Steadfast.

bandwidth

2019 ANNUAL REPORT

To our stockholders and friends,

Thank you for being part of another stellar year for Bandwidth.

2019 was marked by continued revenue growth and outstanding performance. We generated total revenue of $232.6 million, up 14% year-over-year. Within total revenue, CPaaS revenue was $197.9 million, up 20% year-over-year. We finished the year with 1,728 active CPaaS customers, up 40% from the close of 2018.

Our 2019 results reflect the strength and contributions of our growing team. In 2019, the BAND grew to 772 employees, including 206 in our Research & Development organization (up from 156 in 2018) and 212 in our Sales and Marketing organizations (up from 150 in 2018).

I am proud of Bandwidth's performance when measured by these metrics. I also recognize that you, our customers, our team, and I expect more than stellar financial results. We also strive to serve as a good corporate citizen and foster an environment of respect and responsibility in which our team can thrive.

and Whole Person Challenges that seek to strengthen the mind, body, and spirit. We also invest in robust training programs to develop our employees in their careers and as leaders. Bandwidth provides company-facilitated and self-directed learning opportunities, enhanced by our strong partnerships with area universities including NC State, Duke, and the University of North Carolina. Year after year, I witness the dramatic impact of our Whole Person Promise in the lives of our BANDmates and in the successes we share with our customers as a result of our highly-engaged team.

Bandwidth's mission is to develop and deliver the power to communicate. Our technologies and our nationwide network help our customers connect. We work to connect with the communities where we live and work. Simply put, we are committed to loving our neighbors, and we do so by giving generously of our time, talents, and treasures. Over the years, Bandwidth team members have contributed more than 10,000 hours of volunteer time and raised money for dozens of charities. In 2019 alone, our BANDmates

I applaud the growing chorus of voices calling for companies to be more than profit sources and demanding that the workplace be **more than just a place of business**.

I applaud the growing chorus of voices calling for companies to be more than profit sources and demanding that the workplace be more than just a place of business. At Bandwidth, these truths have been at our core since the Company's founding and have fueled our extraordinary success story.

In 2013, we codified our "Whole Person Promise" and it remains at the heart of everything we do. The Whole Person Promise reflects our conviction that accomplishing Bandwidth's mission requires us to care for our team members, who in turn care for our customers, each other, and our communities. Our Whole Person Promise seeks to ensure that every team member has meaningful work and the support necessary to thrive in mind, body, and spirit.

At Bandwidth, this includes 100% employer-paid benefits, vacation embargos that let BANDmates enjoy time off without work intrusions, 90-minute workout lunches, industry-leading parental leave policies, corporate chaplains, free gym memberships,

devoted more than 1,500 hours to community service. The long list of charitable organizations supported by Bandwidth in 2019 includes:

- American Cancer Society
- American Red Cross
- Big Brothers Big Sisters
- Food Bank of Central & Eastern North Carolina
- Gigi's Playhouse
- Habitat for Humanity
- Holt Brothers Foundation
- Meals on Wheels
- Rise Against Hunger
- Special Olympics

We foster our **culture of connection** by encouraging BANDmates

We foster our culture of connection by encouraging BANDmates to take time during the workday to participate in community events. We reward community engagement with extra vacation days. In the coming years, this team will continue to find new ways to do well by doing good.

As we grow, so does our opportunity to enhance and protect the communities where we live and work and those beyond. We're taking steps—big and small—to do our part to contribute to environmental sustainability.

Bandwidth's Communications Platform powers countless tools that allow people to connect, no matter the distance. We power companies including Google, Zoom, Microsoft, Cisco Webex, LogMeIn, and RingCentral. These companies eliminate the need for face-to-face meetings and facilitate remote working arrangements combating the negative environmental impact of commuting and travel. We are proud to power these innovators.

One of our primary office buildings is LEED certified, and we expect that number to increase as we expand our corporate presence in Raleigh and beyond. We utilize data centers operated with a commitment to sustainable environmental performance. Outside the office, you can find our BANDmates volunteering on park beautification projects and helping tend to the three bee hives that we sponsor through Bee Downtown. This organization installs and maintains beehives on corporate campuses to help rebuild healthy honey bee populations. We also enjoy the bounty of these hives in a literal sense. Come join us for a cup of tea sweetened with our very own Bandwidth honey!

Thank you for your enduring trust in this team, which continues to demonstrate unwavering focus and dedication. It is my honor to serve our customers as part of this BAND. Above all, I am grateful for the abundant blessings that God continues to pour down on the Bandwidth team, our families, and the work set before us.

Onward,

David A. Morken
Co-Founder, Chairman,
& Chief Executive Officer


bandwidth

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, 2019

OR

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

For the transition period from to

Commission File Number: 001-38285

BANDWIDTH INC.

(Exact name of registrant as specified in its charter)

Delaware	**56-2242657**
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification Number)

900 Main Campus Drive
Raleigh, NC 27606
(Address of principal executive offices) (Zip Code)

(800) 808-5150
(Registrant's telephone number, including area code)

Securities Registered Pursuant to Section 12(b) of the Act:

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Class A Common Stock, par value $0.001 per share	BAND	NASDAQ Global Select Market

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

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

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

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

Indicate by check mark whether the registrant has submitted electronically and posted to its corporate web site, if any, 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 and post such files). Yes ☒ No ☐

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

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

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

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

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

The aggregate market value of the voting and non-voting common stock held by non-affiliates of the registrant as of June 28, 2019, the last business day of the registrant's most recently completed second fiscal quarter, was $1,415 million based upon the closing price reported for such date on the NASDAQ Global Select Market.

As of January 31, 2020, 18,610,208 shares of the registrant's Class A common stock and 4,927,401 shares of registrant's Class B common stock were outstanding, respectively.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's Definitive Proxy Statement for the 2020 Annual Meeting of Stockholders are incorporated herein by reference in Part II and Part III of this Annual Report on Form 10-K to the extent stated herein. Such Definitive Proxy Statement will be filed with the Securities and Exchange Commission within 120 days of the registrant's fiscal year ended December 31, 2019.

BANDWIDTH INC.

Annual Report on Form 10-K

For the Year Ended December 31, 2019

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Special Note Regarding Forward-Looking Statements

This Annual Report on Form 10-K contains forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended (the "Securities Act") and Section 21E of the Securities Exchange Act of 1934, as amended (the "Exchange Act"). All statements contained in this Annual Report on Form 10-K, other than statements of historical fact, are forward-looking statements. Forward-looking statements generally can be identified by the words "may," "will," "expect," "believe," "anticipate," "intend," "could," "would," "project," "plan," "estimate," or "continue," or the negative of these words or other similar terms or expressions that concern our expectations strategy, plans or intentions. Forward looking statements contained in this Annual Report on Form 10-K include, but are not limited to, statements about:

- our ability to attract and retain customers, including large enterprises;
- our approach to identifying, attracting and keeping new and existing customers, as well as our expectations regarding customer turnover;
- our beliefs regarding network traffic growth and other trends related to the usage of our products and services;
- our expectations regarding revenue, costs, expenses, gross margin, dollar based net retention rate, adjusted EBITDA, non-generally accepted accounting principles in the United States of America ("GAAP") net income and capital expenditures;
- our beliefs regarding the growth of our business and how that impacts our liquidity and capital resources requirements;
- the sufficiency of our cash and cash equivalents to meet our liquidity needs;
- our ability to attract, train, and retain qualified employees and key personnel;
- our beliefs regarding the expense and productivity of and competition for our sales force;
- our expectations regarding headcount;
- our ability to maintain and benefit from our corporate culture;
- our plans to further invest in and grow our business, including international offerings, and our ability to effectively manage our growth and associated investments;
- our ability to introduce new products and services and enhance existing products and services;
- our ability to compete successfully against current and future competitors;
- the evolution of technology affecting our products, services and markets;
- the impact of certain new accounting standards and guidance, as well as the time and cost of continued compliance with existing rules and standards;
- our beliefs regarding the use of Non-GAAP financial measures;
- our ability to maintain, protect and enhance our intellectual property;
- our expectations regarding litigation and other pending or potential disputes;
- our ability to comply with modified or new laws and regulations; and
- the increased expenses associated with being a public company.

We caution you that the foregoing list may not contain all the forward-looking statements made in this Annual Report on Form 10-K.

You should not rely upon forward-looking statements as predictions of future events. We have based the forward-looking statements contained in this Annual Report on Form 10-K primarily on our current expectations and projections about future events and trends that we believe may affect our business, financial condition, results of operations and prospects. The outcome of the events described in these forward-looking statements is subject to risks, uncertainties and other factors described in the section titled “Risk Factors” and elsewhere in this Annual Report on Form 10-K. Moreover, we operate in a very competitive and rapidly changing environment. New risks and uncertainties emerge from time to time and it is not possible for us to predict all risks and uncertainties that could have an impact on the forward-looking statements contained in this Annual Report on Form 10-K. We cannot assure you that the results, events and circumstances reflected in the forward-looking statements will be achieved or occur, and actual results, events or circumstances could differ materially from those described in the forward-looking statements.

The forward-looking statements made in this Annual Report on Form 10-K relate only to events as of the date on which the statements are made. We undertake no obligation to update any forward-looking statements made in this Annual Report on Form 10-K to reflect events or circumstances after the date of this Annual Report on Form 10-K or to reflect new information or the occurrence of unanticipated events, except as required by law. We may not actually achieve the plans, intentions or expectations disclosed in our forward-looking statements and you should not place undue reliance on our forward-looking statements. Our forward-looking statements do not reflect the potential impact of any future acquisitions, mergers, dispositions, joint ventures or investments we may make.

PART I - FINANCIAL INFORMATION

Item 1. Business

Overview

We are a leading cloud-based communications platform for enterprises in the United States. Our solutions include a broad range of software Application Programming Interfaces ("APIs") for voice and messaging functionality and our owned and managed, purpose-built Internet Protocol ("IP") voice network, one of the largest in the nation. Our sophisticated and easy-to-use software APIs allow enterprises to enhance their products and services by incorporating advanced voice, messaging and 911 services capabilities. Companies use our platform to more frequently and seamlessly connect with their end users, add voice calling capabilities to applications and devices, transition from on-premise to cloud-based communication tools and applications, integrate messaging capabilities into applications or software, offer end users new mobile application experiences including emergency services and improve employee productivity, among other use cases. By owning and operating a capital-efficient, purpose-built IP voice network, we are able to offer advanced monitoring, reporting and analytics, superior customer service, dedicated operating teams, personalized support, and flexible cost structures. For more than a decade, we have pioneered the Communications Platform-as-a-Service ("CPaaS") space through our innovation-rich culture and focus on empowering enterprises with end-to-end communications solutions.

As technologies evolve and new mobile applications and connected devices proliferate, enterprises must adapt and innovate their communications solutions to create a "connected" experience anywhere, anytime, on any device. Enterprises looking to capitalize on trends such as Application-to-Person ("A2P") messaging, omnichannel customer service, and voice-as-an-interface need solutions that are reliable, secure, scalable and cost-efficient. Most software-powered communications providers rely heavily on leased networks and cannot provide enterprise-grade service and support. We believe traditional large-scale network providers lack the capabilities to build robust software platforms for agile development of communications solutions. Enterprises focus on their core businesses and lack the technical know-how or strategic flexibility to build the customized solutions they require in-house. As a result, enterprises need a third-party, end-to-end, cloud-based software solution that eliminates the complexity and expense of building and maintaining their own communications platform.

Our solutions address enterprises' communications needs and we believe they are shaping the future of how enterprises connect through embedded voice and messaging for applications and devices. At the core of our solutions are our communications software APIs, which allow companies to build products and services on top of our cloud-based, out-of-the-box software. Our software APIs include pre-defined functions that are easily customizable for specific use cases without the challenge and expense of building and deploying complex code. Moreover, our platform collects and analyzes terabytes of call and messaging data records in real-time and provides a seamless integration to CRM and Business Intelligence analytics tools to provide meaningful data driven actionable insights for critical business decisions. Customers can then launch and scale applications and solutions with reliability using our own nationwide IP voice network. Our voice software APIs allow enterprises to make and receive phone calls and create advanced voice experiences. Integration with our purpose-built IP voice network ensures enterprise-grade functionality and secure, high-quality connections. Our messaging software APIs provide enterprises with advanced tools to connect with end users via messaging. Our customers also use our solutions to enable 911 response capabilities, real-time provisioning and activation of phone numbers, and toll-free number messaging.

We are the only CPaaS provider in the industry with our own nationwide IP voice network, which we have purpose-built for our platform. Our network is capital-efficient and custom-built to support the applications and experiences that make a difference in the way enterprises communicate. Since a communications platform is only as strong as the network that backs it, we believe our network provides a significant competitive advantage in the control, quality, pricing power and scalability of our offering. We are able to control the quality and provide the support our customers expect, as well as efficiently meet scalability and cost requirements.

Our customers currently include large enterprises, communications service providers, conferencing providers, contact centers, small and medium-sized businesses, emerging technology companies and any other business. Our customers operate in a diverse set of industries, including technology, communications, hospitality and services, that need to launch and scale robust communications experiences. Our customers choose Bandwidth because we empower them to embed seamless communications within their products and services in a reliable, flexible, scalable and cost-efficient manner. Our customers include Google, Microsoft, Cisco-Webex, Dialpad, RingCentral, GoDaddy, Kipsu, Rover and ZipRecruiter, among many others. We do not currently have any consumer or residential customers, although our enterprise customers may utilize our solutions to serve their own consumer or residential customers or end users.

Our usage-based revenue model allows us to grow with our customers and increase our revenue base as our customers expand their usage of our solutions. Our dollar-based net retention rate, which measures our customers' increased utilization of our platform, was 107%, 118% and 113% for the years ended December 31, 2017, 2018 and 2019, respectively.

We have continued growing our business in recent periods. For the years ended December 31, 2017, 2018 and 2019, our revenue was $163.0 million, $204.1 million and $232.6 million, respectively, and our net income was $6.0 million, $17.9 million and $2.5 million, respectively.

Segments

We have two reportable segments, CPaaS and Other. Segments are evaluated based on revenue and gross profit. We do not allocate operating expenses, interest expense or income tax expense to our segments. Accordingly, we do not report such information. We generate a majority of our revenue from our CPaaS segment. CPaaS revenue is derived from voice usage, phone number services, 911-enabled phone number services, messaging services and other services. We generate a portion of our CPaaS revenue from usage-based fees which include voice calling and messaging services. The remainder of our revenue is generated by our Other segment. Other revenue is composed of revenue earned from our legacy services and indirect revenue. See Note 9, "Segment and Geographic Information," in our consolidated financial statements included elsewhere in this Annual Report on Form 10-K, for additional information about our segments.

Our Platform

Our Bandwidth Communications Platform empowers enterprises to create and scale voice, messaging and 911 communications services across any application and device. Our software platform and IP voice network enable our enterprise customers to rapidly develop and deploy real-time and mission-critical, software-powered communications solutions. Our sophisticated and easy-to-use software APIs allow enterprises to enhance their products and services by incorporating advanced voice and messaging capabilities. By owning and operating a capital-efficient, purpose-built IP voice network, we are able to offer advanced monitoring, reporting and analytics, superior customer service, dedicated operating teams, personalized support and flexible cost structures.

Our cloud-based platform is a proprietary CPaaS offering consisting of voice and messaging solutions:

Voice Software API. We provide flexible software APIs that are used to build voice calling within applications, innovative call flows between users or machines, call recording, text-to-speech for interactive voice response, call detail records, conference calling, bridging and more. We provide the ability to have customized high-quality call routing for business voice use cases and global reach. Our voice quality monitoring service provides tools and processes for network quality tests and proactive tuning. While we provide a wide range of functionalities, some of the common use cases are:

- ***Enabling local and toll-free numbers via software API****:* Our platform empowers enterprises with a capability to activate and manage phone numbers instantly and at scale. With our bulk porting option customers can port an unlimited amount of phone numbers at once, coordinating port dates and times from multiple carriers. Using our easy to use software APIs, our enterprise customers can easily add additional lines to their business as well as for their end users.

- ***Automating voice communication while preserving privacy***: Our software APIs enable voice communication capabilities from a mobile application to an individual or a group with or without disclosing personal identity.

- ***Embedding 'click-to-call' communication feature**:* We enhance our enterprise customers' mobile and web marketing capabilities by embedding click-to-call functionality in their customer outreach, including advertising campaigns, that enables them to connect with consumers instantly.

- ***Real-time call analytics**:* We provide our enterprise customers with real-time call analytics through our dashboard that correlates the raw data from calls with CRM records, including the call duration, customer sentiment and other attributes, in order to provide meaningful contextual sales and other business insights.

- ***Transitioning from traditional premise focused communications to cloud based services:*** We provide unified communications providers modern, scalable and cost efficient voice and messaging solutions which enable their digital transformation efforts. Our network and API solutions work in a hybrid environment as well as a full cloud deployment.

Messaging Software API. Our software APIs for messaging deliver a complete wireless experience for both P2P and A2P messaging including: delivery receipts, MMS, long text support, short code support, emoji support and bi-directional unicode (international characters) and short codes interoperability. Bandwidth's messaging services are enabled for both local and toll-free phone numbers. While we provide a wide range of functionalities, some of the common use cases are:

- ***Automated real-time notification and alerts**:* Our software APIs empower our enterprise customers with predefined functionalities to send and receive messages to and from an application to an individual or a group. Our customers often build more customized use cases on top of our predefined use cases.

- ***Two-factor authentication***: We enable enterprises to verify the identity and maintain security of end users through our software-based SMS verification service that sends unique codes to end users in order to log in to mobile and web applications.

- ***Group messaging***: Enterprises utilize our platform to collaborate with their end users on a real-time basis by enabling group messaging within their user community to share messages, videos, carry out polls and surveys amongst other uses without leaving the application.

911 Software API. We are the only software platform that provides complete communications solutions with integrated 911 services. We can instantly connect numbers, devices or applications to emergency services with reliable and accurate emergency routing. Our Dynamic Geospatial Routing uses geocoding to enable real-time routing based on X,Y coordinates of the caller and defined Public Safety Access Point boundaries. Additionally, our notification API enables an email notification sent to on-site security personnel when a 911 call takes place within a large enterprise. Our Advanced "Next Generation 911" "i3"-ready NENA i2 "Enhanced" service network covers approximately 99% of the United States.

Key Benefits of Our Software Platform

Our Bandwidth Communications Platform provides the following benefits to the enterprises we serve:

- *Easy to Build and Deploy*. Our easy-to-use, intuitive software APIs are ready to launch and scale from day one. We enable enterprises to rapidly and easily scale communications functionalities to a vast range of applications and devices. Our technology requires minimal lines of code to build customized applications, which allows for rapid composition of customized solutions and seamless embedding within other applications.

- *Easy to Scale*. We enable enterprises to easily scale nationwide at launch, without sacrificing quality, while meeting the most stringent requirements. We can deliver full end-to-end automation for even the largest of enterprises using our IP voice network, which is the largest of any CPaaS provider based on the number of rate centers, a measure for the footprint covered by our IP voice network. We are able to support high user volumes without impacting deliverability. Our software, built on our own IP voice network, removes complexity, eliminates performance degradation and increases cost efficiencies at scale.

- *Flexibility*. Our software APIs are easy to deploy and use and allow for the creation of solutions to address a broad array of use cases. Our software can be implemented directly into product workflow for a variety of custom solutions such as creation of virtual call centers, group messaging and dynamic call location routing. We enable developers to easily and rapidly innovate with our platform.

Key Benefits of Our Network

Our owned and managed IP voice network provides the following benefits to the enterprises we serve:

- *Enhanced Quality and Reliability*. We offer greater levels of quality and delivery assurance than providers offering services across the public Internet or through partnerships. As a result, the enterprises we serve have enjoyed 99.9% network uptime in 2019.

- *Total Accountability.* The ability to vertically integrate our software platform with our own IP voice network provides us with a differentiated ability to continuously monitor, report and resolve any software- or network-related issues on a real-time basis. For our enterprise customers, having a single platform solution for their entire communications requirements, including software and network, provides tremendous value with respect to time and financial resources. Our service-level agreements with our enterprise customers assure that we provide high quality service and give them peace of mind and confidence in our service.

- *Lower Total Cost to Our Customers*. The differentiated pairing of our software combined with owning the delivery capability through our IP voice network leads to significant savings for the enterprises we serve as compared to our competitors. Our IP voice network lowers total cost to our customers as compared to our competitors because of our reduced capital expenditure requirements and lower marginal costs at scale, which we are able to pass on to our customers.

Our Competitive Strengths

In our 20 years of business, we have prided ourselves on maintaining a start-up culture and our focus on continuous innovation. We have innovated on our CPaaS offerings to empower our enterprise customers with the most comprehensive software-powered communications platform that integrates seamlessly with one of the largest IP voice networks in the United States that we built and operate. Our innovation-rich culture, customer-centric solutions and track record of successful execution provide us with the following competitive strengths:

- *Highly Scalable Platform Built for the Enterprise.* We built our Bandwidth Communications Platform from the ground up as an enterprise-grade cloud application. As a result, our deployment is fast, our software APIs are flexible and easy-to-use, and we enable enterprises to launch and scale on day one. Our software APIs allow the enterprise customers we serve to grow with flexibility and seamlessly embed communications in their applications or devices. Our scalable platform allows us to serve large-scale Internet companies and cloud service providers.

- *Broadest, Most Complete Solutions in the Industry.* We provide enterprises the broadest, most complete communications services solutions in the industry through our integrated software and IP voice network. Our large library of voice and messaging APIs enables our customers to incorporate into their products and services a broad range of capabilities not otherwise attainable.

- *Purpose-Built IP Voice Network.* Our Bandwidth Communications Platform's IP voice network, which we own and operate nationwide, supports our ability to scale at a reliable and consistent quality for the enterprises we serve. The control and scale we have over our own IP voice network integrated with our Bandwidth Communications Platform provides us distinct competitive advantages that include consistent high quality, in-depth enterprise support, real-time network visibility and economies of scale.

- *Deep Experience and Expertise in Voice and Messaging.* The combination of our versatile software API platform and our IP voice network control allows us to offer not just best efforts, but best-in-class voice and messaging solutions for enterprises. Our senior leadership team has a combined 100+ years of industry experience and an average tenure with Bandwidth of more than a decade.

- *Growing, Long-Term Relationships with Low Customer Churn.* We deliver comprehensive solutions that address the unique and complex needs of the enterprises we serve. As a result, these enterprises have continued to innovate and grow with our platform over extended time frames. Our relationship with each of the enterprises we serve often expands across different product suites, divisions and use cases over time. Our customers include large enterprises and small and medium-sized businesses across various industries, and we rarely lose customers that have been on our platform for more than three months. For example, a number of our largest enterprise customers have been on our platform for more than ten years. Based on surveys conducted after customer interactions in 2019, our customers have expressed a 97% satisfaction rate.

- *CPaaS-Based 911 Network Capabilities.* We believe we are the only CPaaS software provider with 911 capabilities. We believe our 911 capabilities provide a significant advantage as compared to software platform providers that are enabling residential voice services through new connected device experiences. Moreover, our dynamic geospatial routing capability routes 911 calls based on a real-time location of the caller to produce industry-leading results.

Our Growth Strategy

- *Expand Existing Enterprise Relationships.* We will continue to expand our relationships with our existing enterprise customers. For example, enterprises often initially purchase only our voice solution and later expand to also purchase our messaging and 911 services. Additionally, we are able to help enterprises scale efficiently and offer their solutions to more of their customers as they grow.

- *Grow Our Enterprise Customer Base.* We believe there is a substantial opportunity to increase our enterprise customer base across a broad range of industries and companies. We plan to continue to grow and invest in our direct sales force and marketing to increase our enterprise customer base.

- *Continue to Innovate Our Platform.* We are committed to building on our track record of leveraging our innovative product capabilities to meet our customers' needs, just as we have done throughout our history, through dramatic waves of change in communications technology. We were early to deploy software-based networks and to offer hosted cloud-based voice services, while building out one of the fastest growing IP voice networks over the last ten years. Our team has continued to adapt to a dynamic environment to grow our business, and we intend to invest in continued development of our platform and product features to support new use cases and help our enterprise customers succeed as communications technologies evolve.

- *Continue Our Focus on Enterprise Customer Satisfaction.* We intend to continue focusing on delivering world-class services and support to the enterprises we serve to ensure a high level of satisfaction. We believe that satisfied customers provide vital product feedback, purchase additional services, renew contracts at a high rate and provide broad advocacy and new customer referrals for our business.

