition as follows (in thousands):

Cash consideration	$	3,041
Contingent consideration		359
Final aggregate purchase price	$	3,400

Intangible assets acquired:		
Developed technology	$	2,630
IPR&D		400
Goodwill		370
Total purchase consideration	$	3,400

Pro forma results of operations for this acquisition were not presented as the effects were not material to our financial results.

Mondada

On October 15, 2020, the Company purchased all of the outstanding membership interests of Mondada. Mondada's Kinobi patch management solutions integrate with Jamf Pro, allowing organizations to extend Jamf Pro's built-in patch management functionality to include all Mac applications within an environment. The Kinobi solutions aim to help organizations stay secure while taking away the headache of manually monitoring patch updates. The Company accounted for the acquisition by applying the acquisition method of accounting for business combinations in accordance with ASC 805. The total purchase price was $2.7 million. The acquisition was funded with cash on hand. Acquisition-related expenses were expensed as incurred and totaled $0.2 million. These expenses were recognized as acquisition costs in general and administrative expenses in the consolidated statement of operations during the year ended December 31, 2020.

Separately identifiable intangible assets acquired consist of developed technology and customer relationships. The fair value of the acquired developed technology was estimated to be $1.0 million using a cost approach, which estimates the cost to recreate the technology. The estimated useful life of the acquired developed technology is 5 years. The fair value of the acquired customer relationships was estimated to be $0.1 million using an excess earnings methodology. The estimated useful life of the acquired customer relationships is 6 years. For more details on the Company's intangible assets, see Note 6.

The following table summarizes the fair value of consideration transferred and the estimated fair values of the assets acquired and liabilities assumed at the date of acquisition (in thousands):

Assets acquired:		
Cash	$	17
Other current assets		71
Long-term assets		12
Deferred tax asset		5
Liabilities assumed:		
Accounts payable and accrued liabilities		(25)
Deferred revenue		(123)
Intangible assets acquired		1,111
Goodwill		1,662
Total purchase consideration	$	2,730

The goodwill recognized in this acquisition is primarily attributable to the workforce acquired and the expected synergies of integrating Mondada's Kinobi patch management solutions with Jamf Pro. The goodwill is not deductible for income tax purposes.

Pro forma results of operations for this acquisition were not presented as the effects were not material to our financial results.

Digita Security LLC

On July 26, 2019, the Company purchased all of the outstanding membership interests of Digita. With this acquisition, Digita's acquired technology complemented the Company's existing Apple management, authentication, and account management solutions with a security offering to provide a more robust suite of capabilities and service offerings in the Apple enterprise market. The Company accounted for the acquisition by applying the acquisition method of accounting for business combinations in accordance with ASC 805. The acquisition aggregate purchase consideration totaled $14.4 million, which included contingent purchase consideration with an estimated fair value of $9.0 million and the remainder provided for with cash. Acquisition-related expenses were expensed as incurred and totaled $0.5 million. These expenses were recognized as acquisition costs in general and administrative expenses in the consolidated statement of operations during the year ended December 31, 2019. Goodwill in the amount of $1.7 million is deductible for income tax purposes.

The maximum contingent consideration is $15.0 million if the acquired business achieves certain revenue milestones by December 31, 2022. In the second quarter of 2021, the acquired business achieved the minimum revenue milestone, which resulted in the Company making a cash payment of $4.2 million to the former owners of the acquired business. An additional cash payment of $4.6 million was made in January 2022. If the acquired business continues to achieve the revenue milestones, an additional cash payment will be made within 30 days of December 31, 2022. See Note 3 for more information on the fair value of the contingent consideration.

In addition, the terms of the purchase agreement provided for additional future payments to the Digita shareholders in the amount of up to $5.0 million if certain key employees continued their employment with the Company through December 31, 2020. The Company paid and recognized compensation expense of $5.0 million in general and administrative expense in the consolidated statement of operations during the year ended December 31, 2020.

The fair value of the acquired developed technology was estimated by discounting future net cash flows to their present value at market-based rates of return (income approach). The estimated useful life of the acquired developed technology is estimated to be 5 years. For more details on the Company's intangible assets, see Note 6.

Pro forma results of operations for this acquisition were not presented as the effects were not material to our financial results.

The following table summarizes the fair value of consideration transferred and the estimated fair values of the assets acquired and liabilities assumed at the date of acquisition (in thousands):

Assets acquired:		
Cash	$	512
Other current assets		1
Long-term assets		12
Liabilities assumed:		
Accounts payable and accrued liabilities		(119)
Intangible assets acquired		3,300
Goodwill		10,673
Total purchase consideration	$	14,379

ZuluDesk B.V.

On February 1, 2019, the Company purchased all of the outstanding membership units of ZuluDesk whose products are designed to offer a cost-effective mobile device management system for today's modern digital classroom. ZuluDesk's software complement the Company's existing product offerings. The Company accounted for the acquisition by applying the acquisition method of accounting for business combinations in accordance with ASC 805. The final aggregate purchase price was approximately $38.6 million. This acquisition was funded by term debt and borrowings under a revolving line of credit. The goodwill represents the excess of the purchase consideration over the fair value of the underlying net identifiable assets. The goodwill recognized in this acquisition is primarily attributable to the offerings in mobile device management of ZuluDesk and its assembled workforce. The goodwill is not deductible for income tax purposes.

Acquisition-related expenses were expensed as incurred and totaled $0.9 million for the year ended December 31, 2019. These expenses were recognized as acquisition costs in general and administrative expenses in the consolidated statement of operations. ZuluDesk contributed revenue and net loss of $4.5 million and $0.3 million, respectively, from February 1, 2019 through December 31, 2019, excluding the effects of the acquisition and integration costs. The Company used borrowings under the 2017 Term Loan Facility to complete the acquisition.

The Company allocated the net purchase consideration to the net assets acquired, including finite-lived intangible assets, based on their respective fair values at the time of the acquisition as follows (in thousands):

Assets acquired:		
Cash	$	3,325
Other current assets		1,306
Long-term assets		154
Liabilities assumed:		
Accounts payable and accrued liabilities		(419)
Deferred revenue		(3,050)
Deferred tax liability		(2,996)
Intangible assets acquired		12,310
Goodwill		28,000
Total purchase consideration	$	38,630

The estimated useful lives and fair values of the identifiable intangible assets acquired were as follows:

	Useful Life	Gross Value (in thousands)	
Customer relationships	8.0 years	$	7,900
Developed technology	5.0 years		4,300
Non-competes	2.0 years		90
Trademarks	0.9 years		20
Total identifiable intangible assets		$	12,310

The weighted-average useful life of the intangible assets acquired is 7 years.

The fair value of the separately identifiable intangible assets acquired was estimated by applying an income approach. Under the income approach, an intangible asset's fair value is equal to the present value of future economic benefits to be derived from ownership of the asset. Indications of value are developed by discounting future net cash flows to their present value at market-based rates of return. For more details on the intangible assets, see Note 6.

Pro forma results are not presented for 2019 as the acquisition occurred in February and would not be materially different from the actual results of operations for the year ended December 31, 2019.

Note 6. Goodwill and other intangible assets

The change in the carrying amount of goodwill was as follows:

	Years Ended December 31,					
	2021		2020 (in thousands)		2019	
Goodwill, beginning of period	$	541,480	$	539,818	$	501,145
Goodwill acquired		311,203		1,662		38,673
Measurement period adjustments [1]		(477)		—		—
Foreign currency translation adjustment		(6,472)		—		—
Goodwill, end of period	$	845,734	$	541,480	$	539,818

[1] Represents the measurement period adjustments related to the Wandera acquisition. See Note 5 for more information.

The gross carrying amount and accumulated amortization of intangible assets other than goodwill were as follows:

	December 31, 2021				
	Useful Life	Gross Value	Accumulated Amortization	Net Carrying Value	Weighted-Average Remaining Useful Life
			(in thousands)		
Trademarks	3 - 8 years	$ 34,690	$ 17,788	$ 16,902	3.8 years
Customer relationships	2 - 12 years	249,495	75,600	173,895	8.3 years
Developed technology	5 - 6.5 years	116,193	47,142	69,051	5.1 years
Non-competes	2 - 2.5 years	1,797	439	1,358	2.0 years
Order backlog	2.5 years	3,745	758	2,987	2.0 years
Total intangible assets subject to amortization		405,920	141,727	264,193	
IPR&D	Indefinite	400	—	400	
Total intangible assets		$ 406,320	$ 141,727	$ 264,593	

	December 31, 2020				
	Useful Life	Gross Value	Accumulated Amortization	Net Carrying Value	Weighted-Average Remaining Useful Life
			(in thousands)		
Trademarks	8 years	$ 34,320	$ 13,454	$ 20,866	4.8 years
Customer relationships	2 - 12 years	214,428	55,810	158,618	8.7 years
Developed technology	5 years	54,563	31,173	23,390	2.3 years
Non-competes	2 years	90	86	4	0.1 years
Total intangible assets		$ 303,401	$ 100,523	$ 202,878	

The gross value and net carrying value in the table above include a cumulative foreign currency translation adjustment of $(2.1) million as of December 31, 2021. The cumulative foreign currency translation adjustment for accumulated amortization was not material as of December 31, 2021.

Amortization expense was $41.3 million, $33.3 million, and $32.7 million for the years ended December 31, 2021, 2020, and 2019, respectively.

Future estimated amortization expense as of December 31, 2021 is as follows (in thousands):

Years ending December 31:	
2022	$ 47,303
2023	39,517
2024	35,984
2025	34,859
2026	30,538
Thereafter	75,992
Total amortization expense	$ 264,193

The amounts in the table above are estimates. The actual amount of amortization expense may differ from the estimated amount due to additional intangible assets acquired, changes in foreign currency exchange rates, impairment of intangible assets, accelerated amortization of intangible assets, and other events.

There were no impairments to goodwill or intangible assets recorded for the years ended December 31, 2021, 2020, and 2019.

Note 7. Leases

The Company leases office facilities and vehicles under operating lease agreements that have initial terms ranging from 1 to 9 years. Some leases include one or more options to renew, generally at our sole discretion, with renewal terms that can extend the lease term up to 10 years. In addition, certain leases contain termination options, where the rights to terminate are held by either the Company, the lessor, or both parties. These options to extend or terminate a lease are included in the lease terms when it is reasonably certain that the Company will exercise that option. The Company's leases generally do not contain any material restrictive covenants or residual value guarantees. The Company also leases office equipment under a finance lease agreement with a term of 4 years. The Company's finance lease was not material to the consolidated financial statements as of December 31, 2021.

Supplemental balance sheet information related to the Company's operating leases is as follows:

Leases	Balance Sheet Classification	December 31, 2021 (in thousands)
Assets		
Operating lease assets	Other assets	$ 21,600
Liabilities		
Operating lease liabilities - current	Accrued liabilities	$ 5,251
Operating lease liabilities - non-current	Other liabilities	20,086
Total operating lease liabilities		$ 25,337

The weighted-average remaining term of the Company's operating leases was 5.9 years as of December 31, 2021. The weighted-average discount rate used to measure the present value of the operating lease liabilities was 3.5% as of December 31, 2021.

The components of lease expense were as follows:

	Year Ended December 31, 2021
Operating lease cost	$ 5,935
Short-term lease cost	272
Variable lease cost	1,943
Total lease expense	$ 8,150

Operating lease cost is recognized on a straight-line basis over the lease term. The Company leases certain office facilities with a related party, including the office space in Eau Claire, Wisconsin. Operating lease cost with related parties was $1.1 million for the year ended December 31, 2021.

Total lease expense, including the Company's share of the lessors' operating expenses, was $5.0 million and $4.3 million for the years ended December 31, 2020 and 2019, respectively. Lease expense with related parties, including the Company's share of the lessors' operating expenses, was $1.1 million and $1.3 million for the years ended December 31, 2020 and 2019, respectively.

For the year ended December 31, 2021, operating cash flows included $5.9 million of cash paid for operating lease liabilities.

Maturities of the Company’s operating lease liabilities as of December 31, 2021 were as follows:

	Operating Leases (in thousands)
Years ending December 31:	
2022	$ 6,036
2023	5,645
2024	4,584
2025	2,519
2026	2,507
Thereafter	6,975
Total lease payments	28,266
Less: imputed interest	2,929
Total present value of lease liabilities	$ 25,337

Approximate future minimum lease payments for non-cancelable operating leases with unrelated and related parties as of December 31, 2020 under ASC 840 were as follows:

	Unrelated	Related	Total
		(in thousands)	
Years ending December 31:			
2021	$ 4,758	$ 1,079	$ 5,837
2022	4,294	1,090	5,384
2023	4,146	1,101	5,247
2024	3,705	832	4,537
2025	2,551	—	2,551
Thereafter	9,482	—	9,482
	$ 28,936	$ 4,102	$ 33,038

Note 8. Commitments and contingencies

Hosting Services and Other Support Software Agreements

The Company has various contractual agreements for hosting services and other support software. Certain of these agreements are with Vista affiliates and, therefore, are considered related party transactions. See Note 15 for more information. The below table reflects the minimum payments under these agreements with unrelated and related parties as of December 31, 2021:

	Unrelated	Related	Total
		(in thousands)	
Years ending December 31:			
2022	$ 19,165	$ 693	$ 19,858
2023	4,100	295	4,395
2024	104	302	406
2025	—	308	308
2026	—	—	—
Thereafter	—	—	—
	$ 23,369	$ 1,598	$ 24,967

Leases

See Note 7 for information on the Company’s future commitments related to its lease arrangements.

Contingencies

In 2021, the Company was engaged in discussions with an entity regarding the entity's patented technology and allegations regarding the Company's infringement of that technology. During the fourth quarter of 2021, the Company settled this matter and paid the entity $5.0 million. The Company recognized the expense within general and administrative expenses during the year ended December 31, 2021, of which $4.2 million was accrued for in the second quarter of 2021.