- *Develop and Grow Our International Offerings.* Our international services had been limited to outbound international calling and outbound international messaging. Some of our enterprise customers operate globally or have plans to do so. Accordingly, we are pursuing international expansion opportunities, including those where we might have a cost or quality advantage in serving our customers. We completed the build out of two data centers in Frankfurt and London in 2019 and are now authorized to conduct business in 13 European countries: the United Kingdom, 11 members of the European Union and Switzerland. We have also obtained regulatory authority to provide telecommunication services in these 13 European countries.

- *Pursue Acquisitions and Strategic Investments Selectively.* We may selectively pursue acquisitions and strategic investments in businesses and technologies that strengthen our platform.

Our Customers

We have a broad and diversified customer base. We benefit from longstanding relationships with well-recognized enterprise customers, as well as small and medium-sized businesses. Many of our customers have multi-year contracts, with no single customer representing 10% of total revenue for the year ended December 31, 2019.

Our management is highly focused on creating and maintaining strategic partnerships beyond standard transactional customer relationships. We empower enterprises to create, scale and operate voice or messaging communications services across any mobile application or connected device and this reinforces our customer relationships.

The majority of our customers sign master service agreements ("MSAs") that contain standard terms and conditions, including billing and payment, default, termination, limitations of liability, confidentiality, assignment and notification, and other key terms and conditions. Customers order specific services in separate service order forms that incorporate the applicable MSA. Each service order form details the minimum contract duration, any applicable monthly recurring charge and applicable non-recurring charges. The terms and conditions for each order are also specified in the applicable service order form.

Sales and Marketing

Our sales and marketing teams work together to identify and establish relationships with prospects, acquire new enterprise customers, expand relationships with existing enterprises and integrate them with our Bandwidth Communications Platform. Our marketing staff generates leads through our website, online marketing campaigns, webinars, sponsored events, white papers, public relations and other outbound lead development efforts. Our marketing staff also targets companies with products that could use our services for the first time or to displace our competitors. Our marketing initiatives enhance awareness and adoption of our services.

We engage potential customers and existing customers through an enterprise sales approach. Our sales executives directly engage C-level executives and other senior business, product and technical decision makers responsible for the end user experience and financial results at their enterprises. Our sales executives work to educate these decision makers and their teams about the benefits of using our Bandwidth Communications Platform to launch and scale robust communications experiences. Our sales team includes sales development, inside sales, field sales and sales engineering personnel.

As of December 31, 2019, we had 212 employees in our sales and marketing organization.

Research and Development

Our ability to compete depends in large part on our continuous commitment to research and development ("R&D"). We also seek to continuously enhance our existing services and develop new products and services. Our product and network teams are responsible for the design, development, testing and release of our platform. These teams closely coordinate with our executive management, which is responsible for creating a vision for our platform, and with our sales and marketing teams, which relay enterprise demands and possible new use cases or enhancements. Our development efforts focus on the availability and resiliency of our Bandwidth Communications Platform and our IP voice network, including infrastructure, ease-of-use and flexibility, end-user experience and ability to integrate with other enterprise systems.

As of December 31, 2019, we had 206 employees in our R&D organization.

Competition

The CPaaS market is rapidly evolving and increasingly competitive. We believe that the principal competitive factors in our market are:

- platform scalability, reliability, deliverability, security and performance;
- network control and quality;

- completeness of offering;
- ease of integration and programmability;
- product features;
- customer support;
- ability to deliver measurable value and savings;
- the cost of deploying and using our service offerings;
- the strength of sales and marketing efforts;
- brand awareness and reputation;
- global reach; and
- credibility with product executives and developers.

We believe that we compete favorably based on the factors listed above and believe that none of our competitors currently competes directly with us across all our product offerings.

Our competitors fall into two primary categories:

- CPaaS companies that offer a narrower set of software APIs, less robust customer support and fewer other features while relying on third-party networks and physical infrastructure; and
- network service providers that offer limited developer functionality on top of their own networks and physical infrastructure, such as AT&T, CenturyLink and Verizon.

Some of our competitors have greater financial, technical and other resources, greater geographic reach, greater name recognition, larger sales and marketing budgets and larger intellectual property portfolios. As a result, certain of our competitors may be able to respond more quickly and effectively than we can to new or changing opportunities, technologies, standards or enterprise requirements. In addition, some competitors may offer products or services that address one or a limited number of functions at lower prices, with greater depth than our services or geographies where we do not operate. With the introduction of new products and services and new market entrants, we expect competition to intensify in the future. Moreover, as we expand the scope of our platform, we may face additional competition.

Intellectual Property

We rely on a combination of patent, copyright, trademark and trade secret laws in the United States and other jurisdictions, as well as license agreements and other contractual protections, to protect our proprietary technology. We also rely on registered and unregistered trademarks to protect our brand.

As of December 31, 2019, we had ten U.S. patents and one U.S. patent application pending. In addition, as of December 31, 2019, we had twelve registered trademarks.

We seek to protect our intellectual property rights by implementing a policy that requires our employees and independent contractors involved in development of intellectual property on our behalf to enter into agreements acknowledging that all works or other intellectual property generated or conceived by them on our behalf are our property, and assigning to us any rights, including intellectual property rights, that they may claim or otherwise have in those works or property, to the extent allowable under applicable law.

Despite our efforts to protect our technology and proprietary rights through intellectual property rights, licenses and other contractual protections, unauthorized parties may still copy or otherwise obtain and use our software and other technology. Any significant impairment of our intellectual property rights could harm our business or our ability to compete. Further, companies in the communications and technology industries may own large numbers of patents, copyrights and trademarks and may frequently threaten litigation, or file suit against us based on allegations of infringement or other violations of intellectual property rights. In the future, we may face allegations that we have infringed the intellectual property rights of third parties, including our competitors and non-practicing entities.

Employees

As of December 31, 2019, we had a total of 772 employees, all of whom are located in the United States. None of our employees are represented by a labor union or covered by a collective bargaining agreement. We have not experienced any work stoppages, and we consider our relations with our employees to be good.

Regulatory

General

We and the communications services that we provide through our software APIs are subject to many U.S. federal and state and foreign laws and regulations. These laws and regulations may concern telecommunications, as well as privacy, data protection, intellectual property, competition, consumer protection, taxation or other subjects. Many of the laws and regulations to which we and the communications services that we provide through our software APIs are subject are still evolving and being tested in courts and could be interpreted in ways that could harm our business. In addition, the application and interpretation of these laws and regulations are often uncertain, particularly in the new and rapidly evolving industry in which we operate. Because laws and regulations have continued to develop and evolve rapidly, it is possible that we may not be, or may not have been, compliant with each such applicable law or regulation.

Federal Telecommunications Regulation

The Federal Communications Commission ("FCC") has jurisdiction over interstate and international telecommunications services. We have obtained FCC authorization to provide services on a facilities and resale basis, as well as via a wireless telecommunications license.

Under the Communications Act of 1934, as amended by the Telecommunications Act of 1996 (the "1996 Act"), any entity, including cable television companies and electric and gas utilities, may enter any telecommunications market, subject to reasonable state regulation of safety, quality and consumer protection. The industry continues to evolve toward new services built upon IP technologies. With these technological advances, there have been challenges to the traditional regulatory structure under the 1996 Act. One of the challenges that has arisen is fraud and abuse in the form of illegal robocalling and unwanted text messaging. The FCC is conducting several proceedings to understand and address fraud and abuse in the form of illegal robocalling. Much of the FCC's efforts to thwart illegal robocalling involve or relate to the Telephone Consumer Protection Act of 1991 (the "TCPA"), which restricts telemarketing calls and the use of automatic text messages without the recipient's proper consent. More recently, Congress passed and the President signed the TRACED Act. The TRACED Act directs the FCC to conduct a number of different rulemaking proceedings and increases the FCC's enforcement authority, among other things. The scope and interpretation of these laws and regulations continue to evolve and develop. If we do not comply with these laws or regulations or if we become liable under these laws or regulations due to the failure of our customers to comply with these laws by obtaining the recipient's proper consent, we could face direct liability.

VoIP Regulation. Some of our communications services provided through our software APIs may qualify as Voice-over Internet Protocol ("VoIP"). The FCC has imposed various regulatory requirements on VoIP providers that previously applied only to traditional telecommunications providers, such as obligations to provide 911 functionality, to contribute to the federal universal service fund, to comply with regulations relating to local number portability, to abide by the FCC's service discontinuance rules, to contribute to the Telecommunications Relay Services fund and to abide by the regulations concerning Customer Proprietary Network Information, outage reporting, access for persons with disabilities and the Communications Assistance for Law Enforcement Act. In some instances, these regulations indirectly affect us because they directly apply to our customers. Several state public utility commissions are conducting regulatory proceedings that could affect our rights and obligations, or the rights and obligations of our customers, with respect to IP-based voice applications. Specifically, some states have taken the position that the "local" component of VoIP service is subject to traditional regulations applicable to local telecommunications services, such as the obligation to pay intrastate universal service fees. We cannot predict whether the FCC or state public utility commissions will impose additional requirements, regulations or charges upon our provision of services related to IP communications.

Universal Service. Some of our services are subject to federal and state regulations that implement universal service support for access to communications services in rural and high-cost areas and to low-income consumers at reasonable rates; and access to advanced communications services by schools, libraries and rural health care providers. In some instances, these regulations indirectly affect us because they directly apply to our customers. The FCC assesses us a percentage of interstate and international revenue we receive from certain customers as our contribution to the Federal Universal Service Fund, which assessments we generally pass on to our customers. Additionally, the FCC has ruled that states may assess contributions to their state Universal Service Funds on VoIP providers' intrastate revenue. Any change in the assessment methodology may affect our revenue and expenses, but at this time it is not possible to predict the extent we would be affected, if at all.

Intercarrier Compensation. Telecommunications carriers compensate one another for traffic carried on each other's networks. Interexchange carriers pay access charges to local telephone companies for long distance calls that originate and terminate on local networks. Local telephone companies historically have charged one another for local and Internet-bound traffic terminating on each other's networks. The methodology by which carriers have compensated one another for exchanged traffic, whether it be for local, intrastate or interstate traffic, has been under review by the FCC for over a decade and continues to be subject to on-going reform efforts.

In November 2011, the FCC released its Universal Service Fund/Intercarrier Compensation Transformation Order (the "USF/ICC Transformation Order"). Along with addressing other matters, the USF/ICC Transformation Order established a prospective intercarrier compensation framework for terminating switched access and VoIP traffic. Under the USF/ICC Transformation Order and subsequent related FCC orders, most terminating switched access charges and all reciprocal compensation charges were capped at then-current levels, and were reduced to zero over, as relevant to us, generally a six-year transition period that began July 1, 2012.

Pursuant to the USF/ICC Transformation Order, VoIP, while remaining unclassified as either an information or a telecommunications service, was prospectively categorized as either local or non-local traffic. If "local," then VoIP traffic is subject to reciprocal compensation; if "non-local," then it is subject to interstate rates, thus eliminating any intrastate access rate applicable to VoIP. The USF/ICC Transformation Order did not address the treatment of VoIP retroactively. During 2015, the FCC issued clarifications concerning the rating of VoIP traffic that were favorable to us. Those clarifications were appealed, and in November 2016 the appellate court vacated the FCC's 2015 clarification and ruled that additional action by the FCC is required. On December 17, 2019, the FCC issued an order that further revised its interpretation of the VoIP symmetry rule. The FCC now concludes that local exchange carriers ("LECs") may assess end office switched access charges only if the LEC or its VoIP partner provides a physical connection to the last-mile facilities used to serve an end user. If neither the LEC nor its VoIP partner provides such a physical connection, the LEC may not assess end office switched access charges because it is not providing the functional equivalent of end office switched access. The FCC also decided to give its order retroactive effect. We cannot predict the impact on our business, including whether other carriers will agree with our legal interpretations and treatments, at this time.

State Telecommunications Regulation

The 1996 Act intended to increase competition in the telecommunications industry, especially in the local market. With respect to local services, incumbent local exchange carriers ("ILECs") such as AT&T are required to allow interconnection to their incumbent networks and to provide access to network facilities, as well as several other pro-competitive measures.

State regulatory agencies have jurisdiction when our facilities and services are used to provide intrastate telecommunications services. A portion of our traffic may be classified as intrastate telecommunications and therefore subject to state regulation. We are authorized to provide competitive local exchange telecommunications services in 49 states and the District of Columbia, and thus are subject to these additional regulatory regimes. Changes in applicable state regulations could affect our business.

In addition, we need to maintain interconnection agreements with ILECs where we wish to provide service, which are subject to approval by individual states and subject to state arbitration in the event of disputes. We expect that we should be able to negotiate or otherwise obtain renewals or successor agreements through adoption of others' contracts or through arbitration proceedings, although the rates, terms and conditions applicable to interconnection and the exchange of traffic with certain ILECs could change significantly in certain cases.

International

As we expand internationally, we also become subject to telecommunications laws and regulations in the foreign countries where we offer our products. To date, we have concentrated our efforts in Europe, including the United Kingdom.

The European Regulatory Framework. In 2002, the European Council adopted a set of six directives to create the framework for telecommunication laws in Europe (the "2002 Directives"). The directives are binding upon the European Union member states, which must adopt implementing national laws consistent with the directives. The 2002 Directives included the Framework Directive, the Authorization Directive, the Access Directive, the Universal Service Directive and the E-Privacy Directive, each of which applies or will apply to us. In 2009 the European Council adopted two directives that amended the Framework Directive, the Authorization Directive, the Access Directive, the Universal Service Directive and the E-Privacy Directive (the "2009 Directives").

The Framework Directive. The Framework Directive describes the European regulatory framework and defines terms. The Framework Directive also mandates the independence of the national regulatory authorities (the "NRAs") to ensure the proper administration and exercise of power. The Framework Directive also establishes the principles governing the management of telephone numbers.

The Authorization Directive. The Authorization Directive creates the rules governing the provision of electronic communications networks and services. The Authorization Directive generally eliminates licensure requirements, except where necessary with respect to the allocation of spectrum and telephone numbers.

The Access Directive. The Access Directive establishes a uniform framework for the regulation of access to and the interconnection of electronic communications networks. The Access Directive also outlines the relationships among suppliers of network and services, including principles to govern contractual relationships and regulatory involvement by the NRAs as necessary. The Access Directive effectively governs the relationships among service providers at a wholesale level.

The Universal Service Directive. The Universal Service Directive governs the provision of electronic communication networks and services to end users. The Universal Service Directive seeks to ensure that end users have access to a minimum set of services. However, the minimum set of services is not required to be provided by all providers. Instead, the applicable NRAs may designate one or more companies to achieve the universal service in each country.

The E-Privacy Directive. The E-Privacy Directive seeks to ensure privacy and confidentiality in the processing of personal data in electronic communications. The E-Privacy Directive requires providers of publicly available electronic communications services to take appropriate technical and organizational measures to safeguard the security of services. These measures must: ensure that personal data can be accessed only by authorized personnel for legally authorized purposes; protect personal data stored or transmitted against accidental or unlawful destruction, accidental loss or alteration, and unauthorized or unlawful storage, processing, access or disclosure; and ensure the implementation of a security policy with respect to the processing of personal data. The E-Privacy Directive also requires notification of any breach or loss of personal data to the applicable NRA.

Implementing National Legislation. Each of the European Union member states has adopted national legislation to implement the 2002 Directives and the 2009 Directives. The 2002 Directives and the 2009 Directives ensure substantial similarities among nations, but not absolute uniformity.

United Kingdom. The United Kingdom ("U.K.") departed from the European Union ("EU") in January 2020. We understand that the transition period contemplated by the withdrawal agreement governing the U.K.'s departure from the EU provides that EU law will continue to apply in and in relation to the UK only through December 2020. Thereafter, the Framework Directive and the implementing Directives will no longer directly apply in the U.K. We do not anticipate considerable changes, however, since the Framework Directive and the implementing Directives have previously been transposed into U.K. law.

Corporate Information

Bandwidth Inc. was founded in July 2000 and incorporated in Delaware on March 29, 2001. Our principal executive offices are located at 900 Main Campus Drive, Raleigh, NC 27606, and our telephone number is (800) 808-5150. Our website address is www.bandwidth.com. Information contained on, or that can be accessed through, our website does not constitute part of this Annual Report on Form 10-K.

Available Information

The following information can be found, free of charge, on our corporate website at https://www.bandwidth.com/:

- our annual report on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, and all amendments to those reports as soon as reasonably practicable after such material is electronically filed with or furnished to the Securities and Exchange Commission (the "SEC");
- our policies related to corporate governance, including our Code of Business Conduct and Ethics applicable to our directors, officers and employees (including our principal executive officer and principal financial and accounting officer), that we have adopted to meet applicable rules and regulations; and
- the charters of the Audit and Compensation Committees of our Board of Directors.

In addition, copies of our annual report will be made available, free of charge, upon written request.

We intend to satisfy the applicable disclosure requirements regarding amendments to, or waivers from, provisions of our Code of Business Conduct and Ethics by posting such information on our website. 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 should not be considered part of this report.

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 and uncertainties described below, together with all of the other information in this Annual Report on Form 10-K, including the section titled "Management's Discussion and Analysis of Financial Condition and Results of Operations" and our consolidated financial statements and related notes appearing elsewhere in this Annual Report on Form 10-K. The risks and uncertainties described below may not be the only ones we face. If any of the risks actually occur, our business, financial condition, results of operations and prospects could be materially and adversely affected. In that event, the market price of our Class A common stock could decline.

Risks Related to Our Business

The success of our growth and expansion plans depends on a number of factors that are beyond our control.

We have grown our business considerably over the last several years. We cannot guarantee that we will be able to maintain our growth or that we will choose to target the same pace of growth in the future. Our success in achieving continued growth depends upon several factors including:

- the availability and retention of qualified and effective personnel with the expertise required to sell and operate effectively or successfully;

- the overall economic health of new and existing markets;

- the number and effectiveness of competitors;

- the pricing structure under which we will be able to purchase services required to serve our customers;

- the availability to us of technologies needed to remain competitive;

- federal, state and international regulatory conditions, including the maintenance of state regulation that protects us from unfair business practices by traditional network service providers or others with greater market power who have relationships with us as both competitors and suppliers; and

- changes in industry standards, laws, regulations, or regulatory enforcement in the United States and internationally.

The market in which we participate is highly competitive, and if we do not compete effectively, our business, results of operations and financial condition could be harmed.

The market for cloud communications is rapidly evolving, significantly fragmented and highly competitive, with relatively low barriers to entry in some segments. The principal competitive factors in our market include completeness of offering, credibility with enterprises and developers, global reach, ease of integration and programmability, product features, platform scalability, reliability, deliverability, security and performance, brand awareness and reputation, the strength of sales and marketing efforts, customer support, as well as the cost of deploying and using our services. Our competitors fall into two primary categories:

- CPaaS companies that offer a narrower set of software APIs, less robust customer support and fewer other features while relying on third-party networks and physical infrastructure; and

- network service providers that offer limited developer functionality on top of their own networks and physical infrastructure.

Some of our competitors and potential competitors are larger and have greater name recognition, longer operating histories, more established customer relationships, a larger global reach, larger budgets and significantly greater resources than we do. In addition, they have the operating flexibility to bundle competing products and services at little or no incremental cost, including offering them at a lower price as part of a larger sales transaction. As a result, our competitors may be able to respond more quickly and effectively than we can to new or changing opportunities, technologies, standards or customer requirements. In addition, some competitors may offer services that address one or a limited number of functions at lower prices, with greater depth than our services or in different geographies. Our current and potential competitors may develop and market new services with comparable functionality to our services, and this could lead to us having to decrease prices in order to remain competitive. In addition, some of our competitors have lower list prices than us, which may be attractive to certain customers even if those services have different or lesser functionality. If we are unable to maintain our current pricing due to competitive pressures, our margins will be reduced and our business, results of operations and financial condition would be adversely affected. Customers utilize our services in many ways and use varying levels of functionality that our services offer or are capable of supporting or enabling within their applications. Customers that use many of the features of our services or use our services to support or enable core functionality for their applications may have difficulty or find it impractical to replace our services with a competitor's services, while customers that use only limited functionality may be able to more easily replace our services with competitive offerings.

With the introduction of new services and new market entrants, we expect competition to intensify in the future. In addition, some of our customers choose to use our services and our competitors' services at the same time. Moreover, as we expand the scope of our services, we may face additional competition. Further, customers and consumers may choose to adopt other forms of electronic communications or alternative communication platforms, including developing necessary networks and platforms in-house.

Furthermore, if our competitors were to merge such that the combined entity would be able to compete fully with our service offering, then our business, results of operations and financial condition may be adversely effected. If one or more of our competitors were to merge or partner with another of our competitors, the change in the competitive landscape could also adversely affect our ability to compete effectively. In addition, pricing pressures and increased competition generally could result in reduced revenue, reduced margins, increased losses or the failure of our services to achieve or maintain widespread market acceptance, any of which could harm our business, results of operations and financial condition.

We presently operate in the United States, provide certain limited services in Canada, and are expanding our operations to include international offerings. Our IP voice network, which is at the core of our product offerings, is located in the United States. Our current and potential competitors have developed and may develop in the future product solutions that are available internationally as well as domestically. To the extent that customers seek product solutions that include support and scaling internationally, they may choose to use other service providers to fill their communication service needs before we can fully develop our international offerings. Furthermore, while we believe the U.S. market is sufficiently large and expanding to allow us to continue to grow our business, we may face slower growth due to our relative lack of exposure to international markets. Each of these factors could lead to reduced revenue, slower growth and lower brand name recognition amongst our industry competitors, any or all of which could harm our business, results of operations and financial condition.

If we are unable to attract new customers in a cost-effective manner, then our business, results of operations and financial condition would be adversely affected.

In order to grow our business, we must continue to attract new customers in a cost-effective manner. We use a variety of marketing channels to promote our services, our Bandwidth Communications Platform, and we periodically adjust the mix of our marketing programs. If the costs of the marketing channels we use increase dramatically, then we may choose to use alternative and less expensive channels, which may not be as effective as the channels we currently use. As we add to or change the mix of our marketing strategies, we may need to expand into more expensive channels than those we are currently in, which could adversely affect our business, results of operations and financial condition. We will incur marketing expenses before we are able to recognize any revenue that the marketing initiatives may generate, and these expenses may not result in increased revenue or brand awareness. We have made in the past, and may make in the future, significant expenditures and investments in new marketing campaigns. We cannot assure you that any new investments in sales and marketing, including any increased focus on enterprise sales efforts, will lead to the cost-effective acquisition of additional customers or increased sales or that our sales and marketing efficiency will be consistent with prior periods. If we are unable to maintain effective marketing programs, then our ability to attract new customers could be materially and adversely affected, our advertising and marketing expenses could increase substantially and our results of operations may suffer.

The market for some of our services and platform is new and unproven, may decline or experience limited growth and is dependent in part on enterprises and developers continuing to adopt our platform and use our services.

We have been developing and providing a cloud-based platform that enables developers and organizations to integrate voice and messaging communications capabilities into their software applications. This market is relatively new and unproven and is subject to a number of risks and uncertainties. We believe that our future success will depend in large part on the growth, if any, of this market. For example, the utilization of software APIs by developers and organizations to build communications functionality into their applications is still relatively new, and developers and organizations may not recognize the need for, or benefits of, our services and platform. Moreover, if they do not recognize the need for and benefits of our services and platform, they may decide to adopt alternative services and/or develop the necessary services in-house to satisfy their business needs. In order to grow our business and expand our market position, we intend to focus on educating enterprise customers about the benefits of our services and platform, expanding the functionality of our services and bringing new technologies to market to increase market acceptance and use of our platform. Our ability to expand the market that our services and platform address depends upon a number of factors, including the cost, performance and perceived value associated with such services and platform. The market for our services and platform could fail to grow significantly or there could be a reduction in demand for our services and platform as a result of a lack of customer acceptance, technological changes or challenges, competing services, platforms and services, decreases in spending by current and prospective customers, weakening economic conditions and other causes. If our market does not experience significant growth or demand for our services and platform decreases, then our business, results of operations and financial condition could be adversely affected.

We must increase the network traffic and resulting revenue from the services that we offer to realize our targets for anticipated revenue growth, cash flow and operating performance.

We must increase the network traffic and resulting revenue from our inbound and outbound voice calling, messaging, emergency voice functions, telephone numbers and related services at acceptable margins to realize our targets for anticipated revenue growth, cash flow and operating performance. If:

- we do not maintain or improve our current relationships with existing key customers;
- we are not able to expand the available capacity on our network to meet our customers' demands in a timely manner;
- we do not develop new large enterprise customers; or
- our customers determine to obtain these services from either their own network or from one of our competitors,

then we may be unable to increase or maintain our revenue at acceptable margins.

Our business depends on customers increasing their use of our services and any loss of customers or decline in their use of our services could materially and adversely affect our business, results of operations and financial condition.

Our ability to grow and generate incremental revenue depends, in part, on our ability to maintain and grow our relationships with existing customers and to have them increase their usage of our Bandwidth Communications Platform. If our customers do not increase their use of our services, then our revenue may decline and our results of operations may be harmed. Customers generally are charged based on the usage of our services. Most of our customers do not have long-term contractual financial commitments to us and, therefore, most of our customers may reduce or cease their use of our services at any time without penalty or termination charges. We cannot accurately predict customers' usage levels and the loss of customers or reductions in their usage levels of our services may each have a negative impact on our business, results of operations and financial condition and may cause our dollar-based net retention rate to decline in the future if our customers are not satisfied with our services. If a significant number of customers cease using, or reduce their usage of, our services, then we may be required to spend significantly more on sales and marketing than we currently plan to spend in order to maintain or increase revenue from customers. Such additional sales and marketing expenditures could adversely affect our business, results of operations and financial condition.

If we are unable to increase the revenue that we derive from enterprises, our business, results of operations and financial condition may be adversely affected.

We currently generate all of our revenue from enterprise customers. Our ability to expand our sales to enterprise customers will depend, in part, on our ability to effectively organize, focus and train our sales and marketing personnel and to attract and retain sales personnel with experience selling to enterprises. We believe that there is significant competition for experienced sales professionals with the skills and technical knowledge that we require. Our ability to achieve significant revenue growth in the future will depend, in part, on our ability to recruit, train and retain a sufficient number of experienced sales professionals, particularly those with experience selling to enterprises. In addition, even if we are successful in hiring qualified sales personnel, new hires require significant training and experience before they achieve full productivity, particularly for sales efforts targeted at enterprises and new territories. Our recent hires and planned hires may not become as productive as quickly as we expect and we may be unable to hire or retain sufficient numbers of qualified individuals in the future in the markets where we do business.

With respect to enterprise customers, the decision to adopt our services may require the approval of multiple technical and business decision makers, including security, compliance, procurement, operations and IT. In addition, while enterprise customers may quickly deploy our services on a limited basis, before they will commit to deploying our services at scale, they often require extensive education about our services and significant customer support time, engage in protracted pricing negotiations and seek to secure readily available development resources. In addition, sales cycles for enterprises are inherently complex, and some enterprise customers may not generate revenue that justifies the cost to obtain such customers. In addition, these complex and resource-intensive sales efforts could place additional strain on our limited product and engineering resources. Further, enterprises, including some of our customers, may choose to develop their own solutions that do not include our services. They also may demand reductions in pricing as their usage of our services increases, which could have an adverse impact on our gross margin. Our efforts to sell to these potential customers may not be successful. If we are unable to increase the revenue that we derive from enterprises, then our business, results of operations and financial condition may be adversely affected.

If we do not develop enhancements to our services and introduce new services that achieve market acceptance, our business, results of operations and financial condition could be adversely affected.

Our ability to attract new customers and increase revenue from existing customers depends in part on our ability to enhance and improve our existing services, increase adoption and usage of our services and introduce new services. The success of any enhancements or new services depends on several factors, including timely completion, adequate quality testing, actual performance quality, market-accepted pricing levels and overall market acceptance. Enhancements and new services that we develop may not be introduced in a timely or cost-effective manner, may contain errors or defects, may have interoperability difficulties with our Bandwidth Communications Platform or other services or may not achieve the broad market acceptance necessary to generate significant revenue. We also must integrate with a variety of network, hardware, mobile and software platforms and technologies, which requires us to enhance and modify our products and our Bandwidth Communications Platform to adapt to changes and innovation in these technologies. Wireline and wireless telephone providers or cell-phone operating system providers such as Apple and Google have developed and may in the future develop new applications, functions or technologies intended to filter illegal robocalls or other unwanted phone calls or messages. Such applications, functions or technologies may inadvertently filter legal and desired calls or messages to or from our customers. In certain instances, we may need to update our services and technology to work with these applications, functions or technologies. Any failure to operate effectively with evolving or new technologies could reduce the demand for our services. If we cannot respond to these changes cost-effectively, our services may become less marketable and less competitive or obsolete, and our business, results of operations and financial condition could be adversely affected. To the extent that upgrades of existing products, services and technology are required for the introduction of new services, the success of these upgrades also may be dependent on reaching mutually acceptable terms with vendors and on vendors meeting their obligations in a timely manner.

Furthermore, our ability to increase the usage of our services depends, in part, on the development of new use cases for our services, which may be outside of our control. Our ability to generate usage of additional services by our customers may also require increasingly sophisticated and more costly sales efforts and result in a longer sales cycle. If we are unable to successfully enhance our existing services to meet evolving customer requirements, increase adoption and usage of our services or develop new services, or if our efforts to increase the usage of our services are more expensive than we expect, then our business, results of operations and financial condition would be adversely affected.

We have experienced rapid growth and expect our growth to continue, and if we fail to effectively manage our growth, then our business, results of operations and financial condition could be adversely affected.

We have experienced substantial growth in our business since inception, which has placed and may continue to place significant demands on our corporate culture, operational infrastructure and management. We believe that our corporate culture has been a critical component of our success. We have invested substantial time and resources in building our team and nurturing our culture. As we expand our business and mature as a public company, we may find it difficult to maintain our corporate culture while managing this growth. Any failure to manage our anticipated growth and organizational changes in a manner that preserves the key aspects of our culture could hurt our chance for future success, including our ability to recruit and retain personnel, and effectively focus on and pursue our corporate objectives. This, in turn, could adversely affect our business, results of operations and financial condition.

In addition, in order to successfully manage our rapid growth, our organizational structure has become more complex. In order to manage these increasing complexities, we will need to continue to scale and adapt our operational, financial and management controls, as well as our reporting systems and procedures. The expansion of our systems and infrastructure will require us to commit substantial financial, operational and management resources before our revenue increases and without any assurances that our revenue will increase.

Finally, continued growth could strain our ability to maintain reliable service levels for our customers. If we fail to achieve the necessary level of efficiency in our organization as we grow, then our business, results of operations and financial condition could be adversely affected.

Our pricing and billing systems are complex and errors could adversely affect our revenue and profits.

Our pricing and billing efforts are complex to develop and challenging to implement. To be profitable, we must have accurate and complete information about the costs associated with voice and messaging, and properly incorporate such information into our pricing model. Our pricing model must also reflect accurate and current information about the market for our services, including the pricing of competitive alternatives for our services, as well as reliable forecasts of traffic volume. We may determine pricing for our services based on data that is outdated or otherwise flawed. Even if we have complete and accurate market information, we may not set prices to optimize both revenue and profitability. If we price our services too high, the amount of traffic that our customers may route to our network may decrease and accordingly our revenue may decline. If we price our services too low, our margins may be adversely affected, which will reduce our ability to achieve and maintain profitability.

Additionally, we rely heavily on third parties to provide us with key software and services for our billing. If these third parties cease to provide those services to us for any reason, or fail to perform billing services accurately and completely, we may not be able to deliver accurate invoices promptly. Delays in invoicing can lead to delays in revenue recognition, and inaccuracies in our billing could result in lost revenue. If we fail to adapt quickly and effectively to changes affecting our costs, pricing and billing, our profitability and cash flow will be adversely affected.

We must continue to develop effective business support systems to implement customer orders and to provide and bill for services.

We depend on our ability to continue to develop effective business support systems. This complicated undertaking requires significant resources and expertise and support from third-party vendors. Following the development of the business support systems, the data migration must be completed for the full benefit of the systems to be realized. Business support systems are needed for:

- quoting, accepting and inputting customer orders for services;

- provisioning, installing and delivering services;
- providing customers with direct access to the information systems included in our Bandwidth Communications Platform so that they can manage the services they purchase from us, generally through web-based customer portals; and
- billing for services.

Because our business provides for continued rapid growth in the number of customers that we serve, the volume of services offered, as well as the integration of any acquired companies' business support systems, if any, we must continue to develop our business support systems on a schedule sufficient to meet proposed milestone dates. If we fail to develop effective business support systems or complete the data migration into these systems, it could materially adversely affect our ability to implement our business plans, realize anticipated benefits from our acquisitions, if any, and meet our financial goals and objectives.

If we are not able to maintain and enhance our brand and increase market awareness of our company and services, then our business, results of operations and financial condition may be adversely affected.

We believe that maintaining and enhancing our brand identity and increasing market awareness of our company and services are critical to achieving widespread acceptance of our company and our Bandwidth Communications Platform, as well as to strengthen our relationships with our existing customers and to our ability to attract new customers. The successful promotion of our brand will depend largely on our continued marketing efforts, our ability to continue to offer high quality services and our ability to successfully differentiate our services from competing products and services. Our brand promotion activities may not be successful or yield increased revenue. In addition, independent industry analysts often provide reviews of our services and competing products and services, which may significantly influence the perception of our services in the marketplace. If these reviews are negative or not as strong as reviews of our competitors' services, then our brand may be harmed.

From time to time, our customers have complained about our services, such as complaints about our pricing and customer support. If we do not handle customer complaints effectively, then our brand and reputation may suffer, our customers may lose confidence in us and they may reduce or cease their use of our services. In addition, many of our customers post and discuss on social media about products and services, including our services and our Bandwidth Communications Platform. Our success depends, in part, on our ability to generate positive customer feedback and minimize negative feedback on social media channels where existing and potential customers seek and share information. If actions we take or changes we make to our services or our Bandwidth Communications Platform upset these customers, then their online commentary could negatively affect our brand and reputation. Complaints or negative publicity about us, our services or our Bandwidth Communications Platform could materially and adversely affect our ability to attract and retain customers, our business, results of operations and financial condition.

The promotion of our brand also requires us to make substantial expenditures, and we anticipate that these expenditures will increase as our market becomes more competitive and as we expand into new markets. To the extent that these activities increase revenue, this revenue still may not be enough to offset the increased expenses we incur. If we do not successfully maintain and enhance our brand, then our business may not grow, we may see our pricing power reduced relative to competitors and we may lose customers, all of which would adversely affect our business, results of operations and financial condition.

Any failure to deliver and maintain high-quality customer support may adversely affect our relationships with our customers and prospective customers and could adversely affect our reputation, business, results of operations and financial condition.

Many of our customers depend on our customer support team to assist them in deploying or using our services effectively, to help them resolve post-deployment issues quickly and to provide ongoing support. If we do not devote sufficient resources or are otherwise unsuccessful in assisting our customers effectively, it could adversely affect our ability to retain existing customers and could prevent prospective customers from adopting our services. We may be unable to respond quickly enough to accommodate short-term increases in demand for customer support. We also may be unable to modify the nature, scope and delivery of our customer support to compete with changes in the support services provided by our competitors. Increased demand for customer support, without corresponding revenue, could increase costs and adversely affect our business, results of operations and financial condition. Our sales are highly dependent on our business reputation and on positive recommendations from existing customers. Any failure to deliver and maintain high-quality customer support, or a market perception that we do not maintain high-quality customer support, could adversely affect our reputation, business, results of operations and financial condition.

We are launching our operations internationally, which exposes us to significant risks.

As part of our growth strategy, we are expanding our operations to include international offerings, including the deployment of two data centers in Frankfurt and London, the establishment of a limited presence in each of Frankfurt and Madrid primarily for regulatory purposes, and the employment of our first internationally based employee. We expect, in the future, to hire additional employees to provide international support to our existing U.S.-based customers and may, in the future, open foreign offices in order to reach new customers and further support our existing U.S.-based customers. Operating in international markets requires significant resources and management attention and will subject us to regulatory, economic and political risks in addition to those we already face in the United States. We have limited experience with international operations, and our international expansion efforts may not be successful.

In addition, we will face risks in doing business internationally that could adversely affect our business, including:

- exposure to political developments in the United Kingdom ("U.K."), including the January 2020 departure of the U.K. from the European Union ("EU"), which has created an uncertain political and economic environment, instability for businesses and volatility in global financial markets and the value of foreign currencies, all of which could disrupt trade, the sale of our services and the mobility of our employees and contractors between the U.K., EU and other jurisdictions;
- difficulties in managing and staffing international operations, including difficulties related to the increased operations, travel, infrastructure and legal compliance costs associated with numerous international locations;
- our ability to effectively price our products in competitive international markets;
- new and different sources of competition;
- costs associated with network service providers outside of the United States;
- the need to adapt and localize our products for specific countries;
- difficulties in understanding and complying with local laws, regulations and customs in foreign jurisdictions, particularly in the areas of data privacy and security;
- difficulties related to differing technical standards, data privacy and telecommunications regulations and certification requirements outside the United States, which could prevent customers from deploying our products or limit their usage;
- export controls and economic sanctions administered by the Bureau of Industry and Security of the U.S. Department of Commerce and the Office of Foreign Assets Control of the U.S. Department of the Treasury;
- compliance with various anti-bribery and anti-corruption laws, such as the U.S. Foreign Corrupt Practices Act and U.K. Bribery Act 2010;
- tariffs and other non-tariff barriers, such as quotas;
- more limited protection for intellectual property rights in some countries;
- adverse tax consequences;

- fluctuations in currency exchange rates, which could increase the price of our products outside of the United States, increase the expenses of our international operations and expose us to foreign currency exchange rate risk;

- currency control regulations, which might restrict or prohibit our conversion of other currencies into U.S. dollars;

- restrictions on the transfer of funds;

- deterioration of political relations between the United States and other countries; and

- political or social unrest or economic instability in a specific country or region in which we operate, which could have an adverse impact on our operations in that location.

In addition, due to potential costs from our international expansion efforts and network service provider fees outside of the United States, our gross margin for international customers may be lower than our gross margin for domestic customers. As a result, our gross margin may fluctuate as we expand our operations and customer base internationally.

Our failure to manage any of these risks successfully could delay our international expansion or, once developed, harm our international operations, and adversely affect our business, results of operations and financial condition.

Our revenue is concentrated in a limited number of enterprise customers.

A significant portion of our revenue is concentrated among a limited number of enterprise customers. If we lost one or more of our top ten customers, or, if one or more of these major customers significantly decreased orders for our services, our business would be materially and adversely affected.

Breaches of our networks or systems, or those of third parties upon which we rely, could degrade our ability to conduct our business, compromise the integrity of our services and our Bandwidth Communications Platform, result in significant data losses and the theft of our intellectual property, damage our reputation, expose us to liability to third parties and require us to incur significant additional costs to maintain the security of our networks and data.

We depend upon our IT systems to conduct virtually all of our business operations, ranging from our internal operations and R&D activities to our marketing and sales efforts and communications with our customers and business partners. Cyber attacks, including through the use of malware, computer viruses, dedicated denial of services attacks, credential harvesting and other means for obtaining unauthorized access to or disrupting the operation of our networks and systems and those of our suppliers, vendors and other service providers, could cause harm to our business, including by misappropriating our proprietary information or that of our customers, employees and business partners or to cause interruptions of our services and our Bandwidth Communications Platform. Cyber attacks may cause equipment failures, loss of information, including sensitive personal information of customers or employees or valuable technical and marketing information, as well as disruptions to our or our customers' operations. Cyber attacks against companies have increased in frequency, scope and potential harm in recent years. Further, the perpetrators of cyber attacks are not restricted to particular groups or persons. These attacks may be committed by company employees or external actors operating in any geography, including jurisdictions where law enforcement measures to address such attacks are unavailable or ineffective, and may even be launched by or at the behest of nation states. While, to date, we have not been subject to cyber attacks which, individually or in the aggregate, have been material to our operations or financial condition, the preventive actions we take to reduce the risks associated with cyber-attacks, including protection of our systems and networks, may be insufficient to repel or mitigate the effects of a major cyber-attack in the future. Because the techniques used by such individuals or entities to access, disrupt or sabotage devices, systems and networks change frequently and may not be recognized until launched against a target, we may be unable to anticipate these techniques, and we may not become aware in a timely manner of such a security breach which could exacerbate any damage we experience. Additionally, we depend upon our employees and contractors to appropriately handle confidential and sensitive data, including customer data and customer proprietary network information pursuant to applicable federal law, and to deploy our IT resources in a safe and secure manner that does not expose our network systems to security breaches or the loss of data. Any data security incidents, including internal malfeasance by our employees, unauthorized access or usage, virus or similar breach or disruption of us or our services providers, could result in a loss of confidential information, theft of our intellectual property, damage to our reputation, loss of customers, litigation, regulatory investigations, fines, penalties and other liabilities.

Our existing general liability and cyber liability insurance policies may not cover, or may cover only a portion of, any potential claims related to security breaches to which we are exposed or may not be adequate to indemnify us for all or any portion of liabilities that may be imposed. We also cannot be certain that our existing insurance coverage will continue to be available on acceptable terms or in amounts sufficient to cover the potentially significant losses that may result from a security incident or breach or that the insurer will not deny coverage of any future claim. Accordingly, if our cybersecurity measures and those of our service providers, fail to protect against unauthorized access, attacks (which may include sophisticated cyber-attacks) and the mishandling of data by our employees and contractors, then our reputation, business, results of operations and financial condition could be adversely affected.

We are currently subject to litigation related to taxes and charges associated with our provision of 911 services, which could divert management's attention and adversely affect our results of operations.

We, along with many other telecommunications companies and similar service providers, currently are subject to litigation and a civil investigation regarding our billing, collection and remittance of non-income-based taxes and other similar charges regarding 911 services alleged to apply in certain states, counties, and municipalities located in Illinois, New York, North Carolina, Pennsylvania, and Rhode Island. See the section titled "Item 3. Legal Proceedings." We may face similar litigation in other jurisdictions in the future. While we are vigorously defending these lawsuits, litigation is inherently uncertain. Tax assessments, penalties and interest or future requirements arising from these lawsuits, or any other lawsuits that may arise in other jurisdictions, may adversely affect our business, results of operations and financial condition.

We face a risk of litigation resulting from customer misuse of our services and software to make or send unauthorized calls and/or messages, including those in violation of the Telephone Consumer Protection Act. Customer misuse of our services and software also could damage our reputation.

Calls and/or text messages originated by our customers may subject us to potential risks, including litigation, regulatory enforcement, fines, and reputational damage. For example, the Telephone Consumer Protection Act of 1991 (the "TCPA") restricts telemarketing and the use of technologies that enable automatic calling and/or messaging without proper consent. This may result in civil claims against us, including those arising due to our customers' use of our platform, and requests for information through third-party subpoenas or regulatory investigations. Internationally, we also may become subject to similar laws imposing limitations on marketing calls to wireline and wireless numbers. The scope and interpretation of the laws that are or may be applicable to the making and/or delivery of calls and/or messages are continuously evolving and developing. If we do not comply with these laws or regulations or if we become liable under these laws or regulations due to the failure of our customers to comply with these laws by obtaining proper consent, we could become subject to lawsuits, fines, civil penalties, potentially significant statutory damages, consent decrees, injunctions, adverse publicity, loss of user confidence in our services, loss of users and other adverse consequences, which could materially harm our business.

Some of our customers may use our platform to transmit illegal, offensive or unauthorized calls and messages, including spam, phishing scams, and links to harmful applications. Some of our customers also may reproduce and distribute copyrighted material or the trademarks of others without permission. These actions violate our policies, including our Acceptable Use Policy, which applies to all customers. We generally complete considerable "know-your-customer" reviews before a customer can use our platform, although we do not thereafter conduct proactive audits of our customers to confirm compliance with our policies, including our Acceptable Use Policy. We rely on our customers' contractual representations to us that their use of our platform will comply with applicable law and our policies. We also generally evaluate complaints that we receive regarding our customers' use of our platform. Our substantial efforts will not prevent all illegal robocalls and other fraudulent activity. The unlawful or fraudulent use of our platform could subject us to claims for damages, copyright or trademark infringement, regulatory enforcement, fraud, or negligence or damage our reputation. Even if claims asserted against us do not result in liability, we may incur substantial costs to investigate and defend such claims. If we are liable for our customers' activities, we could be required to pay fines or penalties, redesign our business methods, or otherwise expend resources to remedy any damages caused by such actions and avoid future liability.

The communications industry faces significant regulatory uncertainties and the resolution of these uncertainties could harm our business, results of operations and financial condition.

If current or future regulations change, the FCC, state or international regulators may not grant us any required regulatory authorization or may take action against us if we are found to have provided services without obtaining the necessary authorizations, or to have violated other requirements of their rules and orders. Delays in receiving required regulatory approvals or the enactment of new adverse regulation or regulatory requirements may slow our growth and have a material adverse effect on our business, results of operations and financial condition.

Proceedings before the FCC could limit our access to various network services or further increase the rates we must pay for such services. Likewise, the availability and price of special access facilities could be affected by proceedings before the FCC, changes to applicable FCC rules, and FCC forbearance from the enforcement of obligations on incumbent LECs. Other proceedings before the FCC could result in an increase in the amount we pay to other carriers or a reduction in the revenue we derive from other carriers in, or retroactive liability for, access charges and reciprocal compensation. For example, on December 17, 2019, the FCC issued an order that revised its interpretation of the VoIP symmetry rule. The FCC now concludes that LECs may assess end office switched access charges only if the LEC or its VoIP partner provides a physical connection to the last-mile facilities used to serve an end user. If neither the LEC nor its VoIP partner provides such a physical connection, the LEC may not assess end office switched access charges because it is not providing the functional equivalent of end office switched access. The FCC also decided to give its order retroactive effect. We cannot predict the impact on our business, including whether other carriers will agree with our legal interpretations and treatments, at this time. Other proceedings before the FCC could also result in increases in the cost of regulatory compliance. For example, the FCC has opened a proceeding to examine how to improve the delivery of emergency 911 services and whether to expand requirements to include communications services not currently subject to emergency calling obligations. A number of states also have proceedings pending that could impact our access to and the rates we pay for network services. Other state proceedings could limit our pricing and billing flexibility. Our business would be substantially impaired if the FCC, the courts or state commissions eliminated our access to the facilities and services we use to serve our customers, substantially increased the rates we pay for facilities and services, increased the costs or complexity associated with providing emergency 911 services or adversely affected the revenue we receive from other carriers or our customers. In addition, congressional legislative efforts to rewrite the Telecommunications Act of 1996 or enact other telecommunications legislation, as well as various state legislative initiatives, may cause major industry and regulatory changes. We cannot predict the outcome of these proceedings or legislative initiatives or the effects, if any, that these proceedings or legislative initiatives may have on our business and operations.

While we believe we are currently in compliance with all federal, state, local and international rules and regulations, these regulations are subject to interpretation and the relevant regulators may determine that our application of these rules and regulations is not consistent with their interpretation. Additionally, in certain instances, third parties or government agencies may bring action with federal, state or local regulators if they believe a provider has breached applicable rules and regulations.

The effects of increased regulation of IP-based service providers are unknown.

While the FCC has to date generally subjected IP-based service providers to less stringent regulatory oversight than traditional common carriers, the FCC has imposed certain regulatory obligations on providers of interconnected and non-interconnected VoIP services, including the obligations to contribute to the Universal Service Fund, to provide 911 services, and to comply with the Communications Assistance for Law Enforcement Act. The recently enacted TRACED Act aims to mitigate illegal robocalls by directing the FCC to conduct certain rulemaking proceedings that include adopting rules that require participation in the technical standard known as STIR/SHAKEN, among other requirements. The TRACED Act applies to both IP-based and non-IP-based service providers. Further, some states have imposed taxes, fees and/or surcharges on interconnected VoIP telephony services. The imposition of additional regulations could have a material adverse effect on our business.

We must obtain and maintain permits and licenses to operate our network.

If we are unable, on acceptable terms and on a timely basis, to obtain and maintain the permits and licenses needed to expand and operate our network, our business could be materially adversely affected. In addition, the cancellation or non-renewal of the permits or licenses that are obtained could materially adversely affect our business. In the event we are the target of an acquisition, the regulatory agencies responsible for granting, renewing or transferring permits and licenses may delay or reject applications to transfer such permits or licenses and as a result these uncertainties, we may not be as attractive an acquisition target.