From time to time, the Company may be subject to various claims, charges, and litigation. The Company records a liability when it is both probable that a liability has been incurred and the amount of the loss can be reasonably estimated. The Company maintains insurance to cover certain actions and believes that resolution of such claims, charges, or litigation will not have a material impact on the Company's financial position, results of operations, or liquidity. The Company had no liabilities for contingencies as of December 31, 2021 and 2020.

Note 9. Debt

Convertible Senior Notes

On September 17, 2021, the Company issued $373.8 million aggregate principal amount of 0.125% 2026 Notes in a private offering. The 2026 Notes were issued pursuant to the 2026 Notes Indenture, dated September 17, 2021, among the Company, JAMF Software, LLC, as subsidiary guarantor, and U.S. Bank National Association, as trustee. The 2026 Notes are general senior, unsecured obligations of the Company and mature on September 1, 2026, unless earlier converted, redeemed, or repurchased. The 2026 Notes bear interest at a rate of 0.125% per year, payable semiannually in arrears on March 1st and September 1st of each year, beginning on March 1, 2022. The Company recorded the principal amount of the 2026 Notes, net of issuance costs, as a liability in the consolidated balance sheet in accordance with ASU 2020-06, which the Company early adopted on January 1, 2021.

The Company's net proceeds from the offering were approximately $361.4 million after deducting the initial purchasers' discounts and commissions and the offering expenses paid by the Company. The Company used (i) approximately $250.0 million of the net proceeds to repay the Company's 2021 Term Loan Facility (as defined and described below) and to pay any associated prepayment penalties and accrued and unpaid interest to the date of repayment and (ii) approximately $36.0 million of the net proceeds to fund the cost of entering into the Capped Calls (as defined and described below), and will use the remainder of the net proceeds for general corporate purposes, which may include working capital, capital expenditures, and potential acquisitions and strategic transactions.

The 2026 Notes are convertible at the option of the holders at any time prior to the close of business on the business day immediately preceding March 1, 2026, only under the following circumstances: (1) during any calendar quarter commencing after the calendar quarter ending on December 31, 2021 (and only during such calendar quarter), if the last reported sale price of the Company's common stock for at least 20 trading days (whether or not consecutive) during a period of 30 consecutive trading days ending on, and including, the last trading day of the immediately preceding calendar quarter is greater than or equal to 130% of the conversion price on each applicable trading day; (2) during the five business day period after any ten consecutive trading day period (the "measurement period") in which the trading price (as defined in the 2026 Notes Indenture) per $1,000 principal amount of the 2026 Notes for each trading day of the measurement period was less than 98% of the product of the last reported sale price of the Company's common stock and the conversion rate for the 2026 Notes on each such trading day; (3) if the Company calls such 2026 Notes for redemption, at any time prior to the close of business on the scheduled trading day immediately preceding the redemption date, but only with respect to the 2026 Notes called (or deemed called) for redemption; and (4) upon the occurrence of specified corporate events as set forth in the 2026 Notes Indenture. On or after March 1, 2026 until the close of business on the second scheduled trading day immediately preceding the maturity date (September 1, 2026), holders of the 2026 Notes may convert all or any portion of their 2026 Notes at any time, regardless of the foregoing conditions. Upon conversion, the Company may satisfy its conversion obligation by paying or delivering, as the case may be, cash, shares of the Company's common stock or a combination of cash and shares of the Company's common stock, at the Company's election, in the manner and subject to the terms and conditions provided in the 2026 Notes Indenture. As of December 31, 2021, the conditions allowing holders of the 2026 Notes to convert were not met.

The initial conversion rate for the 2026 Notes is 20.0024 shares of the Company's common stock per $1,000 principal amount of 2026 Notes, which is equivalent to an initial conversion price of approximately $49.99 per share of common stock. The initial conversion price of the 2026 Notes represents a premium of approximately 40.0% to the last reported sale price of the Company's common stock on the NASDAQ Global Select Market on September 14, 2021. The conversion rate for the 2026 Notes is subject to adjustment under certain circumstances in accordance with the terms of the 2026 Notes Indenture. In addition, following certain corporate events that occur prior to the maturity date of the 2026 Notes or if the Company delivers a notice of redemption in respect of the 2026 Notes, the Company will, under certain circumstances, increase the conversion rate of the 2026 Notes for a holder who elects to convert its 2026 Notes (or any portion thereof) in connection with such a corporate event or convert its 2026 Notes called (or deemed called) for redemption during the related redemption period (as defined in the 2026 Notes Indenture), as the case may be.

The Company may not redeem the 2026 Notes prior to September 6, 2024. The Company may redeem for cash all or any portion of the 2026 Notes, at its option, on or after September 6, 2024, if the last reported sale price of the common stock has been at least 130% of the conversion price for the 2026 Notes then in effect for at least 20 trading days (whether or not consecutive) during any 30 consecutive trading day period (including the last trading day of such period) ending on, and including, the trading day immediately preceding the date on which the Company provides notice of redemption at a redemption price equal to 100% of the principal amount of the 2026 Notes to be redeemed, plus accrued and unpaid interest, to, but excluding, the redemption date. If the Company redeems less than all the outstanding 2026 Notes, at least $50.0 million aggregate principal amount of 2026 Notes must be outstanding and not subject to redemption as of the date of the relevant notice of redemption. No sinking fund is provided for the 2026 Notes.

If the Company undergoes a fundamental change (as defined in the 2026 Notes Indenture), holders may require, subject to certain conditions and exceptions, the Company to repurchase for cash all or any portion of their 2026 Notes at a fundamental change repurchase price equal to 100% of the principal amount of the 2026 Notes to be repurchased, plus accrued and unpaid interest, to, but excluding, the fundamental change repurchase date.

The 2026 Notes Indenture includes customary covenants and sets forth certain events of default after which the 2026 Notes may be declared immediately due and payable and sets forth certain types of bankruptcy or insolvency events of default involving the Company or its significant subsidiaries after which the 2026 Notes become automatically due and payable.

The following table sets forth the interest expense related to the 2026 Notes for the year ended December 31, 2021 (in thousands):

Contractual interest expense	$	135
Amortization of issuance costs		711

In the third quarter of 2021, the Company recorded debt issuance costs of $12.4 million related to the issuance of the 2026 Notes as a reduction to the liability in the consolidated balance sheet. Debt issuance costs are amortized to interest expense over the term of the 2026 Notes using the effective interest rate method. The effective interest rate on the 2026 Notes was 0.81% for the year ended December 31, 2021.

Capped Calls

On September 14, 2021, concurrently with the pricing of the 2026 Notes, and on September 17, 2021, concurrently with the initial purchasers' exercise of their option to purchase additional 2026 Notes, the Company also entered into privately negotiated capped call transactions (the "Capped Calls") with third-party banks. The Capped Calls each have an initial strike price of approximately $49.99 per share, subject to certain adjustments, which corresponds to the initial conversion price of the 2026 Notes. The Capped Calls have initial cap prices of $71.42 per share, subject to certain adjustments. The Capped Calls cover, subject to anti-dilution adjustments, approximately 7.5 million shares of the Company's common stock. The Capped Calls are generally intended to reduce or offset the potential dilution to the common stock upon any conversion of the 2026 Notes with such reduction or offset, as the case may be, subject to a cap based on the cap price. The Company used approximately $36.0 million of the net proceeds from the issuance and sale of the 2026 Notes to purchase the Capped Calls. The Company recorded the Capped Calls as a reduction to additional paid-in capital in the consolidated balance sheet. The Capped Calls are subject to either adjustment or termination upon the occurrence of specified extraordinary events affecting the Company, including a merger event, a tender offer, and a nationalization, insolvency or delisting involving the Company. In addition, the Capped Calls are subject to certain specified additional disruption events that may give rise to terminations of the Capped Calls, including changes in law, failures to deliver, and hedging disruptions.

Credit Agreements

On July 27, 2020, the Company entered into a secured credit agreement (the "2020 Credit Agreement") for an initial revolving credit facility of $150.0 million (the "2020 Revolving Credit Facility"), which may be increased or decreased under specific circumstances, with a $25.0 million letter of credit sublimit and a $50.0 million alternative currency sublimit. In addition, the 2020 Credit Agreement provides for the ability of the Company to request incremental term loan facilities, in a minimum amount of $5.0 million for each facility. The maturity date of the 2020 Credit Agreement is July 27, 2025. The 2020 Credit Agreement contains customary representations and warranties, affirmative covenants, reporting obligations, negative covenants, and events of default. We were in compliance with such covenants as of both December 31, 2021 and 2020. As of both December 31, 2021 and 2020, we had $1.0 million of letters of credit outstanding under our 2020 Revolving Credit Facility.

In connection with the closing of the Wandera acquisition on July 1, 2021, the Company entered into the Incremental Facility Amendment No. 1 (the “Credit Agreement Amendment”), which amended the Company’s existing 2020 Credit Agreement. The Credit Agreement Amendment provided for a new 364-day term loan facility (the “2021 Term Loan Facility”) in an aggregate principal amount of $250.0 million on substantially the same terms and conditions as the Company’s existing 2020 Revolving Credit Facility. The Company repaid the principal amount of the 2021 Term Loan Facility on September 23, 2021 with proceeds from the issuance and sale of the 2026 Notes. The Company accounted for this transaction as a debt extinguishment and recorded debt extinguishment costs of $0.4 million for the write-off of remaining debt issuance costs.

In the third quarter of 2020, the Company recorded debt issuance costs of $1.3 million related to the 2020 Credit Agreement. In the second quarter of 2021, the Company recorded debt issuance costs of $0.7 million related to the Credit Agreement Amendment. As of December 31, 2021 and 2020, debt issuance costs related to the 2020 Credit Agreement of $0.9 million and $1.1 million, respectively, are included in other assets in the consolidated balance sheets.

The interest rates applicable to revolving borrowings under the 2020 Credit Agreement are, at the Company’s option, either (i) a base rate, which is equal to the greater of (a) the Prime Rate, (b) the Federal Funds Effective Rate plus 0.50% and (c) the Adjusted LIBO Rate (subject to a floor) for a one month interest period (each term as defined in the 2020 Credit Agreement) plus 1.00%, or (ii) the Adjusted LIBO Rate (subject to a floor) equal to the LIBO Rate for the applicable interest period multiplied by the Statutory Reserve Rate, plus in the case of each of clauses (i) and (ii), the Applicable Rate. The Applicable Rate (i) for base rate loans range from 0.25% to 1.00% per annum and (ii) for LIBO Rate loans range from 1.25% to 2.00% per annum, in each case, based on the Senior Secured Net Leverage Ratio (as such term is defined in the 2020 Credit Agreement). Base rate borrowings may only be made in dollars. The Company pays a commitment fee during the term of the 2020 Credit Agreement ranging from 0.20% to 0.35% per annum of the average daily undrawn portion of the revolving commitments based on the Senior Secured Net Leverage Ratio. For the years ended December 31, 2021 and 2020, the Company accrued $0.3 million and $0.1 million, respectively, for the commitment fee.

On November 13, 2017, the Company entered into the 2017 Credit Agreement. The 2017 Credit Agreement provided for the 2017 Term Loan Facility of $175.0 million with a maturity date of November 13, 2022 and a revolving credit facility (the “2017 Revolving Credit Facility”) of $15.0 million with a maturity date of November 13, 2022. On January 30, 2019, the Company entered into a First Amended Credit Agreement, which increased the 2017 Term Loan Facility to $205.0 million. The First Amended Credit Agreement provided for additional funding for the ZuluDesk acquisition. On April 13, 2019, the Company entered into a Second Amended Credit Agreement, which adjusted the rate for both the 2017 Term Loans and 2017 Credit Facilities. Upon the closing of our IPO, the Company repaid the 2017 Credit Agreement. See Note 1 for more information.

Note 10. Share-based compensation

The Company's equity incentive plans provide for granting various share-based awards to eligible employees, non-employee directors, and consultants of the Company. In addition, the Company offers an employee stock purchase plan to eligible employees.

The Company recognized stock-based compensation expense for all equity arrangements as follows:

	Years Ended December 31,		
	2021	2020	2019
		(in thousands)	
Cost of revenue:			
Subscription	$ 3,755	$ 732	$ 194
Services	594	139	—
Sales and marketing	10,938	1,748	460
Research and development	10,512	1,533	394
General and administrative	10,006	2,591	1,413
	$ 35,805	$ 6,743	$ 2,461

The Company recognized a tax benefit related to stock-based compensation of $12.8 million, $3.8 million, and $0.5 million for the years ended December 31, 2021, 2020, and 2019, respectively.

Equity Incentive Plans

On July 21, 2020, the Company adopted the Jamf Holding Corp. Omnibus Incentive Plan (the "2020 Plan"). The 2020 Plan provides for grants of (i) stock options, (ii) stock appreciation rights, (iii) restricted shares, (iv) performance awards, (v) other share-based awards, and (vi) other cash-based awards to eligible employees, non-employee directors, and consultants of the Company. We initially reserved 14,800,000 shares of our common stock for issuance under the 2020 Plan. The total number of shares reserved for issuance under the 2020 Plan increases on January 1st of each of the first 10 calendar years during the term of the 2020 Plan by the lesser of: (i) a number of shares of our common stock equal to 4% of the total number of shares of our common stock outstanding on December 31st of the preceding calendar year or (ii) a number of shares of our common stock as determined by our Board. The maximum number of shares of common stock available for issuance under the 2020 Plan was 19,479,699 shares as of January 1, 2021. As of December 31, 2021, 12,058,729 shares of common stock are reserved for additional grants under the 2020 Plan.