Our operations are subject to regulation and require us to obtain and maintain several governmental licenses and permits. If we violate those regulatory requirements or fail to obtain and maintain those licenses and permits, including payment of related fees, if any, we may not be able to conduct our business. Moreover, those regulatory requirements could change in a manner that significantly increases our costs or otherwise adversely affects our operations.

In the ordinary course of operating our network and providing our services, we must obtain and maintain a variety of telecommunications and other licenses and authorizations. We also must comply with a variety of regulatory obligations. There can be no assurance we can maintain our licenses or that they will be renewed upon their expiration. Our failure to obtain or maintain necessary licenses, authorizations or to comply with the obligations imposed upon license holders, including the payment of fees, may cause sanctions or additional costs, including the revocation of authority to provide services.

Our operations are subject to regulation at the national level and, often, at the state and local levels. Our operations are also subject to additional regulation by other countries in international markets. Changes to existing regulations or rules, or the failure to regulate going forward in areas historically regulated on matters such as network neutrality, licensing fees, environmental, health and safety, privacy, intercarrier compensation, emergency services, interconnection, illegal robocalling and other areas, in general or particular to our industry, may increase costs, restrict operations or decrease revenue. For example, the recently enacted TRACED Act aims to mitigate illegal robocalls by directing the FCC develop rules requiring participation in the technical standard known as STIR/SHAKEN among other things. As we expand internationally, we are also subject to telecommunications laws and regulations in the foreign countries where we offer our products. Our international operations are subject to country-specific governmental regulation that may increase our costs or impact our products and Bandwidth Communications Platform or prevent us from offering or providing our products in certain countries. Our inability or failure to comply with telecommunications and other laws and regulations could cause the temporary or permanent suspension of our operations, and if we cannot provide emergency calling functionality through our Bandwidth Communications Platform to meet any new federal or state requirements, or any applicable requirements from other countries, the competitive advantages that we currently have may not persist, adversely affecting our ability to obtain and to retain enterprise customers which could have an adverse impact on our business.

In January 2018, the FCC repealed its Network Neutrality Rules. Our business could suffer with respect to the quality of the services we offer, our ability to maintain our internet-based services and our services offered through our Bandwidth Communications Platform, decrease our profitability or increase the price of our services making our offerings less competitive in the marketplace.

In January 2018, the FCC adopted an order largely repealing its network neutrality rules. Among other things, the pre-existing network neutrality rules prevented providers of broadband internet access services — like cable and telephone companies — from blocking, impairing and degrading service offerings from non-affiliated third parties like us. The FCC’s order repealing the pre-existing network neutrality rules was appealed by a number of parties. In October 2019, a three judge panel of the U.S. Court of Appeals for the District of Columbia Circuit issued a decision that largely affirmed the FCC's order, including the reclassification of broadband Internet access as an information service. The court, however, vacated the FCC’s decision that would have prospectively barred states from imposing any rule or requirement that was inconsistent with the FCC's order. The appellate court's decision is subject to rehearing by the full court or parties may seek to appeal the decision to the United States Supreme Court. Various companies appealed the federal court of appeals decision in December 2019. We cannot predict whether the appeal will be successful or whether any states will adopt legislation that results in restoring the pre-existing network neutrality rules that prevent broadband internet access service providers from blocking, impairing and degrading offerings from third parties like us. If broadband providers were to block, impair or degrade our internet-based services or services we offer through our Bandwidth Communications Platform, or if broadband internet access providers were to charge us or our customers to access and use our internet-based services or services offered through our Bandwidth Communications Platform, we could lose customers, our profitability could decrease, or we may have to raise prices, making our service less competitive in the marketplace. Most of the major broadband internet access providers have publicly stated that they will not block, impair or degrade third party offerings. We cannot predict the potential impact of the January 2018 FCC network neutrality order on our offerings at this time.

We are subject to privacy and data security obligations in the United States. Any failure to comply with applicable laws, regulations or contractual obligations may harm our business, results of operations and financial condition. The FCC, other Federal agencies or state attorneys' general could fine or subject us to other adverse actions that may negatively impact our business reputation. If we are subject to an investigation or suffer a breach, we may incur costs or be subject to forfeitures and penalties that could reduce our profitability.

We are subject to privacy and data security laws and regulations that impose obligations in connection with the collection, processing and use of personal data. Federal and state laws or proposed laws impose limits on, or requirements regarding, the collection, distribution, use, security and storage of personally identifiable information ("PII") of individuals. We see increased regulation of data privacy and security, including the adoption of more stringent subject matter specific state laws in the United States. For example, in 2018, California enacted the California Consumer Privacy Act ("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. The CCPA may increase our compliance costs and potential liability. Some observers have noted that the CCPA could mark the beginning of a trend toward more stringent state privacy legislation in the United States, which could increase our potential liability and adversely affect our business.

We also may be bound by contractual obligations relating to our collection, use and disclosure of personal data or may find it necessary or desirable to join industry or other self-regulatory bodies or other privacy or security related organizations that require compliance with their rules pertaining to privacy and data protection.

We are subject to individual or joint jurisdiction of the FCC, the Federal Trade Commission, and state attorneys' general with respect to privacy and data security obligations. If we were to suffer or if one of our customers were to suffer a breach, we may be subject to the jurisdiction of a variety of federal agencies' jurisdictions, as well as state attorneys' general. We may have to comply with a variety of data breach laws at the federal and state levels, comply with any resulting investigations, as well as offer mitigation to customers and potential end users of certain customers to which we provide services. We could also be subject to fines, forfeitures and other penalties that may adversely impact our business.

Any failure or perceived failure by us, our products or the Bandwidth Communications Platform to comply with new or existing U.S. privacy or data security laws, regulations, policies, industry standards or contractual or legal obligations, or any security incident that results in the unauthorized access to, or acquisition, release or transfer of, PII or other customer data may result in governmental investigations, inquiries, enforcement actions and prosecutions, private litigation, fines and penalties, adverse publicity or potential loss of business.

Our business is subject to complex and evolving foreign laws and regulations regarding privacy, data protection and other matters relating to information collection.

There are numerous foreign laws, regulations and directives regarding privacy and the collection, storage, transmission, use, processing, disclosure and protection of PII and other personal or customer data, the scope of which is continually evolving and subject to differing interpretations. We must comply with applicable laws, regulations and directives and we may be subject to significant consequences, including penalties and fines, for our failure to comply.

Uncertainty and changes in the requirements of multiple jurisdictions may increase the cost of compliance, delay or reduce demand for our services, restrict our ability to offer services in certain locations, impact our customers' ability to utilize our services in certain jurisdictions, or subject us to sanctions by national data protection regulators, all of which could harm our business, financial condition and results of operations.

For example, as of May 25, 2018, the General Data Protection Regulation ("GDPR"), replaced the Data Protection Directive with respect to the processing of PII in the EU. The GDPR imposes several stringent requirements for controllers and processors of PII (including non-EU processors who process personal data on behalf of EU controllers), including, for example, more robust internal accountability controls, a strengthened individual data rights regime, shortened timelines for data breach notifications, limitations on retention and secondary use of information and additional obligations when we contract with third parties in connection with the processing of the PII. Failure to comply with the requirements of GDPR and the applicable national data protection laws of the EU member states may result in fines of up to €20 million or up to 4% of the total worldwide annual revenue for the preceding financial year, whichever is higher, and other administrative penalties. Complying with the GDPR has required us to implement additional mechanisms. As we continue to operate under the GDPR, compliance may become onerous and adversely affect our business, financial condition, results of operations and prospects.

In addition, recent legal developments in Europe have created complexity and compliance uncertainty regarding certain transfers of information from the EU to the United States. For example, the Privacy Shield Framework, to the extent applicable to us, is under review and there is currently litigation challenging other EU mechanisms for adequate data transfers (i.e., the standard contractual clauses). It is uncertain whether the Privacy Shield Framework and/or the standard contractual clauses will be invalidated or adversely affected by European courts or legislatures. We rely, or intend to rely, on a mixture of mechanisms, including the Privacy Shield Framework and standard contractual clauses, to transfer PII from the EU to the United States, and we could be impacted by changes in law as a result of a future review of these transfer mechanisms by European regulators under the GDPR, as well as current challenges to these mechanisms in European courts. We and our customers are at risk of enforcement actions taken by European regulators until such point in time that we are able to ensure that all data transfers to us from the EU are legitimized. We also may encounter additional complexity with respect to data privacy and data transfers from the U.K. following the U.K.'s transition out of the EU. If one or more of the legal bases for transferring PII from Europe to the United States is invalidated, or if we are unable to transfer PII between and among countries and regions in which we may operate in the future, it could affect the manner in which we provide our services or could adversely affect our financial results.

Furthermore, any failure, or perceived failure, by us to comply with or make effective modifications to our policies, or to comply with any federal, state or international privacy, data-retention or data-protection-related laws, regulations, orders or industry self-regulatory principles could result in proceedings or actions against us by governmental entities or others, a loss of customer confidence, damage to our brand and reputation or a loss of customers, any of which could have an adverse effect on our business. In addition, various federal, state and foreign legislative or regulatory bodies may enact new or additional laws and regulations concerning privacy, data-retention and data-protection issues, including laws or regulations mandating disclosure to domestic or international law enforcement bodies, which could adversely impact our business, our brand or our reputation with customers. For example, some countries have adopted laws mandating that PII regarding customers in their country be maintained solely in their country. Having to maintain local data centers and redesign product, service and business operations to limit PII processing to within individual countries could increase our operating costs significantly.

Our business could suffer if we cannot obtain or retain local or toll-free numbers, are prohibited from obtaining local or toll-free numbers, or are limited to distributing local or toll-free numbers to only certain customers.

Our future success depends on our ability to procure large quantities of local and toll-free numbers to meet customer demands in the United States at reasonable cost and without undue restrictions. Our ability to procure and distribute numbers depends on factors outside of our control, such as applicable regulations, the practices of the communications carriers that provide numbers to us in certain jurisdictions, the cost of obtaining and managing numbers and the level of demand for new numbers. Due to their limited availability, there are certain popular area code prefixes and specialized "vanity" toll-free numbers that we may not be able to obtain in desired quantities or at all. Our inability to acquire or retain numbers for our operations would make our services, including our Bandwidth Communications Platform, less attractive to potential customers that desire assignments of particular numbering resources. In addition, future growth of our customer base, together with growth of customer bases of other providers of communications services, has increased, which increases our dependence on needing large quantities of local and toll-free numbers associated with desirable area codes or specific toll-free numbering resources at a reasonable cost and without undue restriction. If we are not able to obtain or retain adequate local and toll-free numbers, or attractive subsets of such resources, our business, results of operations and financial condition could be materially adversely affected.

In addition, in order to procure, distribute and retain telephone numbers in the EU, we will be required to register with the local telecommunications regulatory authorities, some of which have been increasingly monitoring and regulating the categories of phone numbers that are eligible for provisioning to our customers. We have registered or are in the process of registering in various countries in which we do business, but in some countries, the regulatory regime around provisioning of phone numbers is unclear, subject to change over time, and sometimes may conflict from jurisdiction to jurisdiction. Furthermore, these regulations and governments' approach to their enforcement, as well as our products and services, are still evolving and we may be unable to maintain compliance with applicable regulations, or enforce compliance by our customers, on a timely basis or without significant cost. Also, compliance with these types of regulations may require changes in products or business practices that result in reduced revenue. If we or our customers use phone numbers in these countries in a manner that violates applicable rules and regulations, we may also be subject to significant penalties or governmental action, including government-initiated audits and, in extreme cases, may be precluded from doing business in that particular country. In the event of such non-compliance, we may be forced to reclaim phone numbers from our customers, which could result in loss of customers, breach of contract claims, loss of revenue and reputational harm, all of which could have a material adverse effect on our business, results of operations and financial condition.

We face exposure to foreign currency exchange rate fluctuations, and such fluctuations could adversely affect our business, results of operations and financial condition.

As we launch and expand our international operations, we face exposure to the effects of fluctuations in currency exchange rates. While we have primarily transacted in U.S. dollars, we have transacted with partners in Europe in British Pounds and Euros. We expect to expand the number of transactions with customers and partners that are denominated in foreign currencies in the future as we expand our business internationally. We also incur expenses for some of our network service provider costs outside of the United States in local currencies and for employee compensation and other operating expenses in local currency. Fluctuations in the exchange rates between the U.S. dollar and other currencies could result in an increase to the U.S. dollar equivalent of such expenses.

In addition, our international subsidiaries maintain net assets denominated in currencies other than the functional operating currencies of these entities. As we expand our international operations, we will become more exposed to the effects of fluctuations in currency exchange rates. Accordingly, changes in the value of foreign currencies relative to the U.S. dollar may affect our results of operations due to transactional and translational remeasurements. Such foreign currency exchange rate fluctuations could make it more difficult to detect underlying trends in our business and results of operations. The trading price of our Class A common stock also could be adversely affected if fluctuations in currency exchange rates cause our results of operations to differ from our expectations or the expectations of our investors and securities analysts who follow our stock.

We do not currently maintain a program to hedge transactional exposures in foreign currencies. 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.

We may be exposed to liabilities under anti-corruption, export control and economic sanction regulations, and similar laws and regulations, and any determination that we violated any of these laws or regulations could have a material adverse effect on our business.

As we launch and expand our international offerings, we are subject to the Foreign Corrupt Practices Act ("FCPA"), the U.K. Bribery Act and other laws that prohibit improper payments or offers of payments to foreign governments and their officials, political parties, and/or private parties by persons and entities for the purpose of obtaining or retaining business. Our international activities create the risk of unauthorized payments or offers of payments by one of our employees or consultants, even though these parties are not always subject to our control. Our policies prohibit these practices by our employees and consultants, although our existing safeguards and any future improvements may prove to be less than effective, and our employees or consultants may engage in conduct for which we might be held responsible. Violations of the FCPA, the U.K. Bribery Act or other laws may result in severe criminal or civil sanctions, and we may be subject to other liabilities, which could negatively affect our business, operating results, and financial condition.

Our products and services may be subject to export control and economic sanctions regulations, including the U.S. Export Administration Regulations, U.S. Customs regulations and various economic and trade sanctions regulations administered by the U.S. Treasury Department's Office of Foreign Assets Control. Our products and services must be offered and sold in compliance with these laws and regulations. If we do not comply with these laws or regulations or if we become liable under these laws or regulations due to the failure of our customers to comply with these laws by obtaining proper consent, we could face liability. In addition, changes in our products or services, changes in applicable regulations, or change in the target of such regulations, could also result in decreased use of our products and services, or in our decreased ability to sell our products or provide our services to existing or prospective customers with international operations. Any decreased use of our products and services or limitation on our ability to export our products and provide our services could adversely affect our business, results of operations and financial condition.

Intellectual property and proprietary rights of others could prevent us from using necessary technology to provide our services or subject us to expensive intellectual property litigation.

If technology that we require to provide our services, including our Bandwidth Communications Platform, was determined by a court to infringe a patent held by another entity that will not grant us a license on terms acceptable to us, we could be precluded by a court order from using that technology and we would likely be required to pay significant monetary damages to the patent holder. The successful enforcement of these patents, or our inability to negotiate a license for these patents on acceptable terms, could force us to cease (i) using the relevant technology and (ii) offering services incorporating the technology. If a claim of infringement was brought against us based on the use of our technology or against our customers based on their use of our services for which we are obligated to indemnify, we could be subject to litigation to determine whether such use or sale is, in fact, infringing. This litigation could be expensive and distracting, regardless of the outcome.

While our own limited patent portfolio may deter other operating companies from bringing such actions, patent infringement claims are increasingly being asserted by patent holding companies, which do not use technology and whose sole business is to enforce patents against operators, such as us, for monetary gain. Because such patent holding companies, commonly referred to as patent "trolls," do not provide services or use technology, the assertion of our own patents by way of counter-claim would be largely ineffective.

Our use of open source software could negatively affect our ability to sell our services and subject us to possible litigation.

Our services, including our Bandwidth Communications Platform, incorporate open source software, and we expect to continue to incorporate open source software in our services in the future. Few of the licenses applicable to open source software have been interpreted by courts, and there is a risk that these licenses could be construed in a manner that could impose unanticipated conditions or restrictions on our ability to commercialize our services, including our Bandwidth Communications Platform. Moreover, although we have implemented policies to regulate the use and incorporation of open source software into our services, we cannot be certain that we have not incorporated open source software in our services in a manner that is inconsistent with such policies. If we fail to comply with open source licenses, we may be subject to certain requirements, including requirements that we offer our services that incorporate the open source software for no cost, that we make available source code for modifications or derivative works we create based upon, incorporating or using the open source software and that we license such modifications or derivative works under the terms of applicable open source licenses. If an author or other third-party that distributes such open source software were to allege that we had not complied with the conditions of one or more of these licenses, we could be required to incur significant legal expenses defending against such allegations and could be subject to significant damages, enjoined from generating revenue from customers using services that contained the open source software and required to comply with onerous conditions or restrictions on these services. In any of these events, we and our customers could be required to seek licenses from third parties in order to continue offering our services and to re-engineer our services or discontinue offering our services to customers in the event re-engineering cannot be accomplished on a timely basis. Any of the foregoing could require us to devote additional R&D resources to re-engineer our services, could result in customer dissatisfaction and may adversely affect our business, results of operations and financial condition.

Indemnity provisions in various agreements potentially expose us to substantial liability for intellectual property infringement and other losses.

Our agreements with customers and other third parties typically include indemnification or other provisions under which we agree to indemnify or otherwise be liable to them for losses suffered or incurred as a result of claims of intellectual property infringement, damages caused by us to property or persons or other liabilities relating to or arising from our services or platform or other acts or omissions. The term of these contractual provisions often survives termination or expiration of the applicable agreement. Large indemnity payments or damage claims from contractual breach could harm our business, results of operations and financial condition. Although we normally contractually limit our liability with respect to such obligations, we may still incur substantial liability related to them. Any dispute with a customer with respect to such obligations could have adverse effects on our relationship with that customer and other current and prospective customers, reduce demand for our services and adversely affect our business, results of operations and financial condition.

The storage, processing and use of personal information and related data subjects us to evolving governmental laws and regulation, commercial standards, contractual obligations and other legal obligations related to consumer and data privacy, which may have a material impact on our costs, use of our services, or expose us to increased liability.

Federal, state, local and foreign laws and regulations, commercial obligations and industry standards, each provide for obligations and restrictions with respect to data privacy and security, as well as the collection, storage, retention, protection, use, processing, transmission, sharing, disclosure and protection of personal information and other customer data, including customer proprietary network information under applicable federal law. The evolving nature of these obligations and restrictions subjects us to the risk of differing interpretations, inconsistency or conflicts among countries or rules, and creates uncertainty regarding their application to our business.

These obligations and restrictions may limit our ability to collect, store, process, use, transmit and share data with our customers, employees and third-party providers and to allow our customers to collect, store, retain, protect, use, process, transmit, share and disclose data with others through our services. Compliance with, and other burdens imposed by, such obligations and restrictions could increase the cost of our operations and impact our ability to market our services through effective segmentation.

Failure to comply with obligations and restrictions related to applicable data protection laws, regulations, standards, and codes of conduct, as well as our own posted privacy policies and contractual commitments could subject us to lawsuits, fines, criminal penalties, statutory damages, consent decrees, injunctions, adverse publicity, loss of user confidence in our services, and loss of users, which could materially harm our business. Because these obligations and restrictions have continued to develop and evolve rapidly, it is possible that we may not be, or may not have been, compliant with each such obligation and restriction. Additionally, third-party contractors may have access to customer or employee data. If these or other third-party vendors violate obligations and restrictions related to applicable data protection laws or our policies, such violations may also put our customers' or employees' information at risk and could in turn have a material and adverse effect on our business.

If we fail to protect our internally developed systems, technology and software and our patents and trademarks, we may become involved in costly litigation or our business or brand may be harmed.

Our ability to compete effectively is dependent in large part upon the maintenance and protection of systems and software that we have developed internally, including some systems and software based on open standards. We cannot patent much of the technology that is important to our business. In addition, any pending patent applications may not be granted, and any issued patent that we own may be challenged, narrowed, invalidated or circumvented. To date, we have relied on patent, copyright and trade secret laws, as well as confidentiality procedures and licensing arrangements, to establish and protect our rights to our technology. While we typically enter into confidentiality agreements with our employees, consultants, customers, and vendors in an effort to control access to and distribution of technology, software, documentation and other information, these agreements may not effectively prevent disclosure of confidential information and may not provide an adequate remedy in the event of unauthorized disclosure of confidential information. Despite these precautions, it may be possible for a third party to copy or otherwise obtain and use our technology without authorization. In addition, others may independently discover trade secrets and proprietary information, and in such cases we could not assert any rights against such party. Policing unauthorized use of our technology is difficult. The steps we take may not prevent misappropriation of the technology we rely on. In addition, effective protection may be unavailable or limited in some jurisdictions outside the United States. Litigation may be necessary in the future to enforce or protect our rights or to determine the validity and scope of the rights of others. That litigation could cause us to incur substantial costs and divert resources away from our daily business, which in turn could adversely affect our business, results of operations and financial condition.

The unlicensed use of our brands by third parties could harm our reputation, cause confusion among our customers or impair our ability to market our services. Accordingly, we have registered numerous trademarks and service marks and have applied for registration of our trademarks and service marks in the United States to establish and protect our brand names as part of our intellectual property strategy. We do not currently have any registered trademarks in any jurisdiction outside of the United States and the laws of some countries do not protect intellectual property and other proprietary rights to the same extent as the laws of the United States. To the extent we expand our international activities, our exposure to unauthorized copying, transfer and use of our proprietary technology or information may increase. We cannot assure you that our pending or future trademark applications will be approved. Although we anticipate that we would be given an opportunity to respond to any such rejections, we may be unable to overcome any such rejections. In addition, in proceedings before the United States Patent and Trademark Office third parties are given an opportunity to oppose pending trademark applications and seek to cancel registered trademarks. Opposition or cancellation proceedings may be filed against our trademarks, and our trademarks may not survive such proceedings. In the event that our trademarks are successfully challenged, we could be forced to rebrand our services, which could result in loss of brand name recognition. Moreover, successful opposition to our applications might encourage third parties to make additional oppositions or commence trademark infringement proceedings against us, which could be costly and time consuming to defend against. If we decide to take limited or no action to protect our trademarks, our trademark rights may be diluted and subject to challenge or invalidation, which could materially and adversely affect our brand in the marketplace. Certain of the trademarks we may use may become so well known by the public that their use becomes generic and they lose trademark protection. Over the long term, if we are unable to establish name recognition based on our trademark and tradenames, then we may not be able to compete effectively and our business may be adversely affected. Further, we cannot assure you that competitors will not infringe our trademarks or that we will have adequate resources to enforce our trademarks.

We are subject to litigation in the ordinary course of business, and uninsured judgments or a rise in insurance premiums may adversely affect our results of operations.

In the ordinary course of business, we are subject to various claims and litigation. Any such claims, regardless of merit, could be time-consuming and expensive to defend and could divert management's attention and resources. In accordance with customary practice, we maintain insurance against some, but not all, of these potential claims. We may elect not to obtain insurance if we believe that the cost of available insurance is excessive relative to the risks presented. The levels of insurance we maintain may not be adequate to fully cover any and all losses or liabilities. Further, we may not be able to maintain insurance at commercially acceptable premium levels or at all. If any significant judgment, claim (or a series of claims) or other event is not fully insured or indemnified against, it could have a material adverse impact on our business, financial condition and results of operations. There can be no assurance as to the actual amount of these liabilities or the timing thereof. We cannot be certain that the outcome of current or future litigation will not have a material adverse impact on our business and results of operations.

We may be liable for the information that content owners or distributors distribute over our network.

The law relating to the liability of private network operators for information carried on or disseminated through their networks remains unsettled. While we disclaim any liability for third-party content in our services agreements, we may become subject to legal claims relating to the content disseminated on our network, even though such content is owned or distributed by our customers or a customer of our customers. For example, lawsuits may be brought against us claiming that material distributed using our network was inaccurate, offensive or violated the law or the rights of others. Claims could also involve matters such as defamation, invasion of privacy and copyright infringement. In addition, the law remains unclear over whether content may be distributed from one jurisdiction, where the content is legal, into another jurisdiction, where it is not. Companies operating private networks have been sued in the past, sometimes successfully, based on the nature of material distributed, even if the content is not owned by the network operator and the network operator has no knowledge of the content or its legality. It is not practical for us to monitor all of the content distributed using our network. We may need to take costly measures to reduce our exposure to these risks or to defend ourselves against such claims, which could adversely affect our results of operations and financial condition.