The 2017 Stock Option Plan ("2017 Option Plan") became effective November 13, 2017 upon the approval of the Board and, prior to the adoption of the 2020 Plan, served as the umbrella plan for the Company's stock-based and cash-based incentive compensation program for its officers and other eligible employees. The aggregate number of shares of common stock that may be issued under the 2017 Option Plan may not exceed 8,470,000 shares. As of December 31, 2021, 128,928 shares of common stock are reserved for additional grants under the 2017 Option Plan. All stock options previously granted by the Company were at an exercise price at or above the estimated fair market value of the Company's common stock as of the grant date. No options were granted during the year ended December 31, 2021.

Return Target Options

The table below summarizes return target options activity for the years ended December 31, 2021, 2020, and 2019:

	Options	Weighted-Average Exercise Price	Weighted-Average Remaining Contractual Term (Years)	Aggregate Intrinsic Value (in thousands)
Outstanding, January 1, 2019	2,200,189	$ 5.49	8.9	$ —
Granted	1,653,209	8.29		—
Exercised	—	—		—
Forfeitures	(165,734)	5.49		—
Outstanding, December 31, 2019	3,687,664	6.75	8.8	29,908
Granted	—	—		—
Exercised	—	—		—
Forfeitures	—	—		—
Outstanding, December 31, 2020	3,687,664	6.75	7.8	85,444
Granted	—	—		—
Exercised	—	—		—
Forfeitures	—	—		—
Outstanding, December 31, 2021	3,687,664	$ 6.75	6.8	$ 115,278
Options exercisable at December 31, 2021	—	$ —	—	$ —
Vested or expected to vest at December 31, 2021	—	$ —	—	$ —

The aggregate intrinsic value in the table above represents the total intrinsic value that would have been received by the optionholders had all optionholders exercised their options on the last day of the period. No return target options vested during the years ended December 31, 2021, 2020, and 2019. There was approximately $33.0 million of unrecognized compensation expense related to these return target options as of December 31, 2021. See Note 2 for the Company's policy on recognizing expense for return target options.

The Company used the following assumptions in the Modified Black-Scholes option pricing model to estimate the fair value of return target options modified during the year ended December 31, 2020 and granted during the year ended December 31, 2019:

	Years Ended December 31,	
	2020	2019
Expected life of options	1.50 years	3 - 3.25 years
Expected volatility	55%	50% - 55%
Risk-free interest rates	0.16%	1.49% - 1.67%
Expected dividend yield	—%	—%
Weighted-average grant-date fair value	$8.95	$6.02

Service-Based Options

The table below summarizes the service-based option activity for the years ended December 31, 2021, 2020, and 2019:

	Options	Weighted-Average Exercise Price	Weighted-Average Remaining Contractual Term (Years)	Aggregate Intrinsic Value (in thousands)
Outstanding, January 1, 2019	4,245,709	$ 5.51	8.9	$ —
Granted	212,668	8.21		—
Exercised	(168,391)	5.49		256
Forfeitures	(216,700)	5.49		—
Outstanding, December 31, 2019	4,073,286	5.65	8.1	37,520
Granted	—	—		—
Exercised	(526,460)	5.67		13,899
Forfeitures	—	—		—
Outstanding, December 31, 2020	3,546,826	5.65	7.1	86,098
Granted	—	—		—
Exercised	(1,903,560)	5.62		54,716
Forfeitures	—	—		—
Outstanding, December 31, 2021	1,643,266	$ 5.68	6.1	$ 53,129
Options exercisable at December 31, 2021	1,434,887	$ 5.49	5.9	$ 46,658
Vested or expected to vest at December 31, 2021	1,643,266	$ 5.68	6.1	$ 53,129

The aggregate intrinsic value in the table above represents the total intrinsic value that would have been received by the optionholders had all optionholders exercised their options on the last date of the period. Service-based options vest over four years with 25% vesting one year after grant and the remainder vesting ratably on a quarterly basis thereafter. The total fair value of service-based options vested during the years ended December 31, 2021, 2020, and 2019 was $2.6 million, $2.6 million, and $2.4 million, respectively. There was $1.0 million of unrecognized compensation expense related to service-based options that is expected to be recognized over a weighted-average period of 1.6 years as of December 31, 2021. The Company issues new shares when service-based options are exercised. All service-based options outstanding under the Company's option plans have exercise prices equal to the fair value of the Company's stock on the grant date. All awards expire after 10 years.

The Company used the following assumptions in the Black-Scholes option pricing model to estimate the fair value of service-based options granted during the year ended December 31, 2019:

	Year Ended December 31, 2019
Expected life of options	6.25 years
Expected volatility	45.1% - 45.3%
Risk-free interest rates	1.6% - 1.7%
Expected dividend yield	—%
Weighted-average grant-date fair value	$7.29

Restricted Stock Units

Restricted stock unit activity for the years ended December 31, 2021, 2020, and 2019 was as follows:

	Units	Weighted-Average Grant Date Fair Value (per share)
Outstanding, January 1, 2019	25,520	$ 5.87
Granted	36,520	12.60
Vested	(25,520)	5.87
Forfeited	—	—
Outstanding, December 31, 2019	36,520	12.60
Granted	1,317,719	26.33
Vested	(36,520)	12.60
Forfeited	(24,612)	26.00
Outstanding, December 31, 2020	1,293,107	26.34
Granted	6,339,974	32.51
Vested	(530,032)	30.57
Forfeited	(212,111)	29.74
Outstanding, December 31, 2021	6,890,938	$ 31.59

RSUs under the 2020 Plan vest ratably over four years. RSUs under the 2017 Option Plan vest 100% on the one year anniversary of the date of the grant. There was $197.1 million of unrecognized compensation expense related to unvested RSUs that is expected to be recognized over a weighted-average period of 3.5 years as of December 31, 2021. The total fair value of RSUs vested during the years ended December 31, 2021, 2020, and 2019 was $16.2 million, $0.5 million, and $0.2 million, respectively.

Employee Stock Purchase Plan

On May 25, 2021, the Company adopted the 2021 ESPP. The 2021 ESPP provides for six-month offering periods beginning May 1st and November 1st of each fiscal year and provides eligible employees the opportunity to purchase shares of the Company's common stock through accumulated payroll deductions at a 15% discount. On each purchase date, the purchase price of the shares is the lesser of (i) 85% of the fair market value of the Company's common stock on the first day of trading of the offering period (the "grant date") or (ii) 85% of the fair market value of the Company's common stock on the last day of trading of the offering period. Payroll deductions are limited to 15% of an employee's eligible compensation. The number of shares an employee may purchase during any offering period is limited to an aggregate value of $25,000 per calendar year based on the stock price on the grant date. During the year ended December 31, 2021, the Company withheld, at the employee's request, $1.2 million of eligible employee compensation, which is included in accrued liabilities in the consolidated balance sheet, for purchases of common stock under the 2021 ESPP.

As of December 31, 2021, 3,000,000 shares of our common stock are reserved for future issuance under the 2021 ESPP. The total number of shares reserved for issuance under the 2021 ESPP will increase on January 1st of each of the first 10 calendar years after the first offering date by a number of shares of our common stock equal to 1% of the total number of shares of our common stock outstanding on December 31st of the preceding calendar year. The aggregate number of shares issued over the term of the 2021 ESPP will not exceed 16,000,000 shares. No shares of common stock were issued under the 2021 ESPP during the year ended December 31, 2021.

The grant date fair value of shares issued under the 2021 ESPP equals the sum of (i) 15% of the Company's quoted stock price at the grant date and (ii) 85% of the fair market value of a stock option using the Black-Scholes option pricing model. The average grant date fair value for the offering period that commenced in 2021 was $11.97 per share. The Company used the following assumptions in the Black-Scholes option pricing model:

	Year Ended December 31, 2021
Expected term	0.5 years
Expected volatility	40.31%
Risk-free interest rate	0.06%
Expected dividend yield	—%

There was $0.7 million of unrecognized compensation expense related to the 2021 ESPP that is expected to be recognized over a period of four months as of December 31, 2021.

Note 11. Net loss per share

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

	Years Ended December 31,		
	2021	2020	2019
	(in thousands, except share and per share amounts)		
Numerator:			
Net loss	$ (75,189)	$ (24,082)	$ (34,345)
Denominator:			
Weighted-average shares used to compute net loss per share, basic and diluted	118,276,462	108,908,597	102,752,092
Basic and diluted net loss per share	$ (0.64)	$ (0.22)	$ (0.33)

Basic net loss per share is computed by dividing the net loss by the weighted-average number of common shares outstanding for the period. Because we have reported a net loss for the years ended December 31, 2021, 2020, and 2019, the number of shares used to calculate diluted net loss per common share is the same as the number of shares used to calculate basic net loss per common share because the potentially dilutive shares would have been antidilutive if included in the calculation.

The following potentially dilutive securities outstanding have been excluded from the computation of diluted weighted-average shares outstanding because such securities have an antidilutive impact due to losses reported:

	Years Ended December 31,		
	2021	2020	2019
Stock options outstanding	5,330,930	7,234,490	7,760,950
Unvested restricted stock units	6,890,938	1,293,107	36,520
Shares related to the 2026 Notes	7,475,897	—	—
Shares committed under the 2021 ESPP	108,331	—	—
Total potentially dilutive securities	19,806,096	8,527,597	7,797,470

Note 12. Employee benefit plans

Employees located in the U.S. are generally eligible to participate in the JAMF Software 401(k) P/S Plan (the "401(k) Plan"). The 401(k) Plan allows eligible employees to defer a percentage of their annual compensation as defined in the 401(k) Plan on a pre-tax or after-tax basis up to the maximum amount allowed by the Internal Revenue Service. The Company contributes an amount equal to 3 percent of each participant's eligible compensation each pay period regardless of whether the participant makes elective deferrals. The Company made contributions to the 401(k) Plan of $4.1 million, $3.2 million, and $2.5 million for the years ended December 31, 2021, 2020, and 2019, respectively.

Employees outside of the U.S. who are not covered by the 401(k) Plan may be covered by local defined contribution plans, which are subject to applicable laws and rules of the country where the plans are administered. The Company made contributions to defined contributions plans outside of the U.S. of $1.5 million, $0.4 million, and $0.3 million for the years ended December 31, 2021, 2020, and 2019, respectively.

Note 13. Long-term incentive plan

In 2018, the Company established a long-term incentive plan ("LTIP") which provided for cash compensation to certain employees upon achievement of the same conditions of the Company's return target options. In conjunction with the IPO, the conditions of the LTIP were modified to also vest following an IPO and registration and sale of shares by Vista provided that Vista achieves a cash return on its equity investment in the Company equaling or exceeding $1.515 billion. In the third quarter of 2021, the Company offered employees with LTIP grants the opportunity to convert those awards into RSUs under the 2020 Plan. Upon conversion, 50% of the RSUs vested immediately and the remaining 50% vest on the one year anniversary of the grant date, provided the employee remains continuously employed by the Company through the vesting date. All employees elected to convert their outstanding LTIP grants into RSUs, resulting in grants totaling 413,234 shares.

The conversion of the previously outstanding LTIP grants into RSUs resulted in the recognition of $9.8 million of stock-based compensation expense during the year ended December 31, 2021. The expense on the unvested RSUs is recognized on a straight-line basis over the vesting period.

Note 14. Income taxes

The domestic and foreign components of loss before income tax benefit were as follows:

	Years Ended December 31,		
	2021	2020	2019
	(in thousands)		
Domestic	$ (71,537)	$ (34,829)	$ (43,544)
Foreign	(8,441)	792	(834)
Loss before income tax benefit	$ (79,978)	$ (34,037)	$ (44,378)

The components of income tax expense (benefit) attributable to continuing operations were as follows:

	Years Ended December 31,		
	2021	2020	2019
	(in thousands)		
Current:			
Federal	$ —	$ (551)	$ (7)
State	217	(73)	138
Foreign	638	987	1,013
Total current expense	855	363	1,144
Deferred:			
Federal	(487)	(10,657)	(9,341)
State	(1,145)	(1,173)	(1,209)
Foreign	(4,012)	1,512	(627)
Total deferred benefit	(5,644)	(10,318)	(11,177)
Total income tax benefit	$ (4,789)	$ (9,955)	$ (10,033)

The income tax benefit differs from the amount of income tax benefit determined by applying the statutory U.S. federal income tax rate to pretax loss due to the following:

	Years Ended December 31,		
	2021	2020	2019
Statutory U.S. federal income tax rate	21.0 %	21.0 %	21.0 %
State income tax benefit, net of federal tax effect	3.1	4.7	2.9
Permanent differences	—	(0.7)	(0.5)
Foreign rate differential	(0.5)	(0.5)	0.2
Remeasurement gain/loss	0.7	(2.0)	0.5
Tax credits	2.3	3.4	2.0
Valuation allowance	(24.4)	(2.3)	(2.0)
Stock-based compensation	12.2	6.9	—
Transaction costs	(0.8)	(0.5)	(0.4)
Deferred rate change	0.9	(1.0)	(0.3)
GILTI inclusion	—	—	(0.5)
Section 162(m)	(9.4)	—	—
Other	0.9	0.2	(0.3)
Effective tax rate	6.0 %	29.2 %	22.6 %

Significant components of the Company's deferred income tax assets and liabilities were as follows:

	December 31,	
	2021	2020
	(in thousands)	
Deferred tax assets:		
Allowance for doubtful accounts	$ 95	$ 113
Accrued compensation	4,529	3,119
Deferred revenue	8,331	3,724
Stock-based compensation	5,026	1,938
Federal tax credits	6,668	4,099
Net operating losses	46,173	26,996
State tax credits	2,086	1,640
Business interest limitation	10,450	9,829
Operating lease liabilities	4,848	—
Convertible Senior Notes	8,304	—
Other	3,172	1,942
Gross deferred tax assets	99,682	53,400
Valuation allowance	(31,512)	(3,016)
Total deferred tax assets	68,170	50,384
Deferred tax liabilities:		
Prepaid items	(624)	(853)
Equipment and leasehold improvements	(168)	—
Deferred contract costs	(10,491)	(7,634)
Operating lease right-of-use assets	(4,047)	—
Intangibles and other	(59,670)	(46,898)
Other	(399)	—
Gross deferred tax liabilities	(75,399)	(55,385)
Net deferred tax liabilities	$ (7,229)	$ (5,001)

The components giving rise to the net deferred tax liabilities detailed above have been included in the consolidated balance sheets as of December 31, 2021 and 2020 as follows:

	December 31, 2021	December 31, 2020
	(in thousands)	
Non-current deferred tax assets [1]	$ 1,471	$ 86
Non-current deferred tax liabilities	(8,700)	(5,087)
Net deferred tax liabilities	$ (7,229)	$ (5,001)

[1] Included in other assets in the consolidated balance sheets.