Third parties may fraudulently use our name to obtain access to customer accounts and other personal information, use our services to commit fraud or steal our services, which could damage our reputation, limit our growth or cause us to incur additional expenses.

Our customers may have been subject to “phishing,” which occurs when a third party calls or sends an email or pop-up message to a customer that claims to be from a business or organization that provides services to the customer. The purpose of the inquiry is typically to encourage the customer to visit a bogus website designed to look like a website operated by the legitimate business or organization or provide information to the operator. At the bogus website, the operator attempts to trick the customer into divulging customer account or other personal information such as credit card information or to introduce viruses through “Trojan horse” programs to the customers’ computers. This could result in identity theft from our customers and the unauthorized use of our services. Third parties also have used our communications services to commit fraud. If we are unable to detect and prevent “phishing” and other similar methods, use of our services for fraud and similar activities, our brand reputation and growth may suffer and we may incur additional costs, including costs to increase security, or be required to credit significant amounts to customers.

Third parties also have used our communications services without paying, including by submitting fraudulent credit information and fraudulent credit card information. This has resulted in our incurring the cost of providing the services, including incurring call termination fees, without any corresponding revenue. We have implemented anti-fraud procedures in order to limit the expenses resulting from theft of service. If our procedures are not effective, theft of service could significantly increase our expenses and adversely affect our business, results of operations and financial condition.

If our customers or their end users do not accept the differences between our service and traditional telephone service, they may choose to remain with their current telephone service provider or may choose to return to service provided by traditional network service providers.

Aspects of our services based on VoIP, including our Bandwidth Communications Platform, are not the same as traditional network service providers. Our continued growth is dependent on the adoption of our services by mainstream customers and their end users, so these differences are important. For example:

- Our 911 calling services are different, in significant respects, from the 911 service associated with traditional wireline and wireless telephone providers and, in certain cases, with other VoIP providers.

- In the event of a power loss or Internet access interruption experienced by a customer, our service may be interrupted.

- Our customers' end users may experience lower call quality than they are used to from traditional wireline or wireless telephone companies, including static, echoes and delays in transmissions.

- Our customers' end users may not be able to call premium-rate telephone numbers such as 1-900 numbers and 976 numbers.

We may lose customers if we experience failures of our system or Bandwidth Communications Platform that significantly disrupt the availability and quality of the services that we provide. Such failures may also cause interruptions to service delivery and the completion of other corporate functions.

Our operations depend on our ability to limit and mitigate interruptions or degradation in service for customers. Interruptions in service or performance problems, for whatever reason, could undermine our customers' confidence in our services and cause us to lose customers or make it more difficult to attract new ones. Because many of our services are critical to the businesses or daily lives of many of our customers or our customers' end users, any significant interruption or degradation in service also could result in lost profits or other losses to customers. Although our service agreements generally limit our liability for service failures and generally exclude any liability for "consequential" damages such as lost profits, a court might not enforce these limitations on liability, which could expose us to financial loss. We also sometimes provide our customers with committed service levels. If we fail to meet these committed service levels, we could be required to provide service credits or other compensation to our customers, which could adversely affect our results of operations.

The failure of any equipment or facility on our network, including our network operations control centers and network data storage locations, could interrupt customer service and other corporate functions until we complete necessary repairs or install replacement equipment. Our business continuity plans also may be inadequate to address a particular failure that we experience. Delays, errors or network equipment or facility failures could result from natural disasters, disease, accidents, terrorist acts, power losses, security breaches, vandalism or other illegal acts, computer viruses or other causes. These delays, errors or failures could significantly impair our business due to:

- service interruptions;

- malfunction of our Bandwidth Communications Platform on which our enterprise users rely for voice, messaging or 911 functionality;

- exposure to customer liability;

- the inability to install new service;

- the unavailability of employees necessary to provide services;

- the delay in the completion of other corporate functions such as issuing bills and the preparation of financial statements; or

- the need for expensive modifications to our systems and infrastructure.

Defects or errors in our services could diminish demand for our services, harm our business and results of operations and subject us to liability.

Our customers use our services for important aspects of their businesses, and any errors, defects or disruptions to our services and any other performance problems with our services could damage our customers' businesses and, in turn, hurt our brand and reputation. We provide regular updates to our services, which have in the past contained, and may in the future contain, undetected errors, failures, vulnerabilities and bugs when first introduced or released. Real or perceived errors, failures or bugs in our services could result in negative publicity, loss of or delay in market acceptance of our platform, loss of competitive position, lower customer retention or claims by customers for losses sustained by them. In such an event, we may be required, or may choose, for customer relations or other reasons, to expend additional resources in order to help correct the problem. In addition, we may not carry insurance sufficient to compensate us for any losses that may result from claims arising from defects or disruptions in our services. As a result, our brand and reputation could be harmed, and our business, results of operations and financial condition may be adversely affected.

If our 911 services do not function properly, we may be exposed to significant liability from our users.

Certain of our IP telephony offerings, as well as the 911 solutions that we offer are subject to FCC rules governing the delivery of emergency calling services. Similar to other providers of IP telephony services, our 911 services are different from those associated with traditional local telecommunications services. These differences may lead to an inability to make and complete calls that would not occur for users of traditional telephony services. For example, to provide the emergency calling services required by the FCC's rules to our IP telephony consumers, we may use components of both the wireline and wireless infrastructure in unique ways that can result in failed connections and calls routed to incorrect emergency call centers. Routing emergency calls over the Internet may be adversely affected by power outages and network congestion that may not occur for users of traditional telephony services. Emergency call centers may not be equipped with appropriate hardware or software to accurately process and respond to emergency calls initiated by consumers of our IP telephony services, and calls routed to the incorrect emergency call center can significantly delay response times for first responders. Users of our interconnected VoIP telephony services from a fixed address are required to manually update their location information for use when calling 911, and failure to do so may result in dispatching of assistance to the wrong location. Even manual updates made appropriately require a certain amount of time before the updated address appears in the relevant databases which could result in misrouting emergency calls to the wrong emergency calling center, dispatching first responders to the wrong address, or both. Moreover, the relevant rules with respect to what address information should be provided to emergency call centers when the call originates from a mobile application are unsettled. As a result, we could be subject to enforcement action by the FCC or other entities — possibly exposing us to significant monetary penalties, cease and desist orders, civil liability, loss of user confidence in our services, loss of users, and other adverse consequences, which could materially harm our business. The FCC's rules, and some states, also impose other obligations on us, such as properly recording our customers' registered locations, obtaining affirmative acknowledgement from customers that they are aware of the differences between emergency calling services associated with IP telephony as compared with traditional telecommunications services, and distribution of appropriate warning labels to place on or near hardware used to place IP telephony calls. Failure to comply with these requirements, or failure of our Bandwidth Communications Platform such that 911 calls did not complete or were misrouted, may result in FCC enforcement action, state attorneys' general investigations, potential exposure to significant monetary penalties, cease and desist orders, civil liability to our users and their customers, loss of user confidence in our services, loss of users, and other adverse consequences, which could materially harm our business.

The FCC's rules also require that we timely report certain 911 service outages. The FCC may make inquiries regarding matters related to any reported 911 service outage. Any inquiry could result in FCC enforcement action, potential monetary penalties and other adverse consequences.

Termination of relationships with key suppliers could cause delay and additional costs.

Our business is dependent on third-party suppliers for fiber, computers, software, transmission electronics and related network components, as well as providers of network colocation facilities that are integrated into our network, some of which are critical to the operation of our business. If any of these critical relationships is terminated, a supplier either exits or curtails its business as a result of economic conditions, a supplier fails to provide critical services or equipment, or the supplier is forced to stop providing services due to legal constraints, such as patent infringement, and we are unable to reach suitable alternative arrangements quickly, we may experience significant additional costs or we may not be able to provide certain services to customers. If that happens, our business, results of operations and financial condition could be materially adversely affected.

Many of our third-party suppliers do not have long-term committed contracts with us and may terminate their agreements with us without notice or by providing 30 days prior written notice. Although we expect that we could receive similar services from other third-party suppliers, if any of our arrangements with our third-party suppliers are terminated, we could experience interruptions in our ability to make our services available to customers, as well as delays and additional expenses in arranging alternative providers. If a significant portion of our third-party suppliers fail to provide these services to us on a cost-effective basis or otherwise terminate these services, the delay caused by qualifying and switching to other providers could be time consuming and costly and could adversely affect our business, results of operations and financial condition.

One of our third-party suppliers, Level 3, provides us with certain 911 call routing and termination services. Pursuant to the agreement with Level 3, Level 3 is our preferred provider for these services until December 31, 2020, after which the agreement automatically renews for consecutive one-year periods, unless terminated by either Level 3 or us. After December 31, 2020, Level 3 may cancel the agreement upon two years' notice and we may cancel the agreement upon one year's notice. If our agreement with Level 3 terminates for any reason other than our default, Level 3 must continue to provide these services to us for at least two years to allow us to transition to another provider. We are obligated to pay Level 3 a minimum of $100,000 per month for as long as the agreement continues. Additionally, Level 3 has a right of first refusal to provide these 911 call routing and termination services to us in additional geographic areas.

Our growth and financial health are subject to a number of economic risks.

The financial markets in the United States have experienced substantial uncertainty during recent years. This uncertainty has included, among other things, extreme volatility in securities prices, drastically reduced liquidity and credit availability, rating downgrades of certain investments and declining values with respect to others. If capital and credit markets continue to experience uncertainty and available funds remain limited, we may not be able to obtain debt or equity financing or to refinance our existing indebtedness on favorable terms or at all, which could affect our strategic operations and our financial performance and force modifications to our operations. These conditions currently have not precluded us from accessing credit markets or financing our operations, but there can be no assurance that financial markets and confidence in major economies will not deteriorate. An extended period of economic deterioration could materially adversely affect our results of operations and financial condition and exacerbate some of the other risk factors contained in this Annual Report on Form 10-K. For example, our customers might defer or entirely decline purchases of our services due to tighter credit or negative financial news or reduce demand for our services. Our customers also may not be able to obtain adequate credit, which could adversely affect the timeliness of their payments to us or ultimately result in a filing by the customer for protection from creditors under applicable insolvency or bankruptcy laws. If our customers cannot make timely payments to us, our accounts receivable could increase. The demand for, and the prices of, our services also may decline due to the actions of our competitors or otherwise.

Key vendors upon which we rely also could be unwilling or unable to provide us with the materials or services that we need to operate our Bandwidth Communications Platform or otherwise on a timely basis or on terms that we find acceptable. Our financial counterparties, insurance providers or others also may default on their contractual obligations to us. If any of our key vendors fail, we may not be able to replace them without disruptions to, or deterioration of, our services and we also may incur higher costs associated with new vendors. Transitioning to new vendors also may result in the loss of the value of assets associated with our integration of third-party services into our network or service offerings.

Our customer churn rate may increase.

Customer churn occurs when a customer discontinues service with us, whether voluntarily or involuntarily, such as a customer switching to a competitor or going out of business. Changes in the economy, increased competition from other providers, or issues with the quality of service we deliver can impact our customer churn rate. We cannot predict future pricing by our competitors, but we anticipate that price competition will continue. Lower prices offered by our competitors could contribute to an increase in customer churn. We cannot predict the timing, duration or magnitude of any deteriorated economic conditions or its impact on our target of customers. Higher customer churn rates could adversely affect our revenue growth. Higher customer churn rates could cause our dollar-based net retention rate to decline. A sustained and significant growth in the churn rate could have a material adverse effect on our business.

The market prices for certain of our services have decreased in the past and may decrease in the future, resulting in lower revenue than we anticipate.

Market prices for certain of our services have decreased over recent years. These decreases resulted from downward market pressure and other factors including:

- technological changes and network expansions, which have resulted in increased transmission capacity available for sale by us and by our competitors; and

- some of our competitors have been willing to accept smaller operating margins in the short term in an attempt to increase long-term revenue.

To retain customers and revenue, we must sometimes reduce prices in response to market conditions and trends. We cannot predict to what extent we may need to reduce our prices to remain competitive or whether we will be able to sustain future pricing levels as our competitors introduce competing services or similar services at lower prices. Our ability to meet price competition may depend on our ability to operate at costs equal to or lower than our competitors or potential competitors. As our prices for some of our services decrease, our operating results may suffer unless we are able to either reduce our operating expenses or increase traffic volume from which we can derive additional revenue.

The need to obtain additional IP circuits from other providers increases our costs. In addition, the need to interconnect our network to networks that are controlled by others could increase our costs.

We lease all of our IP circuits from third parties nationwide. We could incur material expenses if we were required to locate alternative IP circuits. We may not be able to obtain reasonable alternative IP circuits if needed. Failure to obtain usage of alternative IP circuits, if necessary, could have a material adverse effect on our ability to carry on business operations. In addition, some of our agreements with other providers require the payment of amounts for services whether or not those services are used. Our reliance on third-party providers may reduce our operating flexibility, ability to make timely service changes and ability to control quality of service.

In the normal course of business, we need to enter into interconnection agreements with many local telephone companies, as well as the owners of networks that our customers desire to access to deliver their services. We are not always able to secure these interconnection agreements on favorable terms. Costs of obtaining service from other communications carriers comprise a significant proportion of the operating expenses of long distance carriers. Changes in regulation, particularly the regulation of telecommunication carriers and local access network owners, could indirectly, but significantly, affect our competitive position. These changes could increase or decrease the costs of providing our services. Further, if problems occur with our third-party providers or local telephone companies, it may cause errors or poor quality communications, and we could encounter difficulties identifying the source of the problem. The occurrence of errors or poor quality communications on our services, whether caused by our platform or a third-party provider, may result in the loss of our existing customers or the delay of adoption of our services by potential customers and may adversely affect our business, results of operations and financial condition.

Network providers also may institute additional fees due to regulatory, competitive or other industry-related changes that increase our costs. For example, a major U.S. cellular carrier recently introduced a new service offering for Application to Person (“A2P”), messages that will add a new fee for A2P messages delivered to its subscribers. While we may be able to negotiate with network providers, absorb the increased costs, or charge these costs to our customers, we cannot assure you that we will be able to do so. In the case of new A2P fees, we expect to pass these fees on to our customers who send messages to this carrier's subscribers. This is expected to increase our revenue and cost of goods sold, but is not expected to impact the gross profit received for sending these messages. However, these changes may still have a negative impact on our gross margins mathematically. We also may not be able to effectively respond to any new fees if all network providers in a particular market impose equivalent fee structures, if the magnitude of the fees is disproportionately large when compared to the underlying prices paid by our customers, or if the market conditions limit our ability to increase the prices we charge our customers.

We depend largely on the continued services of our senior management and other key employees, the loss of any of whom could adversely affect our business, results of operations and financial condition.

Our future performance depends on the continued services and contributions of our senior management and other key employees to execute on our business plan, to develop our platform, to deliver our services to customers, to attract and retain customers and to identify and pursue opportunities. The loss of services of senior management or other key employees could significantly delay or prevent the achievement of our development and strategic objectives. In particular, we depend to a considerable degree on the vision, skills, experience and effort of our Co-Founder, Chief Executive Officer and Chairman, David A. Morken. The replacement of any of our senior management personnel would likely involve significant time and costs, and such loss could significantly delay or prevent the achievement of our business objectives. The loss of the services of our senior management or other key employees for any reason could adversely affect our business, results of operations and financial condition.

If we are unable to hire, retain and motivate qualified personnel, our business will suffer.

Our future success depends, in part, on our ability to continue to attract and retain highly skilled personnel. We believe that there is, and will continue to be, intense competition for highly skilled management, technical, sales and other personnel with experience in our industry in the Raleigh, North Carolina area, where our headquarters are located, and in other locations where we maintain offices. We must provide competitive compensation packages and a high-quality work environment to hire, retain and motivate employees. If we are unable to retain and motivate our existing employees and attract qualified personnel to fill key positions, we may be unable to manage our business effectively, including the development, marketing and sale of our services, which could adversely affect our business, results of operations and financial condition. To the extent we hire personnel from competitors, we also may be subject to allegations that they have been improperly solicited or hired, or that they divulged proprietary or other confidential information.

Volatility in, or lack of performance of, our stock price may also affect our ability to attract and retain key personnel. Employees may be more likely to terminate their employment with us if the shares they own or the shares underlying any vested options or restricted stock units have significantly appreciated in value, or, conversely, if the exercise prices of any options that they hold are significantly above the trading price of our Class A common stock or the value of any restricted stock units they hold has depreciated significantly. If we are unable to retain our employees, our business, results of operations and financial condition could be adversely affected.

Our management team has limited experience managing a public company.

Other than experience gained at our company, most members of our management team have limited, if any, 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. As a result of being a public company, we are subject to significant regulatory oversight and reporting obligations under the federal securities laws and the continuous scrutiny of securities analysts and investors. These new 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.

We could be subject to liability for historic and future sales, use and similar taxes, which could adversely affect our results of operations.

We conduct operations in many tax jurisdictions throughout the United States. In many of these jurisdictions, non-income-based taxes such as sales, use and telecommunications taxes, including those associated with (or potentially associated with) VoIP telephony services or 911 services, are or may be assessed on our operations. As we launch and expand our international operations, we also face exposure to other non-income-based taxes such as value added taxes that are or may be assessed on our operations. The systems and procedures necessary to comply in these jurisdictions are complex to develop and challenging to implement. Additionally, we rely heavily on third parties to provide us with key software and services for compliance. If these third parties cease to provide those services to us for any reason, or fail to perform services accurately and completely, we may not be able to accurately bill, collect or remit applicable non-income-based taxes. Historically, we have not billed or collected certain of these taxes and, in accordance with GAAP, we have recorded a provision for our tax exposure in these jurisdictions when it is both probable that a liability has been incurred and the amount of the exposure can be reasonably estimated. These estimates include several key assumptions including, but not limited to, the taxability of our services, the jurisdictions in which we believe we have nexus, and the sourcing of revenue to those jurisdictions. In the event these jurisdictions challenge our assumptions and analysis, our actual exposure could differ materially from our current estimates.

Taxing authorities also may periodically perform audits to verify compliance and include all periods that remain open under applicable statutes, which customarily range from three to four years. At any point in time, we may undergo audits that could result in significant assessments of past taxes, fines and interest if we were found to be non-compliant. During the course of an audit, a taxing authority may, as a matter of policy, question our interpretation and/or application of their rules in a manner that, if we were not successful in substantiating our position, could potentially result in a significant financial impact to us.

Furthermore, certain jurisdictions in which we do not collect sales, use and similar taxes may assert that such taxes are applicable, which could result in tax assessments, penalties and interest, and we may be required to collect such taxes in the future. Such tax assessments, penalties and interest or future requirements may adversely affect our business, results of operations and financial condition.

We may be subject to significant U.S. federal income tax-related liabilities and indemnity obligations if there is a determination that the Spin-Off is taxable for U.S. federal income tax purposes.

We may be subject to significant U.S. federal income tax-related liabilities with respect to our prior distribution of all of the issued and outstanding shares of the common stock of Republic Wireless, Inc. (“Republic Wireless”), our former subsidiary, to our stockholders as of and on November 30, 2016 (the “Spin-Off”), if there is a determination that the Spin-Off is taxable for U.S. federal income tax purposes. In that regard, even if the Spin-Off otherwise qualified as a tax-free transaction to us and our stockholders under Section 355, Section 368(a)(1)(D) and related provisions of the U.S. Internal Revenue Code of 1986, as amended (the “Code”) at the time of the Spin-Off, we would be subject to corporate-level taxable gain under Section 355(e) of the Code (“Section 355(e)”) if there was a 50% or greater change in ownership, by vote or value, of shares of our stock or Republic Wireless’s stock that occurred after the Spin-Off as part of a plan or series of related transactions that included the Spin-Off. For purposes of Section 355(e), any acquisitions or issuances of our stock, including pursuant to our initial public offering and pursuant to the reorganizations undertaken and arrangements entered into in connection with our initial public offering, or Republic Wireless’s stock, in each case, that occurred within two years after the Spin-Off are generally presumed to be part of a plan or series of related transactions with respect to the Spin-Off.

In connection with the Spin-Off, we received an opinion from Skadden, Arps, Slate, Meagher & Flom LLP substantially to the effect that, among other things, the Spin-Off should qualify as a tax-free transaction for U.S. federal income tax purposes under Section 355 and Section 368(a)(1)(D) of the Code. In addition, in light of the implications that would arise for us if Section 355(e) applied to the Spin-Off, we received an opinion from Kilpatrick Townsend & Stockton LLP in connection with our initial public offering substantially to the effect that (i) as of the date of the initial public offering, we would not be required to recognize gain with respect to the Spin-Off pursuant to Section 355(e), and (ii) any increases in voting power attributable to conversions of our Class B common stock to Class A common stock by those who held our Class B common stock as of the date of the initial public offering would not cause us to recognize gain with respect to the Spin-Off pursuant to Section 355(e) (together with the opinion from Skadden, Arps, Slate, Meagher & Flom LLP with respect to the Spin-Off, the “Tax Opinions”). Neither of the Tax Opinions is binding on the Internal Revenue Service (the “IRS”) or the courts, however, and the IRS or the courts may not agree with the conclusions reached in the Tax Opinions. Moreover, the Tax Opinions were based upon, among other things, the laws in effect at the time of each of the Tax Opinions and certain assumptions and representations as to factual matters made by us. Any change in applicable law, which may be retroactive, or the failure of any such assumptions or representations to be true, could adversely affect the validity of the conclusions reached in the Tax Opinions.

If the conclusions of the Tax Opinions are not correct, or if the Spin-Off is otherwise ultimately determined to be a taxable transaction, we would be liable for significant U.S. federal income tax related liabilities. In addition, pursuant to the Tax Sharing Agreement, dated November 30, 2016, between us and Republic Wireless (the "Tax Sharing Agreement"), we must generally indemnify Republic Wireless for any taxes or losses incurred by it (or its respective subsidiaries) resulting from the Spin-Off failing to qualify as a tax-free transaction for U.S. federal income tax purposes (including due to the application of Section 355(e)) as a result of subsequent actions we take or fail to take. The amount of any indemnity obligations we may have under the Tax Sharing Agreement in such case may be material.

Even if Section 355(e) does not apply to the Spin-Off as of the date of our initial public offering or as a result of an increase in voting power attributable to conversions of our Class B common stock by those who held such stock as of our initial public offering, subsequent acquisitions or issuances of our stock could be treated as part of a plan or series of related transactions with respect to the Spin-Off. Accordingly, in light of the requirements of Section 355(e), we might forego share repurchases, stock issuances and other strategic transactions for some period of time following our initial public offering. Notwithstanding the foregoing, it is possible that we, Republic Wireless or the holders of our respective stock might inadvertently cause, permit or otherwise not prevent a change in the ownership of our stock or Republic Wireless's stock to occur, which would cause Section 355(e) to apply to the Spin-Off, thereby triggering significant U.S. federal income tax-related liabilities and indemnity obligations under the Tax Sharing Agreement of approximately $50 million. This approximation is based on our current expectations and the tax laws in effect as of our initial public offering. However, we cannot provide any assurance that this estimate will prove to be accurate in the event that Section 355(e) were to apply.

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

The preparation of financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the amounts reported in the consolidated financial statements and accompanying notes. We base our estimates on historical experience and on various other assumptions that we believe to be reasonable under the circumstances, as provided in "Management's Discussion and Analysis of Financial Condition and Results of Operations." The results of these estimates form the basis for making judgments about the carrying values of assets, liabilities and equity, and the amount of revenue and expenses that are not readily apparent from other sources. Significant assumptions and estimates used in preparing our consolidated financial statements include those related to revenue recognition, capitalized internal-use software costs, other non-income taxes, business combination and valuation of goodwill and purchased intangible assets and share-based compensation. Our results of operations may be adversely affected if our assumptions change or if actual circumstances differ from those in our assumptions, which could cause our results of operations to fall below the expectations of securities analysts and investors, resulting in a decline in the trading price of our Class A common stock.

If we fail to maintain an effective system of disclosure controls and internal control over financial reporting, our ability to produce timely and accurate financial statements or comply with applicable regulations could be impaired.