As of December 31, 2021, the Company established a valuation allowance against a majority of our domestic deferred tax assets to reduce the total to an amount management believed was appropriate based on an analysis of both positive and negative evidence. Realization of deferred tax assets is dependent upon sufficient future taxable income during the periods when deductible temporary differences and carryforwards are expected to be available to reduce taxable income. The valuation allowance increased by $28.5 million, $0.9 million, and $0.9 million for the years ended December 31, 2021, 2020, and 2019 respectively.

As of December 31, 2021, the Company had a U.S. federal net operating loss carryforward of approximately $139.8 million, a foreign net operating loss carryforward of approximately $52.8 million, federal research and development credits of approximately $6.1 million, and foreign tax credits of approximately $1.2 million primarily consisting of investment tax credit carryforwards. The Company also had state net operating loss carryforwards of approximately $81.8 million and state credits for research and development of approximately $2.9 million. Approximately $102.5 million of the federal net operating loss carryforwards will begin to expire in 2037. The remainder of the federal net operating losses of $37.3 million and the foreign net operating losses are carried forward indefinitely. The state net operating loss carryforwards will begin to expire in 2022 and are available to offset future taxable income or reduce taxes payable through 2040. The federal research and development credits, state research and development credits, and foreign tax credits will begin expiring in 2033, 2026, and 2023, respectively.

A company's ability to utilize a portion of its net operating loss carryforwards to offset future taxable income may be subject to certain limitations under Section 382 of the Internal Revenue Code due to changes in the equity ownership of the Company. The Company conducted a Section 382 analysis and determined that although an ownership change occurred in a prior period, all net operating losses that were not acquired are fully available as of December 31, 2021.

A reconciliation of the beginning and ending amount of gross unrecognized tax benefits was as follows:

	Years Ended December 31, 2021	2020	2019
		(in thousands)	
Balance, January 1	$ 670	$ 540	$ 439
Additions based on tax positions related to the current year	161	130	92
Additions based on tax positions related to prior years	172	—	19
Reductions based on tax positions related to prior years	—	—	(10)
Balance, December 31	$ 1,003	$ 670	$ 540

Under the provision for uncertainty in income taxes, the total gross amount of unrecognized tax benefit as of December 31, 2021 was approximately $1.1 million. If recognized, the total amount of unrecognized tax benefit that would affect the effective income tax rate was $0.9 million and $0.6 million as of December 31, 2021 and 2020, respectively.

The Company files income tax returns in the U.S. federal jurisdiction, Minnesota, and various other state and foreign jurisdictions. With few exceptions, the Company is not subject to U.S. federal, foreign, state, and local income tax examinations by tax authorities for years before 2018. It is difficult to predict the final timing and resolution of any particular uncertain tax position. Based on the Company's assessment of many factors, including past experience and complex judgements about future events, the Company does not currently anticipate significant changes in its uncertain tax positions over the next 12 months.

The Company recognizes interest and penalties accrued related to unrecognized tax benefits as additional income tax expense. The Company did not recognize material income tax expense related to interest and penalties during the years ended December 31, 2021, 2020, and 2019.

On March 27, 2020, the CARES Act was signed into law. The most significant relief measure which the Company qualified for is the payroll tax deferral. Beginning with pay dates on and after April 17, 2020, the Company elected to defer the employer-paid portion of social security taxes, resulting in an accrual of $3.8 million as of December 31, 2020. The Company paid $1.9 million of the deferred portion of payroll taxes in the fourth quarter of 2021. The remaining $1.9 million is due December 31, 2022 and is included in accrued liabilities in the consolidated balance sheet.

Note 15. Related party transactions

The Company made pledges to the Jamf Nation Global Foundation (“JNGF”) of $1.2 million, $0.5 million, and $1.1 million for the years ended December 31, 2021, 2020, and 2019, respectively. As of December 31, 2021 and 2020, the Company accrued $1.5 million and $0.9 million, respectively, which are included in accrued liabilities in the consolidated balance sheets. The Company has an ongoing lease agreement for office space in Eau Claire, Wisconsin with an entity in which a related party is a minority owner. See Note 7 for further discussion of this lease agreement. The Company may engage in transactions in the ordinary course of business with significant shareholders or other companies whose directors or officers may also serve as directors or officers for the Company. The Company carries out these transactions on customary terms.

Vista is a U.S.-based investment firm that controls the funds which previously owned a majority of the Company. In the third quarter of 2021, Vista sold a portion of its investment in the Company such that its funds no longer owned a majority of the Company as of December 31, 2021. However, Vista is deemed a related party in accordance with ASC Topic 850, *Related Party Disclosures* (“ASC 850”) as it continues to be a principal owner of the Company. The Company has paid for consulting services and other expenses related to services provided by Vista and Vista affiliates. The total expenses incurred by the Company for these services were $0.1 million, $0.3 million, and $1.0 million for the years ended December 31, 2021, 2020, and 2019, respectively. The Company had nil and less than $0.1 million in accounts payable related to these expenses as of December 31, 2021 and 2020, respectively.

The Company also has revenue arrangements with Vista affiliates. The Company recognized revenue related to these arrangements of $0.9 million, $1.0 million, and $0.7 million for the years ended December 31, 2021, 2020, and 2019, respectively. The Company had $0.2 million and $0.3 million in accounts receivable related to these agreements as of December 31, 2021 and 2020, respectively.

In addition, the Company pays for services with Vista affiliates in the normal course of business. The total expenses incurred by the Company for services with Vista affiliates were $1.3 million, $0.7 million, and $0.7 million for the years ended December 31, 2021, 2020, and 2019, respectively. The Company had $0.1 million in accounts payable related to these expenses as of both December 31, 2021 and 2020. The Company also has future commitments for other support software with certain Vista affiliates. See Note 8 for more information.

During the years ended December 31, 2020 and 2019, affiliates of Vista were paid $2.1 million and $3.4 million, respectively, in interest on the portion of the 2017 Term Loan Facility held by them.

Note 16. Condensed financial information (Parent Company only)

Jamf Holding Corp.
(Parent Company only)
Condensed Balance Sheets
(in thousands, except share and per share amounts)

	December 31, 2021	December 31, 2020
Assets		
Current assets:		
Cash and cash equivalents	$ —	$ —
Total current assets	—	—
Investment in subsidiaries	738,426	811,014
Total assets	$ 738,426	$ 811,014
Liabilities and stockholders' equity		
Current liabilities:		
Current liabilities	$ —	$ —
Total current liabilities	—	—
Other liabilities	—	—
Total liabilities	—	—
Commitments and contingencies		
Stockholders' equity:		
Preferred stock, $0.001 par value, 50,000,000 shares authorized at December 31, 2021 and 2020; no shares issued and outstanding at December 31, 2021 and 2020	—	—
Common stock, $0.001 par value, 500,000,000 shares authorized at December 31, 2021 and 2020; 119,426,064 and 116,992,472 shares issued and outstanding at December 31, 2021 and 2020, respectively	119	117
Additional paid-in capital	913,581	903,116
Accumulated other comprehensive loss	(7,866)	—
Accumulated deficit	(167,408)	(92,219)
Total stockholders' equity	738,426	811,014
Total liabilities and stockholders' equity	$ 738,426	$ 811,014

Jamf Holding Corp.
(Parent Company only)
Condensed Statements of Operations
(in thousands)

	Years Ended December 31, 2021	2020	2019
Revenue	$ —	$ —	$ —
Operating expenses	—	—	—
Loss from operations	—	—	—
Other income, net	—	—	—
Loss before income tax benefit and equity in net loss of subsidiaries	—	—	—
Income tax benefit	—	—	—
Equity in net loss of subsidiaries	(75,189)	(24,082)	(34,345)
Net loss	$ (75,189)	$ (24,082)	$ (34,345)

Jamf Holding Corp.
(Parent Company only)
Condensed Statements of Comprehensive Loss
(in thousands)

	Years Ended December 31,		
	2021	2020	2019
Net loss	$ (75,189)	$ (24,082)	$ (34,345)
Other comprehensive loss:			
Subsidiaries' other comprehensive loss	(7,866)	—	—
Total other comprehensive loss	(7,866)	—	—
Comprehensive loss	$ (83,055)	$ (24,082)	$ (34,345)

Basis of presentation

Jamf Holding Corp. is a holding company with no material operations of its own that conducts substantially all of its activities through its subsidiaries. Jamf Holding Corp. has no direct outstanding debt obligations. However, JAMF Holdings Inc., a wholly owned subsidiary, as borrower under the 2020 Credit Agreement, is limited in its ability to declare dividends or make any payment on account of its capital stock to, directly or indirectly, fund a dividend or other distribution to Jamf Holding Corp., subject to limited exceptions, including (1) stock repurchases, (2) unlimited amounts subject to compliance with a 6.0 to 1.0 total leverage ratio giving pro forma effect to any distribution, (3) amounts not to exceed the greater of (i) $20 million and (ii) 20% of EBITDA in any reference period, and (4) payment of Jamf Holding Corp.'s overhead expenses. Due to the aforementioned qualitative restrictions, substantially all of the assets of Jamf Holding Corp.'s subsidiaries are restricted. For a discussion of the 2020 Credit Agreement, see Note 9.

These condensed financial statements have been presented on a "parent-only" basis. Under a parent-only presentation, Jamf Holding Corp.'s investment in subsidiaries is presented under the equity method of accounting. A condensed statement of cash flows was not presented because Jamf Holding Corp. has no material operating, investing, or financing cash flow activities for the years ended December 31, 2021, 2020, and 2019. Certain information and footnote disclosures normally included in financial statements prepared in accordance with GAAP have been condensed or omitted. As such, these parent-only statements should be read in conjunction with the accompanying notes to consolidated financial statements.

Note 17. Subsequent events

The Company evaluated events or transactions that occurred after the balance sheet date for potential recognition or disclosure through the date the financial statements were issued. No subsequent events or transactions were identified.

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

None.

Item 9A. Controls and Procedures

Evaluation of Disclosure Controls and Procedures

We maintain "disclosure controls and procedures," as defined in Rule 13a–15(e) and Rule 15d–15(e) under the Exchange Act that are designed to provide reasonable assurance that information required to be disclosed by the Company in the reports that we file or submit 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 provide reasonable assurance that information required to be disclosed by the Company in the reports that we file or submit under the Exchange Act is accumulated and communicated to our management, including our principal executive and principal financial officers, as appropriate to allow timely decisions regarding required disclosure. Our management, with the participation of our principal executive officer and principal financial officer, evaluated the effectiveness of our disclosure controls and procedures as of December 31, 2021. Based on this evaluation, our principal executive officer and principal financial officer have concluded that our disclosure controls and procedures were not effective as of December 31, 2021 due to the material weakness described below. Notwithstanding such material weakness in internal control over financial reporting, our principal executive officer and principal financial officer have concluded that our Consolidated Financial Statements included in this Annual Report on Form 10-K present fairly, in all material respects, our financial position, results of operations, and cash flows for the periods presented in conformity with GAAP.

Management's Report on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting as defined in Rule 13a-15(f) of the Exchange Act. Our internal control over financial reporting includes policies and procedures designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external reporting purposes in accordance with GAAP. Our management, including our principal executive officer and principal financial officer, conducted an evaluation of the effectiveness of our internal control over financial reporting based on the criteria established in the Internal Control—Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework). Based on this evaluation, our management concluded that our internal control over financial reporting was not effective as of December 31, 2021 due to the material weakness described below.

The Company completed its acquisition of Wandera on July 1, 2021. In accordance with guidance issued by the SEC, management excluded Wandera from its assessment of the effectiveness of the Company's internal control over financial reporting as of December 31, 2021. Wandera's assets represented approximately 28% of the Company's consolidated total assets as of December 31, 2021, and its revenues and net loss for the period from the acquisition date through December 31, 2021 represented approximately 3% and 15% of the Company's consolidated total revenue and net loss, respectively, for the year ended December 31, 2021.

Our independent registered public accounting firm, Ernst & Young LLP, has issued an audit report with respect to our internal control over financial reporting, which appears in Part II, Item 8 of this Annual Report on Form 10-K.

Material Weakness in Internal Control over Financial Reporting

A material weakness is a deficiency, or combination of deficiencies, in internal control over financial reporting, such that there is a reasonable possibility that a material misstatement of a company's annual or interim financial statements will not be prevented or detected on a timely basis. Because the control deficiency described below could have resulted in a material misstatement of our annual or interim financial statements, we determined that this deficiency constitutes a material weakness.

In connection with the preparation of our financial statements for the quarter ended June 30, 2021, we identified misstatements in our accounting related to certain commissions that were incorrectly capitalized in prior periods. The misstatements resulted from a deficiency in the controls over the commissions process. We did not design or maintain effective controls to identify commissions that should have been expensed as incurred rather than capitalized in accordance with GAAP. Specifically, we did not have controls over (i) the communication of commission plan changes between the sales and accounting teams to identify and correctly account for commission plan changes in the financial statements and (ii) reviewing the evaluation of various terms in the commission plans to the relevant accounting guidance. As a result, sales and marketing expenses were understated and deferred contract costs were overstated in prior periods. This material weakness resulted in the revision of our previously issued consolidated financial statements as of and for the years ended December 31, 2020, 2019, and 2018 and for each of the quarters during the years ended December 31, 2020 and 2019 and the quarter ended March 31, 2021.

Our management is committed to remediating this material weakness and has implemented several steps to enhance our internal controls and commissions processes. Our steering committee, anchored by the Chief Financial Officer and Chief Operating Officer, has hired a third-party consultant to help us standardize and automate our commissions processes. The third-party consultant has implemented recommendations to standardize and automate our commission processes. Therefore, we intend to implement these new internal controls in 2022 with the intention of remediation later in the year. The material weakness will not be considered remediated until a sustained period of time has passed to allow management to test the design and operational effectiveness of the corrective actions. Until the material weakness is remediated, we plan to continue to perform additional analyses and other procedures to ensure that our consolidated financial statements are prepared in accordance with GAAP.

Changes in Internal Control

There have been no changes in internal control over financial reporting during the quarter ended December 31, 2021 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Inherent Limitations on Effectiveness of Controls

Our management, including our principal executive officer and principal financial officer, does not expect that our disclosure controls and procedures or our internal control over financial reporting will prevent or detect all errors and all fraud. A control system, no matter how well conceived and operated, can provide only reasonable, not absolute, assurance that the objectives of the control system are met. 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. The design of any system of controls is also based in part upon certain assumptions about the likelihood of future events, and there can be no assurance that any design will succeed in achieving its stated goals under all potential future conditions. Over time, controls may become inadequate because of changes in conditions, or the degree of compliance with policies or procedures may deteriorate. Because of the inherent limitations in a cost-effective control system, misstatements due to error or fraud may occur and not be detected.

Item 9B. Other Information

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 will be set forth in the Proxy Statement relating to our 2022 Annual Meeting of Stockholders (the "Proxy Statement"), which will be filed with the SEC within 120 days of the fiscal year ended December 31, 2021 and is incorporated in this report by reference.

Code of Ethics

We adopted a Code of Ethics that applies to all of our employees, officers and directors, including those officers responsible for financial reporting. Our Code of Ethics is available on our website at ir.jamf.com under "Corporate Governance." We intend to disclose any amendments to our Code of Ethics, or any waivers of its requirements, on our website.

Item 11. Executive Compensation

The information required by this item will be set forth in the Proxy Statement, which will be filed no later than 120 days after the end of our fiscal year ended December 31, 2021 and is incorporated in this report by reference.

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

The information required by this item will be set forth in the Proxy Statement, which will be filed no later than 120 days after the end of our fiscal year ended December 31, 2021 and is incorporated in this report by reference.

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

The information required by this item will be set forth in the Proxy Statement, which will be filed no later than 120 days after the end of our fiscal year ended December 31, 2021 and is incorporated in this report by reference.

Item 14. Principal Accountant Fees and Services

The information required by this item will be set forth in the Proxy Statement, which will be filed no later than 120 days after the end of our fiscal year ended December 31, 2021 and is incorporated in this report by reference.

Part IV.

Item 15. Exhibits and Financial Statement Schedules

Documents filed as part of this Annual Report on Form 10-K are as follows:

1. Consolidated Financial Statements

   Our Consolidated Financial Statements are listed in the “Index to Consolidated Financial Statements” under Part II, Item 8 of this Annual Report on Form 10-K.

2. Financial Statement Schedules

   Financial statement schedules have been omitted because they are not required, not applicable or the required information is included in the Consolidated Financial Statements or notes thereto.

3. Exhibits

   The following documents are incorporated by reference or are filed with this Annual Report on Form 10-K, in each case as indicated therein.

Exhibit Number	Description
2.1	Agreement and Plan of Merger, dated as of May 5, 2021, by and among JAMF Holding Corp., JAMF Software, LLC, White Wolf Merger Sub, Inc., Wandera, Inc., and Shareholder Representative Services LLC.
3.1	Second Amended and Restated Certificate of Incorporation of Jamf Holding Corp., dated July 24, 2020 (incorporated by reference to Exhibit 3.1 to the Company’s Form 8-K filed with the SEC on July 27, 2020).
3.2	Amended and Restated Bylaws of Jamf Holding Corp., dated July 24, 2020 (incorporated by reference to the Company’s Exhibit 3.2 to the Company’s Form 8-K filed with the SEC on July 27, 2020).
4.1	Registration Rights Agreement, dated July 24, 2020, by and among the Company and the other signatories party thereto (incorporated by reference to the Company’s Exhibit 4.1 to the Company’s Form 8-K filed with the SEC on July 27, 2020).
4.2	Description of Securities (incorporated by reference to Exhibit 4.2 to the Company’s Annual Report on Form 10-K filed with the SEC on March 4, 2021).
4.3	Indenture, dated September 17, 2021, among Jamf Holding Corp., JAMF Software, LLC and U.S. Bank National Association (incorporated by reference to Exhibit 4.1 to our Current Report on Form 8-K filed with the SEC on September 20, 2021).
4.4	Form of 0.125% Convertible Senior Note due 2026 (included in Exhibit 4.1) (incorporated by reference to Exhibit 4.2 to our Current Report on Form 8-K filed with the SEC on September 20, 2021).
10.1	Form of Indemnification Agreement (incorporated by reference to Exhibit 10.13 to Jamf Holding Corp.’s Registration Statement on Form S-1 filed with the SEC on June 29, 2020).
10.2+	Jamf Holding Corp. Omnibus Incentive Plan (incorporated by reference to Exhibit 10.1 to Jamf Holding Corp.’s Registration Statement on Form S-8 filed with the SEC on July 24, 2020).
10.3+	Form of Stock Option Award Agreement (incorporated by reference to Exhibit 10.9 to the Registrant’s Registration Statement on Form S-1 (No. 333-239535), filed with the SEC on June 29, 2020).
10.4+	Form of Restricted Shares Award Agreement (incorporated by reference to Exhibit 10.10 to the Registrant’s Registration Statement on Form S-1 (No. 333-239535), filed with the SEC on June 29, 2020).
10.5+	Form of Stock Appreciation Rights Award Agreement (incorporated by reference to Exhibit 10.11 to the Registrant’s Registration Statement on Form S-1 (No. 333-239535), filed with the SEC on June 29, 2020).
10.6+	Form of Restricted Stock Unit Award Agreement (incorporated by reference to Exhibit 10.12 to the Registrant’s Registration Statement on Form S-1 (No. 333-239535), filed with the SEC on June 29, 2020).

10.7+	Amended and Restated Jamf Holding Corp 2017 Stock Option Plan (incorporated by reference to Exhibit 10.6 to Jamf Holding Corp.'s Registration Statement on Form S-8 filed with the SEC on July 24, 2020).
10.8+	Form of Amended and Restated Jamf Holding Corp. Stock Option Plan Grant Agreement (incorporated by reference to Exhibit 10.16 to the Registrant's Registration Statement on Form S-1 (No. 333-239535), filed with the SEC on June 29, 2020).
10.9	Credit Agreement, dated as of July 27, 2020, by and among JAMF Holdings, Inc., as borrower, Juno Intermediate, Inc., as a guarantor, Juno Parent, LLC, as a guarantor, the other loan parties thereto, the lenders party thereto and JPMorgan Chase Bank, N.A., as administrative agent (incorporated by reference to the Company's Exhibit 10.1 to the Company's Form 8-K filed with the SEC on July 29, 2020).
10.10	Amended and Restated Director Nomination Agreement, dated September 1, 2020, by and among the Company and the signatories party thereto (incorporated by reference to Exhibit 10.10 to the Company's Quarterly Report on Form 10-Q filed with the SEC on September 2, 2020).
10.11	Master Services Agreement, effective as of November 13, 2017, by and between Vista Consulting Group, LLC and JAMF Holdings, Inc. (incorporated by reference to Exhibit 10.4 to the Company's Registration Statement on Form S-1 (No. 333-239535) filed with the SEC on June 29, 2020).
10.12+	Letter Agreement, dated as of October 20, 2017, between JAMF Holdings, Inc. and Dean Hager (incorporated by reference to Exhibit 10.5 to the Company's Registration Statement on Form S-1 (No. 333-239535) filed with the SEC on June 29, 2020).
10.13+	Letter Agreement, dated as of November 20, 2017, between JAMF Holdings, Inc. and Jill Putman (incorporated by reference to Exhibit 10.6 to the Company's Registration Statement on Form S-1 (No. 333-239535) filed with the SEC on June 29, 2020).
10.14+	Letter Agreement, dated as of November 20, 2017, between JAMF Holdings, Inc. and John Strosahl (incorporated by reference to Exhibit 10.7 to the Company's Registration Statement on Form S-1 (333-239535) filed with the SEC on June 29, 2020).
10.15+	First Amendment, dated as of April 22, 2021, to the Letter Agreement between JAMF Holdings, Inc. and Dean Hager (incorporated by reference to the Company's Current Report on Form 8-K filed with the SEC on April 26, 2021).
10.16+	First Amendment, dated as of April 22, 2021, to the Letter Agreement between JAMF Holdings, Inc. and Jill Putman (incorporated by reference to the Company's Current Report on Form 8-K filed with the SEC on April 26, 2021).
10.17+	First Amendment, dated as of April 22, 2021, to the Letter Agreement between JAMF Holdings, Inc. and John Strosahl (incorporated by reference to the Company's Current Report on Form 8-K filed with the SEC on April 26, 2021).
10.18	Incremental Facility Amendment No. 1, dated as of July 1, 2021, by and among JAMF Holdings, Inc., as borrower, Juno Intermediate, Inc., as a guarantor, Juno Parent, LLC, as a guarantor, the other loan parties thereto, the lenders party thereto and JPMorgan Chase Bank, N.A., as administrative agent (incorporated by reference to Exhibit 10.4 to our Quarterly Report on Form 10-Q filed with the SEC on August 20, 2021).
10.19	Form of Capped Call Confirmation (incorporated by reference to our Exhibit 10.1 to our Current Report on Form 8-K filed with the SEC on September 20, 2021).
10.20+	Jamf Holding Corp. Employee Stock Purchase Plan, filed herewith.
21.1	List of subsidiaries of Jamf Holding Corp.
23.1	Consent of Ernst & Young LLP, Independent Registered Public Accounting Firm, filed herewith.
31.1	Certification of the Chief Executive Officer pursuant to Exchange Act Rules Rule 13a-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002, filed herewith.
31.2	Certification of the Chief Financial Officer pursuant to Exchange Act Rules Rule 13a-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002, filed herewith.
32.1*	Certification of the Chief Executive Officer pursuant to 18 U.S.C. Section 1350, filed herewith.
32.2*	Certification of the Chief Financial Officer pursuant to 18 U.S.C. Section 1350, filed herewith.

101.INS	Inline XBRL Instance Document
101.SCH	Inline XBRL Taxonomy Extension Schema Document
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase Document
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document
104	Cover Page Interactive Data File (formatted as inline XBRL and contained in Exhibit 101)

* The certifications furnished in Exhibit 32.1 and Exhibit 32.2 hereto are deemed to accompany this Annual on Form 10-K and will not be deemed “filed” for purposes of Section 18 of the Securities Exchange Act of 1934, as amended, except to the extent that the registrant specifically incorporates it by reference.

+ Indicates a management contract or compensatory plan or arrangement.

Item 16. Form 10-K Summary

None.

SIGNATURES

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

JAMF HOLDING CORP. (Registrant)

Date: March 1, 2022	By:	/s/ Ian Goodkind
		Ian Goodkind Chief Accounting Officer (Principal Accounting Officer)

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

Date: March 1, 2022	By:	/s/ Dean Hager
		Dean Hager Chief Executive Officer and Director (Principal Executive Officer)
Date: March 1, 2022	By:	/s/ Jill Putman
		Jill Putman Chief Financial Officer (Principal Financial Officer)
Date: March 1, 2022	By:	/s/ Ian Goodkind
		Ian Goodkind Chief Accounting Officer (Principal Accounting Officer)
Date: March 1, 2022	By:	/s/ David A. Breach
		David A. Breach Director
Date: March 1, 2022	By:	/s/ Andre Durand
		Andre Durand Director
Date: March 1, 2022	By:	/s/ Michael Fosnaugh
		Michael Fosnaugh Director
Date: March 1, 2022	By:	/s/ Virginia Gambale
		Virginia Gambale Director
Date: March 1, 2022	By:	/s/ Charles Guan
		Charles Guan Director
Date: March 1, 2022	By:	/s/ Kevin Klausmeyer
		Kevin Klausmeyer Director
Date: March 1, 2022	By:	/s/ Vina Leite
		Vina Leite Director
Date: March 1, 2022	By:	/s/ Christina Lema
		Christina Lema Director
Date: March 1, 2022	By:	/s/ Martin Taylor
		Martin Taylor Director

JAMF HOLDING CORP.

2021 EMPLOYEE STOCK PURCHASE PLAN

1. Purpose. The purpose of the Plan is to provide employees of the Company and its Designated Companies with an opportunity to purchase Common Stock through accumulated payroll deductions. The Company intends for the Plan to have two components: a Code Section 423 Component ("423 Component") and a non-Code Section 423 Component ("Non-423 Component"). The Company's intention is to have the 423 Component of the Plan qualify as an "employee stock purchase plan" under Section 423 of the Code to the extent possible. The provisions of the 423 Component, accordingly, will be construed so as to extend and limit Plan participation in a uniform and nondiscriminatory basis consistent with the requirements of Section 423 of the Code. In addition, this Plan authorizes the grant of an option to purchase shares of Common Stock under the Non-423 Component that does not qualify as an "employee stock purchase plan" under Section 423 of the Code; such an option will be granted pursuant to rules, procedures or sub-plans adopted by the Administrator designed to achieve tax, non-U.S. exchange or securities laws or other objectives for Eligible Employees and the Company. Except as otherwise provided, the Non-423 Component, to the extent utilized by the Company, will operate and be administered in the same manner as the 423 Component.