As a public company, we are subject to the reporting requirements of the Exchange Act, the Sarbanes-Oxley Act of 2002 (the "Sarbanes-Oxley Act"), and the rules and regulations of the applicable listing standards of the NASDAQ Global Select Market. We expect that the requirements of these rules and regulations will continue to increase our legal, accounting and financial compliance costs, make some activities more difficult, time-consuming and costly and place significant strain on our personnel, systems and resources.

The Sarbanes-Oxley Act requires, among other things, that we maintain effective disclosure controls and procedures and internal control over financial reporting. Our disclosure controls and other procedures are designed to ensure that information required to be disclosed by us in the reports that we will file with the SEC is recorded, processed, summarized and reported within the time periods specified in SEC rules and forms and that information required to be disclosed in reports under the Exchange Act is accumulated and communicated to our principal executive and financial officers, and we continue to evaluate how to improve controls. We are also continuing to improve our internal control over financial reporting. In order to develop, maintain and improve the effectiveness of our disclosure controls and procedures and internal control over financial reporting, we have expended, and anticipate that we will continue to expend, significant resources, including accounting-related costs and significant management oversight.

Our current controls and any new controls that we develop may become inadequate because of changes in conditions in our business. Further, weaknesses in our disclosure controls and internal control over financial reporting may be discovered in the future. Any failure to develop or maintain effective controls or any difficulties encountered in their implementation or improvement could harm our results of operations or cause us to fail to meet our reporting obligations and may result in a restatement of our consolidated financial statements for prior periods. Any failure to implement and maintain effective internal control over financial reporting could also adversely affect the results of periodic management evaluations and annual independent registered public accounting firm attestation reports regarding the effectiveness of our internal control over financial reporting. Ineffective disclosure controls and procedures and internal control over financial reporting could also cause investors to lose confidence in our reported financial and other information, which would likely have a negative effect on the trading price of our Class A common stock. In addition, if we are unable to continue to meet these requirements, we may not be able to remain listed on the NASDAQ Global Select Market.

Our independent registered public accounting firm is required to attest to the effectiveness of our internal control over financial reporting because we are no longer an "emerging growth company" as defined in the Jumpstart Our Business Startups Act of 2012 (the "JOBS Act"). We lost status as an "emerging growth company" as of December 31, 2019. 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 internal control over financial reporting is documented, designed or operating. Any failure to maintain effective disclosure controls and internal control over financial reporting could have a material and adverse effect on our business, results of operations and financial condition and could cause a decline in the trading price of our Class A common stock.

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

We review our intangible assets for impairment when events or changes in circumstances indicate the carrying value may not be recoverable. Goodwill is required to be tested for impairment at least annually. An adverse change in market conditions, particularly if such change has the effect of changing one of our critical assumptions or estimates, could result in a change to the estimation of fair value that could result in an impairment charge to our goodwill or intangible assets. Any such charges may adversely affect our results of operations.

Earthquakes, hurricanes, fires, floods, power outages, terrorist attacks and other significant events could disrupt our business and ability to serve our clients.

A significant event, such as an earthquake, hurricane, a fire, a flood or a power outage, could have a material adverse effect on our business, results of operations or financial condition. Our IP network is designed to be redundant and to offer seamless backup support in an emergency. While our network is designed to withstand the loss of any one data center at any point in time, the simultaneous failure of multiple data centers could disrupt our ability to serve our clients. Additionally, certain of our capabilities cannot be made redundant feasibly or cost-effectively. Acts of physical or cyber terrorism or other geopolitical unrest also could cause disruptions in our business. The adverse impacts of these risks may increase if our disaster recovery plans prove to be inadequate.

Our financial condition and growth may depend upon the successful integration of acquired businesses. We may not be able to efficiently and effectively integrate acquired operations, and thus may not fully realize the anticipated benefits from such acquisitions.

Achieving the anticipated benefits of any acquisitions depends in part upon whether we can integrate new businesses in an efficient and effective manner. The integration of any acquired businesses involves a number of risks, including, but not limited to:

- demands on management related to any significant increase in size after the acquisition;

- the disruption of ongoing business and the diversion of management's attention from the management of daily operations to management of integration activities;
- failure to fully achieve expected synergies and costs savings;
- unanticipated impediments in the integration of departments, systems, including accounting systems, technologies, books and records and procedures, as well as in maintaining uniform standards, controls, including internal control over financial reporting required by the Sarbanes-Oxley Act, procedures and policies;
- difficulty establishing and maintaining appropriate governance, reporting relationships, policies, controls, and procedures for the acquired business, particularly if it is based in a country or region where we did not previously operate;
- new or more stringent regulatory compliance obligations and costs by virtue of the acquisition, including risks related to international acquisitions that may operate in new jurisdictions or geographic areas where we may have no or limited experience;
- loss of customers or the failure of customers to order incremental services that we expect them to order;
- difficulty and delays in integrating the products, technology platforms, operations, systems, and personnel of the acquired business with our own, particularly if the acquired business is outside of our core competencies and current geographic markets;
- failure to provision services that are ordered by customers during the integration period;
- higher integration costs than anticipated;
- difficulties in the assimilation and retention of highly qualified, experienced employees, many of whom may be geographically dispersed;
- litigation, investigations, proceedings, fines, or penalties arising from or relating to the transaction or the acquired business, and any resulting liabilities may exceed our forecasts;
- acquisition of businesses with different revenue models, different contractual relationships, and increased customer concentration risks;
- assumption of long-term contractual obligations, commitments, or liabilities (for example, the costs associated with leased facilities), which could adversely impact our efforts to achieve and maintain profitability and impair our cash flow;
- failure to successfully evaluate or utilize the acquired business' technology and accurately forecast the financial impact of an acquisition, including accounting charges; and
- drag on our overall revenue growth rate or an increase of our net loss, which could cause analysts and investors to reduce their valuation of our company.

Successful integration of any acquired businesses or operations will depend on our ability to manage these operations, realize opportunities for revenue growth presented by strengthened service offerings and expanded geographic market coverage, obtain better terms from our vendors due to increased buying power, and eliminate redundant and excess costs to fully realize the expected synergies. Because of difficulties in combining geographically distant operations and systems which may not be fully compatible, we may not be able to achieve the financial strength and growth we anticipate from the acquisitions.

We may not realize our anticipated benefits from our acquisitions, if any, or may be unable to efficiently and effectively integrate acquired operations as planned. If we fail to integrate acquired businesses and operations efficiently and effectively or fail to realize the benefits we anticipate, we would be likely to experience material adverse effects on our business, financial condition, results of operations and future prospects.

Any acquisitions may also require us to issue debt or equity securities, use our cash resources, incur debt or contingent liabilities, amortize intangibles, or write-off acquisition-related expenses. In addition, we cannot predict market reactions to any acquisitions we may make or to any failure to announce any future acquisitions.

While we would conduct due diligence in connection with any acquisition opportunities, there may be risks or liabilities that such due diligence efforts fail to discover, that are not disclosed to us or that we inadequately assess. The failure to timely identify any material liabilities associated with any acquisitions could adversely affect our business, results of operations, and financial condition.

Our credit facility contains restrictive and financial covenants that may limit our operating flexibility.

Our credit facility contains certain restrictive covenants that either limit our ability to, or require a mandatory prepayment in the event we, among other things, incur additional indebtedness, issue guarantees, create liens on assets, make certain investments, merge with or acquire other companies, change business locations, pay dividends or make certain other restricted payments, transfer or dispose of assets, enter into transactions with affiliates and enter into various specified transactions. We, therefore, may not be able to engage in any of the foregoing transactions unless we obtain the consent of our lenders or prepay the outstanding amount under our credit facility. Our credit facility also contains certain financial covenants and financial reporting requirements. Our obligations under our credit facility are secured by all of our property, with certain exceptions. We may not be able to generate sufficient liquidity or CPaaS Revenue to meet the financial covenants or pay the principal and interest under our credit facility. Furthermore, future working capital, borrowings or equity financing could be unavailable to repay or refinance the amounts outstanding under our credit facility. In the event of a liquidation, all outstanding principal and interest would have to be repaid prior to distribution of assets to unsecured creditors, and the holders of our Class A and Class B common stock would receive a portion of any liquidation proceeds only if all of our creditors, including our lenders, were first repaid in full.

If we are unable to comply with the restrictive and financial covenants in our credit facility, there would be a default under the terms of that agreement, and this could result in an acceleration of payment of funds that have been borrowed.

If we were unable to comply with the restrictive and financial covenants in our credit facility, there would be a default under the terms of that agreement. As a result, any borrowings under other instruments that contain cross-acceleration or cross default provisions may also be accelerated and become due and payable. If any of these events occur, there can be no assurance that we would be able to make necessary payments to the lenders or that we would be able to find alternative financing. Even if we were able to obtain alternative financing, there can be no assurance that it would be on terms that are acceptable.

Risks Related to Ownership of Our Class A Common Stock

The trading price of our Class A common stock may be volatile, and you could lose all or part of your investment.

Prior to our initial public offering, there was no public market for shares of our Class A common stock. On November 10, 2017, we sold shares of our Class A common stock to the public at $20.00 per share. From November 10, 2017, the date that our Class A common stock began trading on the NASDAQ Global Select Market, through February 20, 2020, the trading price of our Class A common stock has ranged from $18.05 per share to $90.63 per share. The trading price of our Class A common stock may continue to be volatile and could fluctuate significantly in response to numerous factors, many of which are beyond our control, including:

- price and volume fluctuations in the overall stock market from time to time;
- volatility in the trading prices and trading volumes of technology stocks;
- volatility in the trading volumes of our Class A common stock;
- changes in operating performance and stock market valuations of other technology companies generally, or those in our industry in particular;

- sales of shares of our Class A common stock by us or our stockholders;
- failure of securities analysts to maintain coverage of us, changes in financial estimates by securities analysts who follow our company, or our failure to meet these estimates or the expectations of investors;
- the financial projections we may provide to the public, any changes in those projections or our failure to meet those projections;
- announcements by us or our competitors of new products or services;
- the public's reaction to our press releases, other public announcements and filings with the SEC;
- rumors and market speculation involving us or other companies in our industry;
- actual or anticipated changes in our results of operations or fluctuations in our results of operations;
- actual or anticipated developments in our business, our competitors' businesses or the competitive landscape generally;
- litigation involving us, our industry or both;
- regulatory actions or developments affecting our operations, those of our competitors or our industry more broadly;
- developments or disputes concerning our intellectual property or other proprietary rights;
- announced or completed acquisitions of businesses, products, services or technologies by us or our competitors;
- new laws or regulations or new interpretations of existing laws or regulations applicable to our business, including the impact of changes in the tax code as a result of federal tax legislation enacted at the end of 2017 and uncertainty as to how some of those changes may be applied;
- changes in accounting standards, policies, guidelines, interpretations or principles;
- new rules adopted by certain index providers, such as S&P Dow Jones, that limit or preclude inclusion of companies with multi-class capital structures in certain of their indices;
- any significant change in our management; and
- general economic conditions and slow or negative growth of our markets.

In addition, in the past, securities class action litigation has often been instituted following periods of volatility in the overall market and the market price of a particular company's securities. This litigation, if instituted against us, could result in substantial costs and a diversion of our management's attention and resources.

Substantial future sales of shares of our Class A common stock could cause the market price of our Class A common stock to decline.

The market price of our Class A common stock could decline as a result of substantial sales of our Class A common stock, particularly sales by our directors, executive officers and significant stockholders, or the perception in the market that holders of a large number of shares intend to sell their shares.

Additionally, the shares of Class A common stock subject to outstanding options and restricted stock unit awards under our equity incentive plans and the shares reserved for future issuance under our equity incentive plans will become eligible for sale in the public market upon issuance. Certain holders of our Class A common stock have rights, subject to some conditions, to require us to file registration statements covering their shares or to include their shares in registration statements that we may file for our stockholders or ourselves.

The dual class structure of our common stock has the effect of concentrating voting control with those stockholders who held our capital stock prior to the completion of our initial public offering, including our directors, executive officers and significant stockholders and their respective affiliates who held in the aggregate 70.9% of the voting power of our capital as of December 31, 2019. This limits or precludes your ability to influence corporate matters, including the election of directors, amendments to our organizational documents and any merger, consolidation, sale of all or substantially all of our assets, or other major corporate transaction requiring stockholder approval.

Our Class A common stock has one vote per share, and our Class B common stock has ten votes per share. As of December 31, 2019, our directors, executive officers and holders of more than 5% of our common stock, and their respective affiliates, hold in the aggregate 70.9% of the voting power of our capital stock. Because of the ten-to-one voting ratio between our Class B and Class A common stock, the holders of our Class B common stock collectively will continue to control a majority of the combined voting power of our common stock and therefore be able to control all matters submitted to our stockholders for approval. This concentrated control limits or precludes your ability to influence corporate matters for the foreseeable future, including the election of directors, amendments to our organizational documents, and any merger, consolidation, sale of all or substantially all of our assets, or other major corporate transaction requiring stockholder approval. In addition, this may prevent or discourage unsolicited acquisition proposals or offers for our capital stock that you may feel are in your best interest as one of our stockholders.

Future transfers by holders of Class B common stock will generally result in those shares converting to Class A common stock, subject to limited exceptions, such as certain transfers effected for estate planning purposes. The conversion of Class B common stock to Class A common stock will have the effect, over time, of increasing the relative voting power of those holders of Class B common stock who retain their shares in the long term.

We cannot predict the impact our capital structure may have on our stock price.

In July 2017, S&P Dow Jones, a provider of widely followed stock indices, announced that companies with multiple share classes, such as ours, will not be eligible for inclusion in certain of their indices. As a result, our Class A common stock will likely not be eligible for these stock indices. Additionally, FTSE Russell, another provider of widely followed stock indices, announced plans in July 2017 to require new constituents of its indices to have at least five percent of their voting rights in the hands of public stockholders. Many investment funds are precluded from investing in companies that are not included in such indices, and these funds would be unable to purchase our Class A common stock if we were not included in such indices. We cannot assure you that other stock indices will not take a similar approach to S&P Dow Jones or FTSE Russell in the future. Exclusion from indices could make our Class A common stock less attractive to investors and, as a result, the market price of our Class A common stock could be adversely affected.

In addition, several shareholder advisory firms have announced their opposition to the use of multiple class structures. As a result, the dual class structure of our common stock may cause shareholder advisory firms to publish negative commentary about our corporate governance practices or otherwise seek to cause us to change our capital structure. Any actions or publications by shareholder advisory firms critical of our corporate governance practices or capital structure could also adversely affect the value of our Class A common stock.

We may become controlled by David A. Morken, our Co-Founder and Chief Executive Officer, whose interests may differ from other stockholders.

If all or substantially all of the holders of our Class B common stock convert their shares into Class A common stock voluntarily or otherwise, Mr. Morken may control approximately 54.7% of the combined voting power of our outstanding capital stock. As a result, Mr. Morken may have the ability to control the appointment of our management, the entering into of mergers, sales of substantially all or all of our assets and other extraordinary transactions and influence amendments to our certificate of incorporation and bylaws. If Mr. Morken controls a majority of the voting power of our outstanding capital stock, he would have the ability to control the vote in any election of directors and would have the ability to prevent any transaction that requires shareholder approval regardless of whether other shareholders believe the transaction is in our best interests. In any of these matters, the interests of Mr. Morken may differ from or conflict with your interests. Moreover, this concentration of ownership may also adversely affect the trading price for our Class A common stock to the extent investors perceive disadvantages in owning stock of a company with a controlling shareholder.

If securities or industry analysts cease publishing research or reports about us, our business or our market, or if they change their recommendations regarding our Class A common stock adversely, the trading price of our Class A common stock and trading volume could decline.

The trading market for our Class A common stock is influenced by the research and reports that securities or industry analysts may publish about us, our business, our market or our competitors. If any of the analysts who may cover us change their recommendation regarding our Class A common stock in an adverse manner, or provide more favorable recommendations about our competitors relative to us, the trading price of our Class A common stock would likely decline. If any analyst who covers us were to cease coverage of our company or fail to regularly publish reports on us, we could lose visibility in the financial markets, which in turn could cause the trading price of our Class A common stock or trading volume to decline.

Anti-takeover provisions contained in our second amended and restated certificate of incorporation and second amended and restated bylaws, as well as provisions of Delaware law, could impair a takeover attempt.

Our second amended and restated certificate of incorporation, second amended and restated bylaws and Delaware law contain provisions which could have the effect of rendering more difficult, delaying, or preventing an acquisition deemed undesirable by our board of directors. Among other things, our second amended and restated certificate of incorporation and second amended and restated bylaws include provisions:

- authorizing "blank check" preferred stock, which could be issued by our board of directors without stockholder approval and may contain voting, liquidation, dividend and other rights superior to our Class A and Class B common stock;

- limiting the liability of, and providing indemnification to, our directors and officers;

- limiting the ability of our stockholders to call and bring business before special meetings;

- providing for a dual class common stock structure in which holders of our Class B common stock have the ability to control the outcome of matters requiring stockholder approval, even if they own significantly less than a majority of the outstanding shares of our Class A and Class B common stock, including the election of directors and significant corporate transactions, such as a merger or other sale of our company or its assets;

- providing that our board of directors is classified into three classes of directors with staggered three-year terms;

- prohibiting stockholder action by written consent, which requires all stockholder actions to be taken at a meeting of our stockholders;

- requiring super-majority voting to amend some provisions in our second amended and restated certificate of incorporation and second amended and restated bylaws;

- requiring advance notice of stockholder proposals for business to be conducted at meetings of our stockholders and for nominations of candidates for election to our board of directors; and

- controlling the procedures for the conduct and scheduling of board of directors and stockholder meetings.

These provisions, alone or together, could delay or prevent hostile takeovers and changes in control or changes in our management.

As a Delaware corporation, we are also subject to provisions of Delaware law, including Section 203 of the Delaware General Corporation Law, which prevents certain stockholders holding more than 15% of our outstanding common stock from engaging in certain business combinations without approval of the holders of at least two-thirds of our outstanding common stock not held by such 15% or greater stockholder.

Any provision of our second amended and restated certificate of incorporation, second amended and restated bylaws or Delaware law that has the effect of delaying, preventing or deterring a change in control could limit the opportunity for our stockholders to receive a premium for their shares of our Class A common stock and could also affect the price that some investors are willing to pay for our Class A common stock.

Our second amended and restated certificate of incorporation and our second amended and restated bylaws include super-majority voting provisions that will limit your ability to influence corporate matters.

Our second amended and restated certificate of incorporation and our second amended and restated bylaws include provisions that require the affirmative vote of two-thirds of all of the outstanding shares of our capital stock entitled to vote to effect certain changes. These changes include amending or repealing our second amended and restated bylaws or second amended and restated certificate of incorporation or removing a director from office for cause. If all or substantially all of the holders of our Class B common stock convert their shares into Class A common stock voluntarily or otherwise, Mr. Morken may control the majority of the voting power of our outstanding capital stock, and therefore he may have the ability to prevent any such changes, which will limit your ability to influence corporate matters.

Our second amended and restated bylaws provide, subject to certain exceptions, that the Court of Chancery of the State of Delaware will be the sole and exclusive forum for certain stockholder litigation matters, which could limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or our directors, officers, employees or stockholders.

Our second amended and restated bylaws provide, subject to limited exceptions, that the Court of Chancery of the State of Delaware will, to the fullest extent permitted by law, be the sole and exclusive forum for (i) any derivative action or proceeding brought on our behalf; (ii) any action asserting a claim of breach of a fiduciary duty owed by any of our directors, officers or stockholder to us or our stockholders; (iii) any action asserting a claim against us that is governed by the internal affairs doctrine; or (iv) any action arising pursuant to any provision of the Delaware General Corporation Law, our second amended and restated certificate of incorporation or our second amended and restated bylaws. If a stockholder files an action within the scope of the preceding sentence in any other court than a court located in Delaware, the stockholder shall be deemed to have consented to the provisions of our second amended and restated bylaws described above. This choice of forum provision may limit a stockholder's ability to bring a claim in a judicial forum that it finds favorable for disputes with us or any of our directors, officers, other employees or stockholders which may discourage lawsuits with respect to such claims. Alternatively, if a court were to find the choice of forum provision contained in our second amended and restated bylaws to be inapplicable or unenforceable in an action, we may incur additional costs associated with resolving such action in other jurisdictions, which could materially adversely affect our business, financial condition and results of operations.

We may need additional capital in the future and such capital may be limited or unavailable. Failure to raise capital when needed could prevent us from growing in accordance with our plans.

We may require more capital in the future from equity or debt financings to fund our operations, finance investments in equipment and infrastructure, acquire complementary businesses and technologies, and respond to competitive pressures and potential strategic opportunities. If we are required to raise additional funds through further issuances of equity or other securities convertible into equity, our existing stockholders could suffer significant dilution, and any new shares we issue could have rights, preferences or privileges senior to those of the holders of our Class A common stock. The additional capital we may seek may not be available on favorable terms or at all. In addition, our credit facility limits our ability to incur additional indebtedness under certain circumstances. If we are unable to obtain capital on favorable terms or at all, we may have to reduce our operations or forego opportunities, and this may have a material adverse effect on our business, financial condition and results of operations.

We do not intend to pay dividends for the foreseeable future.

We have never declared or paid any cash dividends on our Class A common stock and do not intend to pay any cash dividends in the foreseeable future. We anticipate that we will retain all of our future earnings for use in the development of our business and for general corporate purposes. Any determination to pay dividends in the future will be at the discretion of our board of directors. In addition, the terms of our credit facility contain restrictions on our ability to declare and pay cash dividends on our capital stock. Accordingly, investors must rely on sales of their Class A common stock after price appreciation, which may never occur, as the only way to realize any future gains on their investments.

If a large number of shares of our Class A common stock is sold in the public market, the sales could reduce the trading price of our Class A common stock and impede our ability to raise future capital.

We cannot predict what effect, if any, future issuances by us of our Class A common stock will have on the market price of our Class A common stock. In addition, shares of our Class A common stock that we issue in connection with an acquisition may not be subject to resale restrictions. The market price of our Class A common stock could drop significantly if certain large holders of our Class A common stock, or recipients of our Class A common stock in connection with an acquisition, sell all or a significant portion of their shares of Class A common stock or are perceived by the market as intending to sell these shares other than in an orderly manner. In addition, these sales could impair our ability to raise capital through the sale of additional Class A common stock in the capital markets.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

Our corporate headquarters is located in Raleigh, North Carolina, where we lease approximately 120,041 square feet of office space at 900 Main Campus Drive and 80,692 square feet of additional office space, of which 17,073 square feet of space is subject to a facilities sharing agreement with Republic Wireless, on the Centennial Campus of North Carolina State University in Raleigh, North Carolina.

In addition to our headquarters, we lease space in Denver, CO and Rochester, NY, each of which are used for both our CPaaS and Other segments, as well as Frankfurt and Madrid, which are primarily used for regulatory purposes for our CPaaS segment. We also maintain data centers located in Raleigh, NC (including our network operations center); Los Angeles, CA; Dallas, TX; Atlanta, GA; New York, NY; Frankfurt, Germany; and London, United Kingdom.

We lease all our facilities and do not own any real property. We may procure additional space in the future as we continue to add employees or expand geographically. We believe our facilities are adequate and suitable for our current needs, and to the extent we require it, we believe additional or alternative space will be readily available in the future to accommodate our operations.

Item 3. Legal Proceedings

Phone Recovery Services, LLC (“Phone Recovery Services”) and Phone Administrative Services, Inc. (“Phone Administrative Services”) acting or purporting to act on behalf of applicable jurisdictions, or the applicable county or city itself, have filed multiple lawsuits against us and/or one of our subsidiaries alleging that we failed to bill, collect and remit certain taxes and surcharges associated with the provision of 911 services.

We face similar lawsuits brought directly by various state and local governments alleging underpayment of 911 taxes and surcharges, although we understand that Phone Recovery Services and Phone Administrative Services may be working in conjunction with each state or local government as a consultant on a contingency basis.