2. Definitions.

(a) "Administrator" means the Board or any Committee designated to administer the Plan pursuant to Section 14 hereof.

(b) "Affiliate" means any entity, other than a Subsidiary, in which the Company has an equity or other ownership interest.

(c) "Applicable Laws" means the requirements relating to the administration of equity-based awards and the related issuance of shares of Common Stock under U.S. state corporate laws, U.S. federal and state securities laws, the Code, any stock exchange or quotation system on which the Common Stock is listed or quoted and the applicable securities and exchange control laws of any non-U.S. country or jurisdiction where options are, or will be, granted under the Plan.

(d) "Board" means the board of directors of the Company.

(e) "Code" means the U.S. Internal Revenue Code of 1986, as amended. Reference to a specific section of the Code or regulation thereunder will include such section or regulation, any valid regulation or other official applicable guidance promulgated under such section, and any comparable provision of any future legislation or regulation amending, supplementing or superseding such section or regulation.

(f) "Committee" means a committee of the Board appointed in accordance with Section 14 hereof.

(g) "Common Stock" means the common stock of the Company.

(h) "Company" means Jamf Holding Corp., a Delaware corporation, or any successor thereto.

(i) "Compensation" means an Eligible Employee's regular and recurring straight time gross earnings, but exclusive of payments for overtime and shift premium, payments for incentive compensation, bonuses, equity compensation and other similar compensation. The Administrator, in its discretion, may, on a uniform and nondiscriminatory basis, establish a different definition of Compensation for a subsequent Offering Period.

(j) "Designated Company" means any Subsidiary or Affiliate that has been designated by the Administrator in its sole discretion as eligible to participate in the Plan. For purposes of the 423 Component, only the Company and its Subsidiaries may be Designated Companies, provided that a Subsidiary that is a Designated Company under the 423 Component may not simultaneously be a Designated Company under the Non-423 Component.

(k) "Effective Date" means July 1, 2021, subject to approval by the stockholders of the Company in the manner and to the degree required under Applicable Laws.

(l) "Eligible Employee" means any individual who is a common law employee (and, with respect to the Non-423 Component, is not classified by the Company as an intern or temporary employee) providing services to the Company or a Designated Company and is customarily employed for more than five (5) months in any calendar year by the Employer, or any lesser number of months in any calendar year established by the Administrator (if required under applicable local law) for purposes of any separate Offering or for Eligible Employees participating in the Non-423 Component. For purposes of the Plan, the employment relationship will be treated as continuing intact while the individual is on sick leave or other leave of absence that the Employer approves or that is legally protected under applicable local laws. Where the period of leave exceeds three (3) months and the individual's right to reemployment is not guaranteed either by statute or by contract, the employment relationship will be deemed to have terminated three (3) months and one (1) day following the commencement of such leave. The Administrator, in its discretion, from time to time may, prior to an Enrollment Date for all options to be granted on such Enrollment Date in an Offering, determine (for each Offering under the 423 Component, on a uniform and nondiscriminatory basis or as otherwise permitted by Section 423 of the Code) that the definition of Eligible Employee will or will not include an individual if he or she: (i) has not completed at least two (2) years of service since his or her last hire date (or such lesser period of time as may be determined by the Administrator in its discretion), (ii) customarily works not more than twenty (20) hours per week (or such lesser period of time as may be determined by the Administrator in its discretion), (iii) customarily works not more than five (5) months per calendar year (or such lesser period of time as may be determined by the Administrator in its discretion), (iv) is a highly compensated employee within the meaning of Section 414(q) of the Code, or (v) is a highly compensated employee within the meaning of Section 414(q) of the Code with compensation above a certain level or is an officer or subject to the disclosure requirements of Section 16(a) of the Exchange Act, provided the exclusion is applied with respect to each Offering under the 423 Component in an identical manner to all highly compensated individuals of the Employer whose employees are participating in that Offering. Such exclusions may be applied with respect to an Offering under a 423 Component in a manner complying with Section 423 of the Code. Such exclusions may be applied with respect to an Offering under the Non- 423 Component without regard to the limitations of Section 423 of the Code.

(m) "Employer" means the employer of an Eligible Employee.

(n) "Enrollment Date" means the first Trading Day of each Offering Period.

(o) "Exchange Act" means the U.S. Securities Exchange Act of 1934, as amended, including the rules and regulations promulgated thereunder.

(a) "Exercise Date" means the last Trading Day of each Offering Period.

(b) "Fair Market Value" means, as of any date and unless the Administrator determines otherwise, the value of Common Stock determined as follows:

(i) If the Common Stock is listed on any established stock exchange or a national market system, including without limitation the New York Stock Exchange, the Nasdaq Global Select Market, the Nasdaq Global Market or the Nasdaq Capital Market of the Nasdaq Stock Market, its Fair Market Value will be the closing sales price for such stock as quoted on such exchange or system on the date of determination (or the closing bid, if no sales were reported);

(ii) If the Common Stock is regularly quoted by a recognized securities dealer but selling prices are not reported, its Fair Market Value will be the mean between the high bid and low asked prices for the Common Stock on the date of determination (or if no bids and asks were reported on that date, as applicable, on the last Trading Day such bids and asks were reported), as reported in *The Wall Street Journal* or such other source as the Administrator deems reliable; or

(iii) In the absence of an established market for the Common Stock, the Fair Market Value thereof will be determined in good faith by the Administrator.

Notwithstanding the foregoing, if the determination date for the Fair Market Value occurs on a weekend or holiday, the Fair Market Value will be the price as determined in accordance with subsections (i) through (iii) above (as applicable) on the next business day, unless otherwise determined by the Administrator.

(c) "Fiscal Year" means the fiscal year of the Company.

(d) "New Exercise Date" means a new Exercise Date if the Administrator shortens any Offering Period then in progress.

(e) "Offering" means an offer under the Plan of an option that may be exercised during an Offering Period as further described in Section 4 hereof. For purposes of the Plan, the Administrator may designate separate Offerings under the Plan (the terms of which need not be identical) in which Eligible Employees of one or more Employers will participate, even if the dates of the applicable Offering Periods of each such Offering are identical and the provisions of the Plan will separately apply to each Offering. If an Offering under the 423 Component is made, to the extent permitted by Section 423 of the Code, the terms of each Offering need not be identical provided that the terms of the Plan and an Offering together satisfy Section 423 of the Code.

(f) "Offering Periods" means the periods of approximately six (6) months during which an option granted pursuant to the Plan may be exercised, commencing on the first Trading Day on or after May 1 and November 1 of each year and terminating on the last Trading Day on or before the May 1 and November 1, respectively, approximately six (6) months later. The duration and timing of Offering Periods may be changed pursuant to Sections 4 and 20 hereof, provided that in no event shall an Offering Period exceed twenty-seven (27) months in duration.

(g) "Parent" means a "parent corporation," whether now or hereafter existing, as defined in Section 424(e) of the Code.

(h) "Participant" means an Eligible Employee who participates in the Plan.

(i) "Plan" means this Jamf Holding Corp. Employee Stock Purchase Plan.

(j) "Purchase Period" means the approximately six (6) month period commencing after one Exercise Date and ending with the next Exercise Date, except that the first Purchase Period of any Offering Period will commence on the Enrollment Date and end with the next Exercise Date. Unless the Administrator provides otherwise, the Purchase Period will have the same duration and coincide with the length of the Offering Period.

(k) "Purchase Price" means an amount equal to eighty-five percent (85%) of the Fair Market Value of a share of Common Stock on the Enrollment Date or on the Exercise Date, whichever is lower; provided however, that the Purchase Price may be determined for subsequent Offering Periods by the Administrator subject to compliance with Section 423 of the Code (or any successor rule or provision or any other Applicable Law, regulation or stock exchange rule) or pursuant to Section 20 hereof.

(l) "Subsidiary" means a "subsidiary corporation," whether now or hereafter existing, as defined in Section 424(f) of the Code.

(m) "Trading Day" means a day on which the national stock exchange upon which the Common Stock is listed is open for trading.

3. Eligibility.

(a) General. Any Eligible Employee on a given Enrollment Date will be eligible to participate in the Plan, subject to the requirements of Section 5 hereof.

(b) Non-U.S. Employees. Eligible Employees who are citizens or residents of a non-U.S. jurisdiction (without regard to whether they also are citizens or residents of the United States or resident aliens (within the meaning of Section 7701(b)(1)(A) of the Code)) may be excluded from participation in the Plan or an Offering if the participation of such Eligible Employees is prohibited under the laws of the applicable jurisdiction or if complying with the laws of the applicable jurisdiction would cause the Plan or an Offering to violate Section 423 of the Code. In the case of the Non-423 Component, an Eligible Employee may be excluded from participation in the Plan or an Offering at the discretion of the Administrator.

(c) 423 Component Limitations. Any provisions of the Plan to the contrary notwithstanding, with respect to any Offering under the 423 Component, no Eligible Employee will be granted an option under the Plan (i) to the extent that, immediately after the grant, such Eligible Employee (or any other person whose stock would be attributed to such Eligible Employee pursuant to Section 424(d) of the Code) would own capital stock of the Company or any Parent or Subsidiary of the Company and/or hold outstanding options to purchase such stock possessing five percent (5%) or more of the total combined voting power or value of all classes of the capital stock of the Company or of any Parent or Subsidiary of the Company, or (ii) to the extent that his or her rights to purchase stock under all employee stock purchase plans (as defined in Section 423 of the Code) of the Company or any Parent or Subsidiary of the Company accrues at a rate that exceeds twenty-five thousand dollars ($25,000) worth of stock (determined at the Fair Market Value of the stock at the time such option is granted) for each calendar year in which such option is outstanding at any time, as determined in accordance with Section 423 of the Code and the regulations thereunder.

4. Offering Periods. The Plan will be implemented by consecutive Offering Periods with a new Offering Period commencing on the first Trading Day on or after May 1 and November 1 of each year, or on such other date as the Administrator will determine. The Administrator will have the power to change the duration of Offering Periods (including the commencement dates thereof) with respect to future Offerings without stockholder approval if

such change is announced prior to the scheduled beginning of the first Offering Period to be affected thereafter.

5. Participation.

(a) First Offering Period. An Eligible Employee will be entitled to participate in the first Offering Period specified in Section 2(u) hereof only if such individual submits a subscription agreement authorizing payroll deductions in a form determined by the Administrator to the Company's designated stock administrator or completes an electronic or other enrollment procedure determined by the Administrator, in each case during such period of time as the Administrator may determine (the "Enrollment Window"). An Eligible Employee's failure to submit the subscription agreement or complete the enrollment procedure during the Enrollment Window will result in such individual being disqualified from participation in the first Offering Period under the Plan.

(b) Subsequent Offering Periods. An Eligible Employee may participate in the Plan in any Offering Period following the first Offering Period by (i) submitting to the Company's stock administrator (or its designee), on or before a date prescribed by the Administrator prior to an applicable Enrollment Date, a properly completed subscription agreement authorizing payroll deductions in the form provided by the Administrator for such purpose, or (ii) completing an electronic or other enrollment procedure determined by the Administrator, in each case during the applicable Enrollment Window. Unless otherwise determined by the Administrator, a Participant's subscription agreement and the designated rate of payroll deduction by a Participant shall continue for future Offering Periods unless the Participant changes or cancels, in accordance with procedures established by the Administrator, prior to the Enrollment Date with respect to a future Offering Period or elects to withdraw from the Plan in accordance with Section 10 hereof.

6. Payroll Deductions.

(a) At the time a Participant enrolls in the Plan pursuant to Section 5 hereof, he or she will elect to have payroll deductions made on each pay day during the Offering Period in an amount not exceeding fifteen percent (15%) of the Compensation which he or she receives on each pay day during the Offering Period; provided, however, that should a pay day occur on an Exercise Date, a Participant will have the payroll deductions made on such day applied to his or her account under the subsequent Offering Period. A Participant's subscription agreement will remain in effect for successive Offering Periods unless terminated as provided in Section 10 hereof.

(b) Payroll deductions for a Participant will commence on the first pay day following the Enrollment Date and will end on the last pay day prior to the Exercise Date of such Offering Period to which such authorization is applicable, unless sooner terminated by the Participant as provided in Section 10 hereof; provided, however, that for the first Offering Period, payroll deductions will commence on the first pay day on or following the later of (i) the end of the Enrollment Window, or (ii) the Enrollment Date of the first Offering Period.

(c) All payroll deductions made for a Participant will be credited to his or her account under the Plan and will be withheld in whole percentages only. A Participant may not make any additional payments into such account.

(d) A Participant may discontinue his or her participation in the Plan as provided in Section 10 hereof. If permitted by the Administrator, as determined in its sole discretion, during a Purchase Period, a Participant may increase or decrease the rate of his or her payroll deductions during the Purchase Period by (i) properly completing and submitting to the

Company's stock administrator (or its designee), on or before a date prescribed by the Administrator prior to an applicable Exercise Date, a new subscription agreement authorizing the change in payroll deduction rate in the form provided by the Administrator for such purpose, or (ii) completing an electronic or other procedure prescribed by the Administrator. If a Participant has not followed such procedures to change the rate of payroll deductions, the rate of his or her payroll deductions will continue at the originally elected rate throughout the Purchase Period and future Offering Periods and Purchase Periods (unless terminated as provided in Section 10 hereof). The Administrator may, in its sole discretion, limit the nature and/or number of payroll deduction rate changes that may be made by Participants during any Offering Period or Purchase Period. Any change in payroll deduction rate made pursuant to this Section 6(d) will be effective as of the first full payroll period following five (5) business days after the date on which the change is made by the Participant (unless the Administrator, in its sole discretion, elects to process a given change in payroll deduction rate more quickly).

(e) Notwithstanding the foregoing, to the extent necessary to comply with Section 423(b)(8) of the Code and Section 3(c) hereof, a Participant's payroll deductions may be decreased to zero percent (0%) by the Administrator at any time during a Purchase Period. To the extent necessary, and subject to Section 423(b)(8) of the Code, payroll deductions will recommence at the rate originally elected by the Participant effective as of the beginning of the first Purchase Period scheduled to end in the following calendar year, unless terminated by the Participant as provided in Section 10.

(f) Notwithstanding any provisions or limits to the contrary in the Plan, the Administrator may allow Eligible Employees to participate in the Plan via cash contributions or other methods instead of payroll deductions if (i) payroll deductions are not permitted under applicable local law, (ii) the Administrator determines that cash contributions are permissible under Section 423 of the Code or (iii) for Participants participating in the Non-423 Component.

(g) At the time the option is exercised, in whole or in part, or at the time some or all of the Common Stock issued under the Plan is disposed of (or any other time that a taxable event related to the Plan occurs), the Participant must make adequate provision for the Company's or Employer's federal, state, local or any other tax liability payable to any authority including taxes imposed by jurisdictions outside of the U.S., national insurance, social security or other tax withholding obligations, if any, which arise upon the exercise of the option or the disposition of the Common Stock (or any other time that a taxable event related to the Plan occurs). At any time, the Company or the Employer may, but will not be obligated to, withhold from the Participant's compensation the amount necessary for the Company or the Employer to meet applicable withholding obligations, including any withholding required to make available to the Company or the Employer any tax deductions or benefits attributable to sale or early disposition of Common Stock by the Eligible Employee. In addition, the Company or the Employer may, but will not be obligated to, withhold from the proceeds of the sale of Common Stock or any other method of withholding the Company or the Employer deems appropriate to the extent permitted by Section 423 of the Code.

7. Grant of Option. On the Enrollment Date of each Offering Period, each Eligible Employee participating in such Offering Period will be granted an option to purchase on each Exercise Date during such Offering Period (at the applicable Purchase Price) up to a number of shares of Common Stock determined by dividing such Eligible Employee's payroll deductions accumulated prior to such Exercise Date and retained in the Eligible Employee's account as of the Exercise Date by the applicable Purchase Price; provided that in no event will an Eligible Employee be permitted to purchase under the Plan during each Purchase Period more than 2,500 shares of Common Stock (subject to any adjustment pursuant to Section 19 hereof) and provided further that such purchase will be subject to the limitations set forth in Sections 3(c) and 13 hereof. The Eligible Employee may accept the grant of such option in accordance with the

requirements of Section 5 hereof. The Administrator may, for future Offering Periods, increase or decrease, in its absolute discretion, the maximum number of shares of Common Stock that an Eligible Employee may purchase during each Purchase Period. Exercise of the option will occur as provided in Section 8 hereof, unless the Participant has withdrawn pursuant to Section 10 hereof. The option will expire on the last day of the Offering Period.

8. Exercise of Option.

(a) Unless a Participant withdraws from the Plan as provided in Section 10 hereof, his or her option for the purchase of shares of Common Stock will be exercised automatically on the Exercise Date, and the maximum number of full shares subject to the option will be purchased for such Participant at the applicable Purchase Price with the accumulated payroll deductions in his or her account. No fractional shares of Common Stock will be purchased; any payroll deductions accumulated in a Participant's account, which are not sufficient to purchase a full share will be retained in the Participant's account for the subsequent Purchase Period or Offering Period, as applicable, subject to earlier withdrawal by the Participant as provided in Section 10. Any other funds left over in a Participant's account after the Exercise Date will be returned to the Participant. During a Participant's lifetime, a Participant's option to purchase shares hereunder is exercisable only by him or her.

(b) If the Administrator determines that, on a given Exercise Date, the number of shares of Common Stock with respect to which options are to be exercised may exceed (i) the number of shares of Common Stock that were available for sale under the Plan on the Enrollment Date of the applicable Offering Period, or (ii) the number of shares of Common Stock available for sale under the Plan on such Exercise Date, the Administrator may in its sole discretion (x) provide that the Company will make a pro rata allocation of the shares of Common Stock available for purchase on such Enrollment Date or Exercise Date, as applicable, in as uniform a manner as will be practicable and as it will determine in its sole discretion to be equitable among all Participants exercising options to purchase Common Stock on such Exercise Date, and continue all Offering Periods then in effect or (y) provide that the Company will make a pro rata allocation of the shares available for purchase on such Enrollment Date or Exercise Date, as applicable, in as uniform a manner as will be practicable and as it will determine in its sole discretion to be equitable among all participants exercising options to purchase Common Stock on such Exercise Date, and terminate any or all Offering Periods then in effect pursuant to Section 20 hereof. The Company may make a pro rata allocation of the shares available on the Enrollment Date of any applicable Offering Period pursuant to the preceding sentence, notwithstanding any authorization of additional shares for issuance under the Plan by the Company's stockholders subsequent to such Enrollment Date.

9. Delivery. As soon as reasonably practicable after each Exercise Date on which a purchase of shares of Common Stock occurs, the Company will arrange the delivery to each Participant of the shares purchased upon exercise of his or her option in a form determined by the Administrator (in its sole discretion) and pursuant to rules established by the Administrator. The Company may permit or require that shares be deposited directly with a broker designated by the Company or with a trustee or designated agent of the Company, and the Company may utilize electronic or automated methods of share transfer. The Company may require that shares be retained with such broker, trustee, or agent for a designated period of time and/or may establish other procedures to permit tracking of disqualifying dispositions or other dispositions of such shares. No Participant will have any voting, dividend, or other stockholder rights with respect to shares of Common Stock subject to any option granted under the Plan until such shares have been purchased and delivered to the Participant as provided in this Section 9.

10. Withdrawal.

(a) A Participant may withdraw all but not less than all the payroll deductions credited to his or her account and not yet used to exercise his or her option under the Plan at any time by (i) submitting to the Company's stock administrator (or its designee) a written notice of withdrawal in the form determined by the Administrator for such purpose, or (ii) completing an electronic or other withdrawal procedure determined by the Administrator. The Administrator may set forth a deadline of when a withdrawal must occur to be effective prior to a given Exercise Date in accordance with policies it may approve from time to time. All of the Participant's payroll deductions credited to his or her account will be paid to such Participant promptly after receipt of notice of withdrawal and such Participant's option for the Offering Period will be automatically terminated, and no further payroll deductions for the purchase of shares will be made for such Offering Period. If a Participant withdraws from an Offering Period, payroll deductions will not resume at the beginning of the succeeding Offering Period, unless the Participant re-enrolls in the Plan in accordance with the provisions of Section 5 hereof.

(b) A Participant's withdrawal from an Offering Period will not have any effect upon his or her eligibility to participate in any similar plan that may hereafter be adopted by the Company or in succeeding Offering Periods that commence after the termination of the Offering Period from which the Participant withdraws.

11. Termination of Employment. Upon a Participant's ceasing to be an Eligible Employee for any reason, he or she will be deemed to have elected to withdraw from the Plan and the payroll deductions credited to such Participant's account during the Offering Period but not yet used to purchase shares of Common Stock under the Plan will be returned to such Participant or, in the case of his or her death, to the person or persons entitled thereto under Section 15 hereof, and such Participant's option will be automatically terminated. Unless determined otherwise by the Administrator in a manner that, with respect to an Offering under the 423 Component, is permitted by, and compliant with, Section 423 of the Code, a Participant whose employment transfers between entities through a termination with an immediate rehire (with no break in service) by the Company or a Designated Company shall not be treated as terminated under the Plan; however, no Participant shall be deemed to switch from an Offering under the Non-423 Component to an Offering under the 423 Component or vice versa unless (and then only to the extent) such switch would not cause the 423 Component or any option thereunder to fail to comply with Section 423 of the Code.

12. Interest. No interest will accrue on the payroll deductions of a participant in the Plan, except as may be required by Applicable Law, as determined by the Company, and if so required by the laws of a particular jurisdiction, shall, with respect to Offerings under the 423 Component, apply to all Participants in the relevant Offering, except to the extent otherwise permitted by Section 423 of the Code.

13. Stock.

(a) Subject to adjustment upon changes in capitalization of the Company as provided in Section 19 hereof, the maximum number of shares of Common Stock that will be made available for sale under the Plan will be equal to three million (3,000,000) shares of Common Stock. In addition, on each January 1 for the first ten (10) calendar years after the first Offering Date, the aggregate number of shares of Common Stock reserved for issuance under the Plan will be increased automatically by the number of shares equal to one percent (1%) of the total number of outstanding shares of the Common Stock on the immediately preceding December 31 (rounded down to the nearest whole share); provided, that the Administrator may in its sole discretion reduce the amount of the increase in any particular year; and, provided further , that the aggregate number of shares issued pursuant to the 423 Component over the term of this Plan will not exceed sixteen million (16,000,000) shares of Common Stock.

(b) Until the shares of Common Stock are issued (as evidenced by the appropriate entry on the books of the Company or of a duly authorized transfer agent of the Company), a Participant will only have the rights of an unsecured creditor with respect to such shares, and no right to vote or receive dividends or any other rights as a stockholder will exist with respect to such shares.

(c) Shares of Common Stock to be delivered to a Participant under the Plan will be registered in the name of the Participant or in the name of the Participant and his or her spouse.

14. Administration. The Plan will be administered by the Board or a Committee appointed by the Board, which Committee will be constituted to comply with Applicable Laws. To the extent permitted by Applicable Laws, the Administrator will have full and exclusive discretionary authority to construe, interpret and apply the terms of the Plan, to delegate ministerial duties to any of the Company's employees, to designate separate Offerings under the Plan, to designate Subsidiaries and Affiliates as participating in the 423 Component or Non-423 Component, to determine eligibility, to adjudicate all disputed claims filed under the Plan and to establish such procedures that it deems necessary or advisable for the administration of the Plan (including, without limitation, to adopt such procedures, sub-plans, and appendices to the subscription agreement as are necessary or appropriate to permit the participation in the Plan by employees who are non-U.S. nationals or employed outside the U.S., the terms of which sub-plans and appendices may take precedence over other provisions of this Plan, with the exception of Section 13(a) hereof, but unless otherwise superseded by the terms of such sub-plan or appendix, the provisions of this Plan shall govern the operation of such sub-plan or appendix). Unless otherwise determined by the Administrator, the employees eligible to participate in each sub-plan will participate in a separate Offering under the 423 Component, or if the terms would not qualify under the 423 Component, in the Non-423 Component, in either case unless such designation would cause the 423 Component to violate the requirements of Section 423 of the Code. Without limiting the generality of the foregoing, the Administrator is specifically authorized to adopt rules and procedures regarding eligibility to participate, the definition of Compensation, handling of payroll deductions, making of contributions to the Plan (including, without limitation, in forms other than payroll deductions), establishment of bank or trust accounts to hold payroll deductions, payment of interest, conversion of local currency, obligations to pay payroll tax, determination of beneficiary designation requirements, withholding procedures and handling of stock certificates that vary with applicable local requirements. The Administrator also is authorized to determine that, to the extent permitted by Section 423 of the Code, the terms of an option granted under the Plan or an Offering to citizens or residents of a non-U.S. jurisdiction will be less favorable than the terms of options granted under the Plan or the same Offering to employees resident solely in the U.S. Every finding, decision and determination made by the Administrator will, to the full extent permitted by law, be final and binding upon all parties.

15. Designation of Beneficiary.

(a) If permitted by the Administrator, a Participant may file a designation of a beneficiary who is to receive any shares of Common Stock and cash, if any, from the Participant's account under the Plan in the event of such Participant's death subsequent to an Exercise Date on which the option is exercised but prior to delivery to such Participant of such shares and cash. In addition, if permitted by the Administrator, a Participant may file a designation of a beneficiary who is to receive any cash from the Participant's account under the Plan in the event of such Participant's death prior to exercise of the option. If a Participant is married and the designated beneficiary is not the spouse, spousal consent will be required for such designation to be effective.

(b) Such designation of beneficiary may be changed by the Participant at any time by notice in a form determined by the Administrator. In the event of the death of a Participant and in the absence of a beneficiary validly designated under the Plan who is living at the time of such Participant's death, the Company will deliver such shares and/or cash to the executor or administrator of the estate of the Participant, or if no such executor or administrator has been appointed (to the knowledge of the Company), the Company, in its discretion, may deliver such shares and/or cash to the spouse or to any one or more dependents or relatives of the Participant, or if no spouse, dependent or relative is known to the Company, then to such other person as the Company may designate.

(c) All beneficiary designations will be in such form and manner as the Administrator may designate from time to time. Notwithstanding Sections 15(a) and (b) above, the Company and/or the Administrator may decide not to permit such designations by Participants in non-U.S. jurisdictions to the extent permitted by Section 423 of the Code.

16. Transferability. Neither payroll deductions credited to a Participant's account nor any rights with regard to the exercise of an option or to receive shares of Common Stock under the Plan may be assigned, transferred, pledged or otherwise disposed of in any way (other than by will, the laws of descent and distribution or as provided in Section 15 hereof) by the Participant. Any such attempt at assignment, transfer, pledge or other disposition will be without effect, except that the Company may treat such act as an election to withdraw funds from an Offering Period in accordance with Section 10 hereof.