The following county or municipal governments have named us in lawsuits associated with the collection and remittance of 911 taxes and surcharges that remain unresolved: Cook County and Kane County Illinois; City of

Chicago, Illinois; the State of Illinois (collectively, the "Illinois Case"); the State of New York (the "New York Case"); Allegheny County, Pennsylvania (the "Pennsylvania Case"); and the State of Rhode Island (the "Rhode Island Case"). The complaints allege that we failed to bill, collect and remit certain taxes and surcharges associated with 911 service pursuant to applicable laws. The Illinois Case was dismissed by the trial court in December 2016, but returned to the trial court following an appeal. The plaintiffs' amended complaint in the Illinois Case was filed on August 12, 2019. We filed a motion to dismiss the Illinois Case on September 26, 2019. The New York Case originally was filed under seal in 2014, amended and filed under seal in 2018, and made available publicly on October 25, 2019. We filed a motion to dismiss the New York Case on February 14, 2020. The Rhode Island Case originally was filed under seal in 2014 and was made available publicly in 2015. Our response to the complaint in the Rhode Island Case has been on hold since 2015, pending the filing of an amended complaint. The Pennsylvania Case is stayed pending the outcome of a related proceeding before the Federal Communications Commission ("FCC").

We intend to vigorously defend these lawsuits and believe we have meritorious defenses to each. However, litigation is inherently uncertain, and any judgment or injunctive relief entered against us or any adverse settlement could negatively affect our business, results of operations and financial condition.

In August 2016, we received a Civil Investigative Demand from the Consumer Protection Division of the North Carolina Department of Justice. We have not been served with a complaint in connection with that investigation. The North Carolina Department of Justice is investigating the billing, collection and remission of certain taxes and surcharges associated with 911 service pursuant to applicable laws of the State of North Carolina.

In addition to the litigation discussed above, from time to time, we may be subject to legal actions and claims in the ordinary course of business. We have received, and may in the future continue to receive, claims from third parties relating to number management, and claims asserting, among other things, infringement of their intellectual property rights. Future litigation may be necessary to defend ourselves, our partners and our customers by determining the scope, enforceability and validity of third-party proprietary rights, or to establish our proprietary rights. The results of any current or future litigation cannot be predicted with certainty, and regardless of the outcome, litigation can have an adverse impact on us because of defense and settlement costs, diversion of management resources, and other factors.

Item 4. Mine Safety Disclosures

Not applicable.

PART II - OTHER INFORMATION

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

Market Information for Class A Common Stock

Our Class A common stock has been listed on the NASDAQ Global Select Market under the symbol "BAND" since November 10, 2017. Prior to that date, there was no public trading market for our Class A common stock.

Stockholders

As of January 31, 2020, we had 33 holders of record of our Class A and Class B common stock. The actual number of stockholders is greater than this number of record holders and includes stockholders who are beneficial owners but whose shares are held in street name by brokers and other nominees.

Dividend Policy

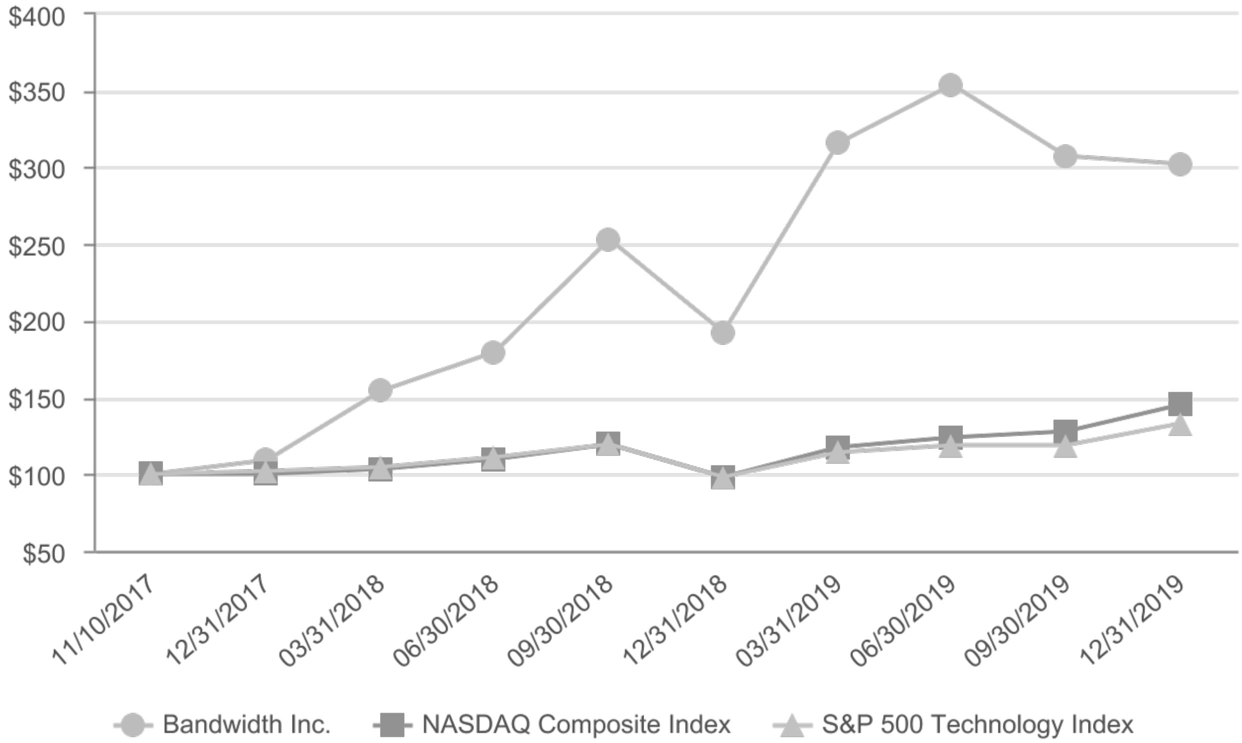
We have never declared or paid any cash dividend on our common stock. We currently intend to retain all of our future earnings, if any, generated by our operations for the development and growth of our business for the foreseeable future. The decision to pay dividends is at the discretion of our board of directors and depends upon our financial condition, results of operations, capital requirements, and other factors that our board of directors deems relevant.

Stock Performance Graph

This performance graph shall not be deemed "soliciting material" or to be "filed" with the SEC for purposes of Section 18 of the Exchange Act, or otherwise subject to the liabilities under that Section, and shall not be deemed to be incorporated by reference into any filing of Bandwidth Inc. under the Securities Act or the Exchange Act.

The graph below compares the cumulative total return to our stockholders between November 10, 2017 (the date our Class A common stock commenced trading on the NASDAQ Global Select Market) through December 31, 2019 in comparison to the NASDAQ Composite Index and the S&P 500 Information Technology Index. The graph assumes $100 was invested in the Class A common stock of Bandwidth Inc., the NASDAQ Composite Index and the S&P 500 Information Technology Index, and assumes reinvestment of any dividends.

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



Securities Authorized for Issuance under Equity Compensation Plans

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

Recent Sales of Unregistered Securities

From January 1, 2019 through December 31, 2019, we did not sell any securities on an unregistered basis.

Use of Proceeds from Public Offering of Common Stock

In November 2017 and in connection with our initial public offering ("IPO"), we sold 4,000,000 shares of our Class A common stock at a public offering price of $20.00 per share, including shares sold in connection with the exercise of the underwriters' option to purchase additional shares. The offer and sale of all the shares in our IPO were registered under the Securities Act pursuant to a registration statement on Form S-1 (File No. 333-220945), which was declared effective by the SEC on November 9, 2017. We received proceeds of $74.4 million, after deducting underwriting discounts and commissions of $5.6 million. In addition, we incurred expenses of approximately $5.4 million; thus, the net offering proceeds, after deducting underwriting discounts and offering expenses, were approximately $69.0 million. Upon the IPO and in accordance with David Morken's employment agreement, the Chief Executive Officer received a cash bonus of $750,000. No other payments were made to our directors or officers or their associates, holders of 10% or more of any class of our equity securities or any affiliates, other than payments in the ordinary course of business to officers for salaries. There has been no material change in the planned use of proceeds from our IPO as described in our final prospectus filed with the SEC on November 13, 2017 pursuant to Rule 424(b) under the Securities Act. The underwriters of our initial public offering were Morgan Stanley, KeyBanc Capital Markets, Baird, Canaccord Genuity and JMP Securities.

In March 2019 and in connection with our follow-on public offering, we sold 2,875,000 shares of our Class A common stock, at a public offering price of $54.25 per share, including shares sold in connection with the exercise of the underwriters' option to purchase additional shares. The offer and sale of all the shares in our follow-on public offering were registered under the Securities Act pursuant to a registration statement on Form S-3 (File No. 333-228939), which was declared effective by the SEC on March 8, 2019. We received proceeds of $147.4 million, after deducting underwriting discounts and commissions of $8.6 million. In addition, we incurred expenses of approximately $0.8 million; thus, the net offering proceeds, after deducting underwriting discounts and offering expenses, were approximately $146.6 million. There has been no material change in the planned use of proceeds from our follow-on public offering as described in our final prospectus filed with the SEC on March 8, 2019 pursuant to Rule 424(b) under the Securities Act. The underwriters of our follow-on public offering were Morgan Stanley, J.P. Morgan, KeyBanc Capital Markets, Baird, Canaccord Genuity and JMP Securities.

Item 6. Selected Financial Data

The consolidated statements of operations data for the years ended December 31, 2017, 2018 and 2019 and the consolidated balance sheets as of December 31, 2018 and 2019, are derived from our audited consolidated financial statements included elsewhere in this Annual Report on Form 10-K. The selected consolidated statements of operations data for the years ended December 31, 2015 and 2016 and the consolidated balance sheets data as of December 31, 2015, 2016 and 2017 are derived from audited consolidated financial statements not included in this Annual Report on Form 10-K. Our historical results are not necessarily indicative of the results that may be expected in the future. The following selected consolidated financial data should be read in conjunction with Item 7, “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and the consolidated financial statements and related notes included in Item 8, “Financial Statements and Supplementary Data,” within this Annual Report on Form 10-K to fully understand factors that may affect the comparability of the information presented below.

Consolidated Statements of Operations Data:	2015	2016	2017	2018	2019
	Year ended December 31,				
	(In thousands, except share and per share amounts)				
Revenue:					
CPaaS revenue	$ 101,502	$ 117,078	$ 131,572	$ 164,415	$ 197,944
Other revenue	36,299	35,057	31,383	39,698	34,650
Total revenue	137,801	152,135	162,955	204,113	232,594
Cost of revenue:					
CPaaS cost of revenue	64,760	71,218	75,859	94,296	110,343
Other cost of revenue	14,482	14,000	13,403	13,849	14,616
Total cost of revenue (1)	79,242	85,218	89,262	108,145	124,959
Gross profit	58,559	66,917	73,693	95,968	107,635
Operating expenses:					
Research and development (1)	7,375	8,520	10,789	20,897	31,461
Sales and marketing (1)	8,620	9,294	11,218	20,731	35,020
General and administrative (1)	34,602	33,859	37,069	47,588	58,847
Total operating expenses	50,597	51,673	59,076	89,216	125,328
Operating income (loss)	7,962	15,244	14,617	6,752	(17,693)
Other (expense) income:					
Interest (expense) income, net	(589)	(908)	(1,728)	301	2,446
Other income, net	—	—	—	—	23
Total other (expense) income	(589)	(908)	(1,728)	301	2,469
Income (loss) from continuing operations before income taxes	7,373	14,336	12,889	7,053	(15,224)
Income tax (provision) benefit (2) (3) (4)	(408)	11,094	(6,918)	10,870	17,718
Income from continuing operations	6,965	25,430	5,971	17,923	2,494
Loss from discontinued operations, net of income	(13,665)	(3,072)	—	—	—
Net (loss) income	$ (6,700)	$ 22,358	$ 5,971	$ 17,923	$ 2,494
Other comprehensive (loss) income					
Unrealized (loss) gain on marketable securities, net of income tax benefit	—	—	—	(1)	1
Foreign currency translation	—	—	—	—	41
Total other comprehensive (loss) income	—	—	—	(1)	42
Total comprehensive (loss) income	$ (6,700)	$ 22,358	$ 5,971	$ 17,922	$ 2,536
Earnings per share:					
Income from continuing operations	$ 6,965	$ 25,430	$ 5,971	$ 17,923	$ 2,494
Less: net income allocated to participating securities	931	3,355	644	—	—
Income from continuing operations attributable to common stockholders	$ 6,034	$ 22,075	$ 5,327	$ 17,923	$ 2,494
Income from continuing operations per share					
Basic	$ 0.52	$ 1.89	$ 0.42	$ 0.96	$ 0.11

	2015	2016	2017	2018	2019
Diluted	$ 0.48	$ 1.72	$ 0.37	$ 0.85	$ 0.10
Net (loss) income	$ (6,700)	$ 22,358	$ 5,971	$ 17,923	$ 2,494
Less: (loss) income allocated to participating securities	(896)	2,950	644	—	—
Net (loss) income attributable to common	$ (5,804)	$ 19,408	$ 5,327	$ 17,923	$ 2,494
Net (loss) income per share:					
Basic	$ (0.50)	$ 1.66	$ 0.42	$ 0.96	$ 0.11
Diluted	$ (0.47)	$ 1.51	$ 0.37	$ 0.85	$ 0.10
Weighted average number of common shares outstanding:					
Basic	11,497,727	11,678,568	12,590,221	18,573,067	22,640,461
Diluted	12,456,540	12,870,632	14,543,170	21,140,382	23,923,777

(1) Includes stock-based compensation expense as shown below.

(2) Includes $13,484 of excess tax benefits associated with the exercise of stock options and vesting of restricted stock units in the year ended December 31, 2019.

(3) The Company recognized a tax benefit of $14,138 due to the release of the deferred tax asset valuation allowance subsequent to the spin-off of Republic Wireless for the year ended December 31, 2016.

(4) On December 22, 2017, the Tax Cuts and Jobs Act (the "Act") was enacted into law. As a result of this change in tax law, the Company recorded a remeasurement of its deferred tax assets, which resulted in additional income tax expense of $2,073.

	Year ended December 31,				
Stock-based compensation expense:	**2015**	**2016**	**2017**	**2018**	**2019**
	(In thousands)				
Cost of revenue	$ 45	$ 61	$ 80	$ 114	$ 211
Research and development	189	138	155	555	1,461
Sales and marketing	239	182	172	511	1,199
General and administrative	3,020	989	1,396	2,159	3,755
Total	$ 3,493	$ 1,370	$ 1,803	$ 3,339	$ 6,626

	As of December 31,				
Consolidated Balance Sheets Data:	**2015**	**2016**	**2017**	**2018**	**2019**
	(In thousands)				
Cash, cash equivalents and restricted cash	$ 10,778	$ 7,028	$ 37,870	$ 41,501	$ 185,004
Working capital	(26,253)	(2,187)	40,977	58,931	181,211
Total assets	63,146	69,973	104,494	150,420	341,416
Long-term debt and capital lease obligations, net of current portion	—	37,738	—	—	—
Series A redeemable convertible preferred stock	21,818	21,818	—	—	—
Total stockholders' (deficit) equity	(19,074)	(22,374)	76,711	108,770	270,090

Non-GAAP Financial Measures

We use Non-GAAP gross profit, Non-GAAP gross margin, Adjusted EBITDA, Non-GAAP net (loss) income and free cash flow for financial and operational decision making and to evaluate period-to-period differences in our performance. Non-GAAP gross profit, Non-GAAP gross margin, Adjusted EBITDA, Non-GAAP net (loss) income and free cash flow are non-GAAP financial measures, which we believe are useful for investors in evaluating our overall financial performance. We believe these measures provide useful information about operating results, enhance the overall understanding of past financial performance and future prospects and allow for greater transparency with respect to key performance indicators used by management in its financial and operational decision making. See below for a reconciliation of each of the non-GAAP financial measures described below.

Non-GAAP Gross Profit and Non-GAAP Gross Margin

GAAP defines gross profit as revenue less cost of revenue. Cost of revenue includes all expenses associated with our various service offerings as more fully described under the caption "Key Components of Statement of Operations-Cost of Revenue and Gross Margin." We define Non-GAAP gross profit as gross profit after adding back the following items:

- depreciation and amortization; and
- stock-based compensation.

We add back depreciation and amortization, and stock-based compensation, because they are non-cash items. We eliminate the impact of these non-cash items because we do not consider them indicative of our core operating performance. Their exclusion facilitates comparisons of our operating performance on a period-to-period basis. Therefore, we believe showing gross margin, as Non-GAAP to remove the impact of these non-cash expenses, such as depreciation and amortization and stock-based compensation, is helpful to investors in assessing our gross profit and gross margin performance in a way that is similar to how management assesses our performance.

We calculate Non-GAAP gross margin by dividing Non-GAAP gross profit by revenue, expressed as a percentage of revenue.

Management uses Non-GAAP gross profit and Non-GAAP gross margin to evaluate operating performance and to determine resource allocation among our various service offerings. We believe Non-GAAP gross profit and Non-GAAP gross margin provide useful information to investors and others to understand and evaluate our operating results in the same manner as our management and board of directors and allows for better comparison of financial results among our competitors. Non-GAAP gross profit and Non-GAAP gross margin may not be comparable to similarly titled measures of other companies because other companies may not calculate Non-GAAP gross profit and Non-GAAP gross margin or similarly titled measures in the same manner as we do.

Consolidated

	Year ended December 31,				
	2015	**2016**	**2017**	**2018**	**2019**
			(In thousands)		
Consolidated Gross Profit	$ 58,559	$ 66,917	$ 73,693	$ 95,968	$ 107,635
Depreciation	5,258	4,574	4,315	4,490	6,583
Stock-based compensation	45	61	80	114	211
Non-GAAP Gross Profit	**$ 63,862**	**$ 71,552**	**$ 78,088**	**$ 100,572**	**$ 114,429**
Non-GAAP Gross Margin %	**46 %**	**47 %**	**48 %**	**49 %**	**49 %**

By Segment

CPaaS

	Year ended December 31,				
	2015	2016	2017	2018	2019
	(In thousands)				
CPaaS Gross Profit	$ 36,742	$ 45,860	$ 55,713	$ 70,119	$ 87,601
Depreciation	5,258	4,574	4,315	4,490	6,583
Stock-based compensation	45	61	80	114	211
Non-GAAP CPaas Gross Profit	**$ 42,045**	**$ 50,495**	**$ 60,108**	**$ 74,723**	**$ 94,395**
Non-GAAP CPaaS Gross Margin %	**41 %**	**43 %**	**46 %**	**45 %**	**48 %**

Other

There are no Non-GAAP adjustments to gross profit for the Other segment**.**

Adjusted EBITDA

We define Adjusted EBITDA as net income or losses from continuing operations, adjusted to reflect the addition or elimination of certain income statement items including, but not limited to:

- income tax provision (benefit);
- interest expense (income), net;
- depreciation and amortization expense;
- stock-based compensation expense;
- impairment of intangible assets, if any; and
- loss (gain) on disposal of property and equipment, if any.

Adjusted EBITDA is a key measure used by management to understand and evaluate our core operating performance and trends, to generate future operating plans and to make strategic decisions regarding the allocation of capital. In particular, the exclusion of certain expenses in calculating Adjusted EBITDA facilitates comparisons of our operating performance on a period-to-period basis.

	Year ended December 31,				
	2015	2016	2017	2018	2019
	(In thousands)				
Income from continuing operations	$ 6,965	$ 25,430	$ 5,971	$ 17,923	$ 2,494
Income tax provision (benefit) (1)	408	(11,094)	6,918	(10,870)	(17,718)
Interest expense (income), net	589	908	1,728	(301)	(2,446)
Depreciation	6,167	5,251	4,873	5,270	9,018
Amortization	908	891	839	554	520
Stock-based compensation	3,493	1,370	1,803	3,339	6,626
Impairment of intangible asset	—	695	—	—	—
Loss on disposal of property and equipment	382	19	91	191	456
Adjusted EBITDA	**$ 18,912**	**$ 23,470**	**$ 22,223**	**$ 16,106**	**$ (1,050)**

(1) Includes excess tax benefits associated with the exercise of stock options and vesting of restricted stock units of $11,887 and $13,484 for the years ended December 31, 2018 and 2019, respectively.

Non-GAAP Net (Loss) Income

We define Non-GAAP net (loss) income as net income or loss adjusted for certain items affecting period-to-period comparability. Non-GAAP net (loss) income excludes:

- stock-based compensation;
- amortization of acquired intangible assets related to the acquisition of Dash Carrier Services, LLC;
- impairment charges of intangibles assets, if any;
- loss (gain) on disposal of property and equipment;
- estimated tax impact of above adjustments;
- income tax benefit resulting from excess tax benefits associated with the exercise of stock options and vesting of restricted stock units; and
- benefit resulting from the release of the valuation allowance on our deferred tax assets.

We calculate Non-GAAP basic and diluted shares by adding the weighted average of outstanding Series A redeemable convertible preferred stock, if any, to the weighted average number of outstanding basic and diluted shares, respectively.

We believe Non-GAAP net (loss) income is a meaningful measure because by removing certain non-cash and other expenses we are able to evaluate our operating results in a manner we believe is more indicative of the current period's performance. We believe the use of Non-GAAP net (loss) income may be helpful to investors because it provides consistency and comparability with past financial performance, facilitates period-to-period comparisons of results of operations and assists in comparisons with other companies, many of which may use similar non-GAAP financial information to supplement their GAAP results.

	Year ended December 31,				
	2015	2016	2017	2018	2019
			(In thousands)		
Net (loss) income	$ (6,700)	$ 22,358	$ 5,971	$ 17,923	$ 2,494
Stock-based compensation	3,493	1,370	1,803	3,339	6,626
Amortization related to acquisitions	520	520	520	520	520
Impairment of intangible asset	—	695	—	—	—
Loss on disposal of property and equipment	382	19	91	191	456
Estimated tax effects of adjustments (1)	—	(994)	(921)	(1,038)	(1,914)
Release of valuation allowance (2)		(14,138)	—	—	—
Income tax benefit of equity compensation	—	—	—	(11,887)	(13,484)
Remeasurement of deferred tax assets associated with tax rate change (3)	—	—	2,073	—	—
Non-GAAP net (loss) income	**$ (2,305)**	**$ 9,830**	**$ 9,537**	**$ 9,048**	**$ (5,302)**
Non-GAAP net (loss) income per Non-GAAP share					
Basic	$ (0.17)	$ 0.73	$ 0.68	$ 0.49	$ (0.23)
Diluted	$ (0.16)	$ 0.67	$ 0.59	$ 0.43	$ (0.23)
Non-GAAP weighted average number of shares outstanding					
Basic	11,497,727	11,678,568	12,590,221	18,573,067	22,640,461
Series A redeemable convertible preferred stock outstanding	1,775,000	1,775,000	1,522,123	—	—
Non-GAAP basic shares	**13,272,727**	**13,453,568**	**14,112,344**	**18,573,067**	**22,640,461**
Diluted	12,456,540	12,870,632	14,543,170	21,140,382	22,640,461
Series A redeemable convertible preferred stock outstanding	1,775,000	1,775,000	1,522,123	—	—
Non-GAAP diluted shares	**14,231,540**	**14,645,632**	**16,065,293**	**21,140,382**	**22,640,461**

(1) The Company had a full valuation allowance against its deferred tax assets for the year ended December 31, 2015.

(2) The Company recognized a tax benefit of $14,138 due to the release of the deferred tax asset valuation allowance subsequent to the spin-off of Republic Wireless for the year ended December 31, 2016.

(3) On December 22, 2017, the Tax Cuts and Jobs Act was enacted into law. As a result of this change in tax law, the Company recorded a remeasurement of its deferred tax asset, which resulted in additional income tax expense of $2,073.

Free Cash Flow

Free cash flow represents net cash provided by or used in operating activities less net cash used in the acquisition of property and equipment and capitalized development costs of software for internal use. We believe free cash flow is a useful indicator of liquidity and provides information to management and investors about the amount of cash generated from our core operations that can be used for investing in our business. Free cash flow has certain limitations in that it does not represent the total increase or decrease in the cash balance for the period, it does not take into consideration investment in long-term securities, nor does it represent the residual cash flows available for discretionary expenditures. Therefore, it is important to evaluate free cash flow along with our consolidated statements of cash flows.

	Year ended December 31,				
	2015	2016	2017	2018	2019
	(In thousands)				
Net cash provided by (used in) operating activities	$ 18,651	$ 16,942	$ 14,623	$ 24,633	$ (1,253)
Net cash used in investing in capital assets (1)	(5,102)	(6,061)	(7,963)	(14,447)	(25,759)
Free cash flow	**$ 13,549**	**$ 10,881**	**$ 6,660**	**$ 10,186**	**$ (27,012)**

(1) Represents the acquisition cost of property, equipment and capitalized development costs for software for internal use.