17. Use of Funds. The Company may use all payroll deductions received or held by it under the Plan for any corporate purpose, and the Company will not be obligated to segregate such payroll deductions except under Offerings or for Participants in the Non-423 Component for which Applicable Laws require that contributions to the Plan by Participants be segregated from the Company's or the Employer's general corporate funds and/or deposited with an independent third party, provided that, if such segregation or deposit with an independent third party is required by Applicable Laws, it will apply to all Participants in the relevant Offering under the 423 Component, except to the extent otherwise permitted by Section 423 of the Code. Until shares of Common Stock are issued, Participants will only have the rights of an unsecured creditor with respect to such shares.

18. Reports. Individual accounts will be maintained for each Participant in the Plan. Statements of account will be given to participating Eligible Employees at least annually, which statements will set forth the amounts of payroll deductions, the Purchase Price, the number of shares of Common Stock purchased and the remaining cash balance, if any.

19. Adjustments, Dissolution, Liquidation, Certain Transactions.

(a) Adjustments. In the event that any dividend or other distribution (whether in the form of cash, Common Stock, other securities, or other property), recapitalization, stock split, reverse stock split, reorganization, merger, consolidation, split-up, spin-off, combination, repurchase, or exchange of Common Stock or other securities of the Company, or other change in the corporate structure of the Company affecting the Common Stock occurs, the Administrator, in order to prevent dilution or enlargement of the benefits or potential benefits intended to be made available under the Plan, will, in such manner as it may deem equitable, adjust the number and class of Common Stock that may be delivered under the Plan, the Purchase Price per share, and the class and the number of shares of Common Stock covered by each option under the Plan that has not yet been exercised, and the numerical limits of Sections 6 and 13 hereof.

(b) Dissolution or Liquidation. In the event of the proposed dissolution or liquidation of the Company, any Offering Period then in progress will be shortened by setting a New Exercise Date, and will terminate immediately prior to the consummation of such proposed dissolution or liquidation, unless provided otherwise by the Administrator. The New Exercise Date will be before the date of the Company's proposed dissolution or liquidation. The Administrator will notify each Participant in writing or electronically, prior to the New Exercise Date, that the Exercise Date for the Participant's option has been changed to the New Exercise Date and that the Participant's option will be exercised automatically on the New Exercise Date, unless prior to such date the Participant has withdrawn from the Offering Period as provided in Section 10 hereof.

(c) Certain Transactions. In the event of a merger, consolidation or similar transaction directly or indirectly involving the Company in which the Company is not the surviving corporation, each outstanding option will be assumed or an equivalent option substituted by the acquiring or successor corporation or a Parent or Subsidiary of the acquiring or successor corporation. In the event that the acquiring or successor corporation refuses to assume or substitute for the option, the Offering Period with respect to which such option relates will be shortened by setting a New Exercise Date on which such Offering Period shall end. The New Exercise Date will occur before the date of the proposed transaction. The Administrator will notify each Participant in writing or electronically prior to the New Exercise Date, that the Exercise Date for the Participant's option has been changed to the New Exercise Date and that the Participant's option will be exercised automatically on the New Exercise Date, unless prior to such date the Participant has withdrawn from the Offering Period as provided in Section 10 hereof.

20. Amendment or Termination.

(a) The Administrator, in its sole discretion, may amend, suspend, or terminate the Plan, or any part thereof, at any time and for any reason. If the Plan is terminated, the Administrator, in its discretion, may elect to terminate all outstanding Offering Periods either immediately or upon completion of the purchase of shares of Common Stock on the next Exercise Date (which may be sooner than originally scheduled, if determined by the Administrator in its discretion), or may elect to permit Offering Periods to expire in accordance with their terms (and subject to any adjustment pursuant to Section 19). If the Offering Periods are terminated prior to expiration, all amounts then credited to Participants' accounts that have not been used to purchase shares of Common Stock will be returned to the Participants (without interest thereon, except as otherwise required under Applicable Laws, as further set forth in Section 12 hereof) as soon as administratively practicable.

(b) Without stockholder consent and without limiting Section 20(a) above, the Administrator will be entitled to change the Offering Periods or Purchase Periods, designate separate Offerings, limit the frequency and/or number of changes in the amount withheld during an Offering Period, establish the exchange rate applicable to amounts withheld in a currency other than U.S. dollars, permit payroll withholding in excess of the amount designated by a Participant in order to adjust for delays or mistakes in the Company's processing of properly completed withholding elections, establish reasonable waiting and adjustment periods and/or accounting and crediting procedures to ensure that amounts applied toward the purchase of Common Stock for each Participant properly correspond with amounts withheld from the Participant's Compensation, and establish such other limitations or procedures as the Administrator determines in its sole discretion advisable that are consistent with the Plan.

(c) In the event the Administrator determines that the ongoing operation of the Plan may result in unfavorable financial accounting consequences, the Administrator may, in its discretion and, to the extent necessary or desirable, modify, amend or terminate the Plan to reduce or eliminate such accounting consequence, including, but not limited to:

(i) amending the Plan to conform with the safe harbor definition under the Financial Accounting Standards Board Accounting Standards Codification Topic 718 (or any successor thereto), including with respect to an Offering Period underway at the time;

(ii) altering the Purchase Price for any Offering Period or Purchase Period including an Offering Period underway at the time of the change in Purchase Price, but, with respect to any existing Offerings under the 423 Component, in no event below the lowest Purchase Price permitted by Section 423 of the Code;

(iii) shortening any Offering Period by setting a New Exercise Date, including an Offering Period underway at the time of the Administrator action;

(iv) reducing the maximum percentage of Compensation a Participant may elect to set aside as payroll deductions; and

(v) reducing the maximum number of shares of Common Stock a Participant may purchase during any Offering Period.

Such modifications or amendments will not require stockholder approval or the consent of any Plan Participants.

21. Notices. All notices or other communications by a Participant to the Company under or in connection with the Plan will be deemed to have been duly given when received in the form and manner specified by the Company at the location, or by the person, designated by the Company for the receipt thereof.

22. Conditions Upon Issuance of Shares. Shares of Common Stock will not be issued with respect to an option unless the exercise of such option and the issuance and delivery of such shares pursuant thereto will comply with all applicable provisions of law, domestic or foreign, including, without limitation, the Securities Act of 1933, as amended, the Exchange Act, the rules and regulations promulgated thereunder, and the requirements of any stock exchange upon which the shares may then be listed, and will be further subject to the approval of counsel for the Company with respect to such compliance.

As a condition to the exercise of an option, the Company may require the person exercising such option to represent and warrant at the time of any such exercise that the shares are being purchased only for investment and without any present intention to sell or distribute such shares if, in the opinion of counsel for the Company, such a representation is required by any of the aforementioned applicable provisions of law.

23. Code Section 409A. The 423 Component of the Plan is intended to be exempt from the application of Code Section 409A pursuant to Treasury Regulation Section 1.409A-1(b)(5)(ii) and any ambiguities herein will be interpreted to so be exempt from Code Section 409A. To the extent the options granted under the Non-423 Component are subject to U.S. taxation, the Non-423 Component is intended to be exempt from the application of Code Section 409A as options granted thereunder are intended to constitute "short term deferrals" and any ambiguities herein will be interpreted such that those options shall so be exempt from Code Section 409A. In furtherance of the foregoing and notwithstanding any provision in the Plan to the contrary, if the Administrator determines that an option granted under the Plan may be subject to Code Section 409A or that any provision in the Plan would cause an option under the

Plan to be subject to Code Section 409A, the Administrator may amend the terms of the Plan and/or of an outstanding option granted under the Plan, or take such other action the Administrator determines is necessary or appropriate, in each case, without the Participant's consent, to exempt any outstanding option or future option that may be granted under the Plan from or to allow any such options to comply with Code Section 409A, but only to the extent any such amendments or action by the Administrator would not violate Code Section 409A. Notwithstanding the foregoing, the Company and any of its Parent or Subsidiaries shall have no liability to a Participant or any other party if the option to purchase Common Stock under the Plan that is intended to be exempt from or compliant with Code Section 409A is not so exempt or compliant or for any action taken by the Administrator with respect thereto. The Company and any of its Parent or Subsidiaries makes no representation that the option to purchase Common Stock under the Plan is compliant with Code Section 409A.

24. Term of Plan. The Plan will become effective as of the Effective Date, and will continue in effect, unless earlier terminated under Section 20 hereof.

25. Governing Law. The Plan shall be governed by, and construed in accordance with, the laws of the State of Delaware (except its choice-of-law provisions).

26. No Right to Employment. Participation in the Plan by a Participant shall not be construed as giving a Participant the right to be retained as an employee of the Company or a Subsidiary or Affiliate, as applicable. Furthermore, the Company or a Subsidiary or Affiliate may dismiss a Participant from employment at any time, free from any liability or any claim under the Plan.

27. Severability. If any provision of the Plan is or becomes or is deemed to be invalid, illegal, or unenforceable for any reason in any jurisdiction or as to any Participant, such invalidity, illegality or unenforceability shall not affect the remaining parts of the Plan, and the Plan shall be construed and enforced as to such jurisdiction or Participant as if the invalid, illegal or unenforceable provision had not been included.

28. Compliance with Applicable Laws. The terms of this Plan are intended to comply with all Applicable Laws and will be construed accordingly.

SUBSIDIARIES OF JAMF HOLDING CORP.
(as of December 31, 2021)

Name	Jurisdiction of Formation
Juno Parent, LLC	Delaware
Juno Intermediate, Inc.	Delaware
JAMF Holdings, Inc.	Minnesota
JAMF Software, LLC	Minnesota
JAMF International, Inc.	Minnesota
Jamf Software Canada Limited	British Columbia (Canada)
Jamf Japan G.K.	Japan
JAMF Software Pacific Limited	Hong Kong
Jamf Software, Inc.	Taiwan
JAMF Software Australia Pty Ltd	Australia
Kinobi IP Pty Ltd	Australia
Mondada Pty Ltd	Australia
The Mondada Group Pty Ltd	Australia
JAMF Software Atlantic B.V.	Netherlands
JAMF Software UK Limited	United Kingdom
JAMF Software France SARL	France
JAMF Software Poland sp. z o.o.	Poland
JAMF Software Germany GmbH	Germany
Jamf Sweden AB	Sweden
Jamf Software S. de R.L. de C.V.	Mexico
Wandera, Inc.	Delaware
Wandera Pte Ltd.	Singapore
Wandera AU Pty Ltd	Australia
Wandera CZ s.r.o.	Czech Republic
Wandera (Italy) srl	Italy
Wandera (Israel) Ltd.	Israel
Wandera Ltd.	United Kingdom

Exhibit 23.1

Consent of Independent Registered Public Accounting Firm

We consent to the incorporation by reference in the Registration Statement (Form S-8 No. 333-240087) pertaining to the Jamf Holding Corp. Omnibus Incentive Plan and the Amended and Restated Jamf Holding Corp. 2017 Stock Option Plan of Jamf Holding Corp. of our report dated March 1, 2022, with respect to the consolidated financial statements of Jamf Holding Corp. included in this Annual Report (Form 10-K) for the year ended December 31, 2021.

/s/ Ernst & Young LLP

Minneapolis, Minnesota
March 1, 2022

Exhibit 31.1

Certification Pursuant to Section 302 of Sarbanes-Oxley Act of 2002

I, Dean Hager, certify that:

1. I have reviewed this Annual Report on Form 10-K of Jamf Holding Corp.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

    a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

    b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

    c) Evaluated the effectiveness of the registrant’s disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

    d) Disclosed in this report any change in the registrant’s internal control over financial reporting that occurred during the registrant’s most recent fiscal quarter (the registrant’s fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant’s internal control over financial reporting; and

5. The registrant’s other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant’s auditors and the audit committee of the registrant’s board of directors (or persons performing the equivalent functions):

    a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant’s ability to record, process, summarize and report financial information; and

    b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant’s internal control over financial reporting.

Date: March 1, 2022

/s/ Dean Hager

Dean Hager
Director and Chief Executive Officer

Exhibit 31.2

Certification Pursuant to Section 302 of Sarbanes-Oxley Act of 2002

I, Jill Putman, certify that:

1. I have reviewed this Annual Report on Form 10-K of Jamf Holding Corp.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

    a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

    b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

    c) Evaluated the effectiveness of the registrant’s disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

    d) Disclosed in this report any change in the registrant’s internal control over financial reporting that occurred during the registrant’s most recent fiscal quarter (the registrant’s fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant’s internal control over financial reporting; and

5. The registrant’s other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant’s auditors and the audit committee of the registrant’s board of directors (or persons performing the equivalent functions):

    a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant’s ability to record, process, summarize and report financial information; and

    b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant’s internal control over financial reporting.

Date: March 1, 2022

/s/ Jill Putman

Jill Putman
Chief Financial Officer

Exhibit 32.1

Certification of the Chief Executive Officer

Pursuant to Rule 18 U.S.C. Section 1350

In connection with the Annual Report on Form 10-K of Jamf Holding Corp. (the “Company”) for the year ended December 31, 2021, as filed with the U.S. Securities and Exchange Commission (the “Report”), I, Dean Hager, Chief Executive Officer of the Company, hereby certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that, to my knowledge:

1. The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended; and
2. The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: March 1, 2022

/s/ Dean Hager

Dean Hager
Director and Chief Executive Officer

Exhibit 32.2

Certification of the Chief Financial Officer

Pursuant to Rule 18 U.S.C. Section 1350

In connection with the Annual Report on Form 10-K of Jamf Holding Corp. (the “Company”) for the year ended December 31, 2021, as filed with the U.S. Securities and Exchange Commission (the “Report”), I, Jill Putman, Chief Financial Officer of the Company, hereby certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that, to my knowledge:

1. The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended; and

2. The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: March 1, 2022

/s/ Jill Putman

Jill Putman
Chief Financial Officer