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

The following discussion and analysis of our financial condition and results of operations should be read in conjunction with our consolidated financial statements and related notes that are included elsewhere in this Annual Report on Form 10-K. This discussion contains forward-looking statements based upon current plans, expectations and beliefs that involve risks and uncertainties. Our actual results may differ materially from those anticipated in these forward-looking statements as a result of various factors, including those set forth under "Risk Factors" in this Annual Report on Form 10-K. Our fiscal year ends on December 31.

Overview

We are a leading cloud-based communications platform for enterprises in the United States. Our solutions include a broad range of software APIs for voice and text functionality and our owned and managed, purpose-built IP voice network, one of the largest in the nation. Our sophisticated and easy-to-use software APIs allow enterprises to enhance their products and services by incorporating advanced voice and text capabilities. Companies use our platform to more frequently and seamlessly connect with their end users, add voice calling capabilities to residential IoT devices, offer end users new mobile application experiences and improve employee productivity, among other use cases. By owning and operating a capital-efficient, purpose-built IP voice network, we are able to offer advanced monitoring, reporting and analytics, superior customer service, dedicated operating teams, personalized support, and flexible cost structures. Over the last ten years, we have pioneered the CPaaS space through our innovation-rich culture and focus on empowering enterprises with end-to-end communications solutions.

Our voice software APIs allow enterprises to make and receive phone calls and create advanced voice experiences. Integration with our purpose-built IP voice network ensures enterprise-grade functionality and secure, high-quality connections. Our messaging software APIs provide enterprises with advanced tools to connect with end users via messaging. Our customers also use our solutions to enable 911 response capabilities, real-time provisioning and activation of phone numbers and toll-free number messaging.

We are the only CPaaS provider in the industry with our own nationwide IP voice network, which we have purpose-built for our platform. Our network is capital-efficient and custom-built to support the applications and experiences that make a difference in the way enterprises communicate. Since a communications platform is only as strong as the network that backs it, we believe our network provides a significant competitive advantage in the control, quality, pricing power and scalability of our offering. We are able to control the quality and provide the support our customers expect, as well as efficiently meet scalability and cost requirements.

For the years ended December 31, 2017, 2018 and 2019, total revenue was $163.0 million, $204.1 million and $232.6 million, respectively. CPaaS revenue for the years ended December 31, 2017, 2018 and 2019 was $131.6 million, $164.4 million and $197.9 million, respectively, representing an increase of 25% in 2018 and 20% in 2019. Net income for the years ended December 31, 2017, 2018 and 2019 was $6.0 million, $17.9 million and $2.5 million, respectively. For the years ended December 31, 2017, 2018 and 2019, the number of active CPaaS customer accounts was 965, 1,230 and 1,728, respectively, representing a year over year increase of 27% in 2018 and 40% in 2019.

Key Performance Indicators

We monitor the following key performance indicators ("KPIs") to help us evaluate our business, identify trends affecting our business, formulate business plans, and make strategic decisions. We believe the following KPIs are useful in evaluating our business:

	Year ended December 31,		
	2017	2018	2019
	(Dollars in thousands)		
Number of active CPaaS customers (as of period end)	965	1,230	1,728
Dollar-based net retention rate	107 %	118 %	113 %
Adjusted EBITDA	$ 22,223	$ 16,106	$ (1,050)
Free cash flow	$ 6,660	$ 10,186	$ (27,012)

Number of Active CPaaS Customer Accounts

We believe the number of active CPaaS customer accounts is an important indicator of the growth of our business, the market acceptance of our platform and our future revenue trends. We define an active CPaaS customer account at the end of any period as an individual account, as identified by a unique account identifier, for which we have recognized at least $100 of revenue in the last month of the period. We believe that the use of our platform by active CPaaS customer accounts at or above the $100 per month threshold is a stronger indicator of potential future engagement than trial usage of our platform at levels below $100 per month. A single organization may constitute multiple unique active CPaaS customer accounts if it has multiple unique account identifiers, each of which is treated as a separate active CPaaS customer account. Customers who pay after using our platform and customers that have credit balances are included in the number of active CPaaS customer accounts. Customers from our Other segment are excluded in the number of active CPaaS customer accounts, unless they are also CPaaS customers.

In the years ended December 31, 2017, 2018 and 2019, revenue from active CPaaS customer accounts represented approximately 99% of total CPaaS revenue.

Dollar-Based Net Retention Rate

Our ability to drive growth and generate incremental revenue depends, in part, on our ability to maintain and grow our relationships with our existing customers that generate CPaaS revenue and seek to increase their use of our platform. We track our performance in this area by measuring the dollar-based net retention rate for our customers who generate CPaaS revenue. Our dollar-based net retention rate compares the CPaaS revenue from customers in a quarter to the same quarter in the prior year. To calculate the dollar-based net retention rate, we first identify the cohort of customers that generate CPaaS revenue and that were customers in the same quarter of the prior year. The dollar-based net retention rate is obtained by dividing the CPaaS revenue generated from that cohort in a quarter, by the CPaaS revenue generated from that same cohort in the corresponding quarter in the prior year. When we calculate dollar-based net retention rate for periods longer than one quarter, we use the average of the quarterly dollar-based net retention rates for the quarters in such period. Our dollar-based net retention rate increases when such customers increase usage of a product, extend usage of a product to new applications or adopt a new product. Our dollar-based net retention rate decreases when such customers cease or reduce usage of a product or when we lower prices on our solutions.

As our customers grow their business and extend the use of our platform, they sometimes create multiple customer accounts with us for operational or other reasons. As such, when we identify a significant customer organization (defined as a single customer organization generating more than 1% of CPaaS revenue in a quarterly reporting period) that has created a new CPaaS customer, this new customer is tied to, and CPaaS revenue from this new customer is included with, the original CPaaS customer for the purposes of calculating this metric.

Key Components of Statements of Operations

Revenue

We generate a majority of our revenue from our CPaaS segment. CPaaS revenue is derived from voice usage, phone number services, 911-enabled phone number services, messaging services and other services. We generate a portion of our CPaaS revenue from usage-based fees which include voice calling and messaging services.

For the years ended December 31, 2017, 2018 and 2019, we generated 58%, 64% and 66% of our CPaaS revenue, respectively, from usage-based fees. We also earn monthly fees from services such as phone number services and 911 access service. For the years ended December 31, 2017, 2018 and 2019, we generated 40%, 34% and 31% of our CPaaS revenue, respectively, in each period from monthly per unit fees. The remaining 2% to 3% of our CPaaS revenue is generated from other miscellaneous services.

The remainder of our revenue is generated by our Other segment. Other revenue is composed of revenue earned from our legacy services and indirect revenue. Other revenue as a percentage of total revenue is expected to continue to decline over time.

We recognize accounts receivable at the time the customer is invoiced. Additionally, we record a receivable and revenue for unbilled revenue if the services have been delivered and are billable in subsequent periods. Unbilled revenue made up 41%, 47% and 54% of outstanding accounts receivable, net of allowance for doubtful accounts as of December 31, 2017, 2018 and 2019, respectively.

Cost of Revenue and Gross Margin

CPaaS cost of revenue consists primarily of fees paid to other network service providers from whom we buy services such as minutes of use, phone numbers, messages, porting of customer numbers and network circuits. Cost of revenue also contains costs related to support of our IP voice network, web services, cloud infrastructure, capacity planning and management, rent for network facilities, software licenses, hardware and software maintenance fees and network engineering services. Personnel costs (including non-cash stock-based compensation expenses) associated with personnel who are responsible for the delivery of services, operation and maintenance of our communications network, and customer support, as well as, third-party support agreements and depreciation of network equipment, amortization of internally developed software and gain (loss) on disposal of property and equipment are also included in cost of revenue.

Other cost of revenue consists of costs supporting non-CPaaS services including leased circuit costs paid to third party providers, internet connectivity expenses, minutes of use, direct operations, contractors, regulatory fees, surcharges and other pass-through costs and software and hardware maintenance fees.

Gross margin is calculated by subtracting cost of revenue from revenue, divided by total revenue, expressed as a percentage. Our cost of revenue and gross margin have been, and will continue to be, affected by several factors, including the timing and extent of our investments in our network, our ability to manage off-network minutes of use and messaging costs, the product mix of revenue, the timing of amortization of capitalized software development costs and the extent to which we periodically choose to pass on any cost savings to our customers in the form of lower usage prices.

Operating Expenses

The most significant components of operating expenses are personnel costs, which consist of salaries, benefits, bonuses, and stock-based compensation expenses. We also incur other non-personnel costs related to our general overhead expenses, including facility expenses, software licenses, web services, depreciation and amortization of assets unrelated to delivery of our services. We expect that our operating expenses will increase in absolute dollars.

Research and Development

Research and development ("R&D") consists primarily of personnel costs (including non-cash stock-based compensation expenses), outsourced software development and engineering service and cloud infrastructure fees for staging and development of outsourced engineering services. We capitalize the portion of our software development costs in instances where we invest resources to develop software for internal use. We plan to continue to invest in R&D to enhance current product offerings and develop new services.

Sales and Marketing

Sales and marketing expenses consist primarily of personnel costs, including commissions for our sales employees and non-cash stock-based compensation expenses. Sales and marketing expenses also include expenditures related to advertising, marketing, our brand awareness activities, sales support and professional services fees.

We focus our sales and marketing efforts on creating sales leads and establishing and promoting our brand. We plan to continue to invest in sales and marketing in order to expand our CPaaS customer base by growing headcount, driving our go-to-market strategies, building brand awareness, advertising and sponsoring additional marketing events.

General and Administrative

General and administrative expenses consist primarily of personnel costs, including stock-based compensation, for our accounting, finance, legal, human resources and administrative support personnel and executives. General and administrative expenses also include costs related to product management and reporting, customer billing and collection functions, information services, professional services fees, credit card processing fees, rent associated with our headquarters in Raleigh, North Carolina and our other offices, and depreciation and amortization. We expect that we will incur increased costs associated with supporting the growth of our business and to meet the increased compliance requirements associated with our transition to, and operation as, a public company.

Income Taxes

For the years ended December 31, 2017, 2018 and 2019, our effective tax rate was 53.7%, (154.1)% and 116.4%, respectively. The increase in our effective tax rate is primarily due to the change in book income before taxes. We recorded $11.9 million and $13.5 million in net excess tax benefit from equity compensation for the years ended December 31, 2018 and 2019, respectively.

Results of Operations

Consolidated Results of Operations

The following table sets forth the consolidated statements of operations for the periods indicated.

	Year ended December 31, 2017	2018	2019
	(In thousands)		
Revenue:			
CPaaS revenue	$ 131,572	$ 164,415	$ 197,944
Other revenue	31,383	39,698	34,650
Total revenue	162,955	204,113	232,594
Cost of revenue:			
CPaaS cost of revenue	75,859	94,296	110,343
Other cost of revenue	13,403	13,849	14,616
Total cost of revenue	89,262	108,145	124,959
Gross profit:			
CPaaS	55,713	70,119	87,601
Other	17,980	25,849	20,034
Total gross profit	73,693	95,968	107,635
Operating expenses:			
Research and development	10,789	20,897	31,461
Sales and marketing	11,218	20,731	35,020
General and administrative	37,069	47,588	58,847
Total operating expenses	59,076	89,216	125,328
Operating income (loss)	14,617	6,752	(17,693)
Other (expense) income, net			
Interest (expense) income, net	(1,728)	301	2,446
Other income, net	—	—	23
Total other (expense) income, net	(1,728)	301	2,469
Income (loss) before income taxes	12,889	7,053	(15,224)
Income tax (provision) benefit	(6,918)	10,870	17,718
Net income	$ 5,971	$ 17,923	$ 2,494

The following table sets forth our results of operations as a percentage of our total revenue for the periods presented. *

	Year ended December 31,		
	2017	2018	2019
Revenue:			
CPaaS revenue	81 %	81 %	85 %
Other revenue	19 %	19 %	15 %
Total revenue	100 %	100 %	100 %
Cost of revenue:			
CPaaS cost of revenue	47 %	46 %	47 %
Other cost of revenue	8 %	7 %	6 %
Total cost of revenue	55 %	53 %	53 %
Gross profit:			
CPaaS	34 %	34 %	37 %
Other	11 %	13 %	9 %
Total gross profit	45 %	47 %	46 %
Operating expenses:			
Research and development	7 %	10 %	14 %
Sales and marketing	7 %	10 %	15 %
General and administrative	23 %	23 %	25 %
Total operating expenses	37 %	43 %	54 %
Operating income (loss)	9 %	3 %	(8)%
Other (expense) income, net			
Interest (expense) income, net	(1)%	— %	1 %
Other income, net	— %	— %	— %
Total other (expense) income, net	(1)%	— %	1 %
Income (loss) before income taxes	8 %	3 %	(7)%
Income tax (provision) benefit	(4)%	5 %	8 %
Net income	4 %	9 %	1 %

(*) Columns may not foot due to rounding.

Comparison of the Years Ended December 31, 2018 and 2019

Revenue

	Year ended December 31, 2018	Year ended December 31, 2019	Change	
	(Dollars in thousands)			
CPaaS revenue	$ 164,415	$ 197,944	$ 33,529	20 %
Other revenue	39,698	34,650	(5,048)	(13)%
Total revenue	$ 204,113	$ 232,594	$ 28,481	14 %

In 2019, total revenue increased by $28.5 million, or 14%, compared to the same period in 2018, and CPaaS revenue increased by $33.5 million, or 20%, compared to the same period in 2018. The increase in CPaaS revenue was primarily attributable to an increase in the usage of all our service offerings, particularly our voice and messaging usage, which accounted for $34.3 million of the increase in CPaaS revenue, and our phone number services and 911-enabled phone number services, which accounted for $8.8 million of the increase in CPaaS revenue. This increase in CPaaS revenue was partially offset by $9.6 million related to pricing decreases that we have implemented over time with our customers in the form of lower usage prices to increase the reach and scale of our platform. The changes in usage and price in 2019 compared to the same period in 2018 were reflected in our dollar-based net retention rate of 113%. The increase in usage was also attributable to a 40% increase in the number of active CPaaS customer accounts, from 1,230 as of December 31, 2018 to 1,728 as of December 31, 2019. In addition, revenue from new CPaaS customers contributed $11.7 million, or 7%, to CPaaS revenue for 2019 compared to $8.7 million, or 7%, to CPaaS revenue in the same period in 2018. As a percentage of total revenue, CPaaS revenue increased from 81% in 2018 to 85% in the same period in 2019.

Other revenue decreased by $5.0 million, or 13%, in 2019 due to lower indirect revenue, which decreased by $2.7 million, primarily due to the settlement of a dispute in 2018. Other revenue also decreased due to the expected decline of legacy revenue, which decreased by $2.3 million, compared to the same period in 2018.

Cost of Revenue and Gross Margin

	Year ended December 31, 2018	Year ended December 31, 2019	Change	
	(Dollars in thousands)			
Cost of revenue:				
CPaaS cost of revenue	$ 94,296	$ 110,343	$ 16,047	17 %
Other cost of revenue	13,849	14,616	767	6 %
Total cost of revenue	$ 108,145	$ 124,959	$ 16,814	16 %
Gross profit	$ 95,968	$ 107,635	$ 11,667	12 %
Gross margin:				
CPaaS	43 %	44 %		
Other	65 %	58 %		
Total gross margin	47 %	46 %		

In 2019, total gross profit increased by $11.7 million, or 12%, compared to the same period in 2018. Total gross margin decreased from 47% to 46% during the same period, primarily from a decrease in other gross margin in 2019 as a result of higher indirect revenue in 2018 due to settlement of a dispute. In 2019, CPaaS cost of revenue increased by $16.0 million, or 17%, compared to the same period in 2018. CPaaS cost of revenue increased primarily due to an increase in voice usage costs of net $4.5 million due to growth in minutes used by customers, partially offset by a decrease in the cost per minute from vendors. Network costs also increased $8.0 million due to network expansions and personnel costs. Cost of messaging increased by $2.3 million due to growth in messages used by customers. Cost of phone numbers increased by $1.2 million. CPaaS gross margin increased from 43% in 2018 to 44% in 2019. Excluding depreciation and stock-based compensation of $4.6 million in 2018 and $6.8 million in 2019, CPaaS Non-GAAP gross margin was 45% and 48% for 2018 and 2019, respectively, and total Non-GAAP gross margin was 49% for both periods.

In 2019, other cost of revenue increased by $0.8 million compared to the same period in 2018, primarily due to a $1.9 million increase in cost of indirect revenue related to messaging surcharges and cost of carrier access revenue offset by a $1.1 million decrease as a result of churn in legacy services.

Operating Expenses

	Year ended December 31,			
	2018	2019	Change	
	(Dollars in thousands)			
Research and development	$ 20,897	$ 31,461	$ 10,564	51 %
Sales and marketing	20,731	35,020	14,289	69 %
General and administrative	47,588	58,847	11,259	24 %
Total operating expenses	$ 89,216	$ 125,328	$ 36,112	40 %

In 2019, R&D expenses related to the expansion of our product offerings increased by $10.6 million, or 51%, compared to the same period in 2018. This increase was primarily due to increased personnel costs of $9.8 million and non-headcount costs of $0.8 million.

In 2019, sales and marketing expenses increased by $14.3 million, or 69%, compared to the same period in 2018 primarily due to an overall increase in sales personnel costs of $11.6 million and non-headcount costs of $2.7 million.

In 2019, general and administrative expenses increased by $11.3 million, or 24%, compared to the same period in 2018. This increase was due to higher personnel cost of $4.1 million, facilities expense of $1.6 million, hosted software costs of $1.4 million, higher bad debt expense of $1.1 million primarily related to a write-off with a customer, professional expenses of $1.0 million, depreciation and amortization costs of $1.0 million, other non-headcount costs of $0.8 million and bank charges and license costs of $0.3 million, which contributed to the overall increase in general and administrative expenses.

Interest Income, Net

In 2019, interest income increased by $2.1 million compared to the same period in 2018, due to a $2.2 million increase in interest income from the investment of follow-on equity offering proceeds offset by $0.1 million increase in interest expense.

Income Tax Benefit

In 2019, income tax benefit increased by $6.8 million compared to the same period in 2018. The effective tax rate for the twelve months ended December 31, 2019 was 116.4% compared to (154.1)% in the same period in 2018. The increase in our effective tax rate is primarily due to the change in book income before taxes.

Comparison of the Years Ended December 31, 2017 and 2018

Revenue

	Year ended December 31, 2017	Year ended December 31, 2018	Change	
	(Dollars in thousands)			
CPaaS revenue	$ 131,572	$ 164,415	$ 32,843	25 %
Other revenue	31,383	39,698	8,315	26 %
Total revenue	$ 162,955	$ 204,113	$ 41,158	25 %

In 2018, total revenue increased by $41.2 million, or 25%, compared to the same period in 2017, and CPaaS revenue increased by $32.8 million, or 25%, compared to the same period in 2017. The increase in CPaaS revenue was primarily attributable to an increase in the usage of all our service offerings, particularly our voice and messaging usage, which accounted for $38.2 million of the increase in CPaaS revenue, and our phone number services and 911-enabled phone number services, which accounted for $6.2 million of the increase in CPaaS revenue. This increase in CPaaS revenue was partially offset by $11.6 million related to pricing decreases that we have implemented over time with our customers in the form of lower usage prices to increase the reach and scale of our platform. The changes in usage and price in 2018 compared to the same period in 2017 were reflected in our , dollar-based net retention rate of 118%. The increase in usage was also attributable to a 27% increase in the number of active CPaaS customer accounts, from 965 as of December 31, 2017 to 1,230 as of December 31, 2018. In addition, revenue from new CPaaS customers contributed $8.7 million, or 7%, to CPaaS revenue for 2018 compared to $5.5 million, or 5% to CPaaS revenue in the same period in 2017. As a percentage of total revenue, CPaaS revenue remained flat at 81% from 2018 to the same period in 2017. Other revenue increased by $8.3 million, or 26%, primarily due to the settlement of a dispute and a higher than usual amount of indirect revenue, which increased by $11.1 million. This increase was partially offset by the expected declines in our legacy services of $2.8 million.

Cost of Revenue and Gross Margin

	Year ended December 31, 2017	Year ended December 31, 2018	Change	
	(Dollars in thousands)			
Cost of revenue:				
CPaaS cost of revenue	$ 75,859	$ 94,296	$ 18,437	24 %
Other cost of revenue	13,403	13,849	446	3 %
Total cost of revenue	$ 89,262	$ 108,145	$ 18,883	21 %
Gross profit	$ 73,693	$ 95,968	$ 22,275	30 %
Gross margin:				
CPaaS	42 %	43 %		
Other	57 %	65 %		
Total gross margin	45 %	47 %		

In 2018, total gross profit increased by $22.3 million, or 30%, compared to the same period in 2017. Total gross margin increased from 45% to 47% during the same period. In 2018, CPaaS cost of revenue increased by, $18.4 million, or 24% compared to the same period in 2017. CPaaS cost of revenue increased primarily due to an increase in voice usage costs of $11.7 million due to growth in minutes used by customers, partially offset by a decrease in the cost per minute from vendors. Network costs also increased $5.6 million due to network expansions. Cost of messaging increased by $1.3 million due to growth in messages used by customers and increased cost per message from vendors. Cost of phone numbers increased by $0.1 million, offset by a $0.3 million decrease in 911 enabled numbers costs. CPaaS gross margin was 42% and 43% for 2017 and 2018, respectively. Excluding depreciation and stock-based compensation of $4.4 million in 2017 and $4.6 million 2018, CPaaS Non-GAAP gross margin was 46% and 45% for 2017 and 2018, respectively, and total Non-GAAP gross margin was 48% and 49% for the same periods.

Other cost of revenue increased by $0.4 million, which was due to a $1.6 million increase in cost of indirect revenue related to cost of carrier access revenue, partially offset by a $1.2 million decrease as a result of churn in legacy services.

Operating Expenses

	Year ended December 31, 2017	Year ended December 31, 2018	Change	
	(Dollars in thousands)			
Research and development	$ 10,789	$ 20,897	$ 10,108	94 %
Sales and marketing	11,218	20,731	9,513	85 %
General and administrative	37,069	47,588	10,519	28 %
Total operating expenses	$ 59,076	$ 89,216	$ 30,140	51 %

In 2018, R&D expenses increased by $10.1 million, or 94%, compared to the same period in 2017. This increase was primarily due to increased personnel costs of $8.8 million and other non-headcount costs of $1.3 million.

In 2018, sales and marketing expenses increased by $9.5 million, or 85%, compared to the same period in 2017 primarily due to an overall increase in sales personnel costs of $8.1 million and other non-headcount costs of $1.4 million.

In 2018, general and administrative expenses increased by $10.5 million, or 28%, compared to the same period in 2017. This increase was due to higher personnel cost of $4.5 million, professional expenses of $2.3 million, hosted software costs of $1.4 million, facilities expense of $1.3 million, and other non-headcount costs of $1.0 million, which contributed to the overall increase in general and administrative expenses.

Interest Income, Net

In 2018, interest income increased by $2.0 million compared to the same period in 2017, due to the repayment of all outstanding debt in 2017 with the proceeds from our initial public offering and increased interest income from investments in marketable securities.

Income Tax Benefit

In 2018, income tax expense decreased by $17.8 million compared to the same period in 2017. The effective tax rate for 2018 was (154.1)% compared to 53.7% in the same period in 2017. The decrease in our effective tax rate is primarily due to the impact of tax deductions from stock option exercises, as well as the decrease in the federal statutory tax rate under the Act.

In 2017 we incurred additional income tax expense of $2,073 due to the re-measurement of our deferred tax assets at the lower corporate tax rate. In accordance with SAB118, all accounting related to the Act was completed in Q4 of 2018. There was no change to the provisional re-measurement of our deferreds that was recorded in Q4 of 2017.

Quarterly Results of Operations

The following tables set forth our unaudited quarterly statements of operations data for each of the eight quarters ended December 31, 2019. The information for each quarter has been prepared on a basis consistent with our audited consolidated financial statements included in this Annual Report on Form 10-K, and reflect, in the opinion of management, all adjustments of a normal, recurring nature that are necessary for a fair presentation of the financial information contained in those statements. Our historical results are not necessarily indicative of the results that may be expected in the future. The following quarterly financial data should be read in conjunction with our audited consolidated financial statements included in this Annual Report on Form 10-K.

	Three Months Ended							
	March 31, 2018	June 30, 2018	September 30, 2018	December 31, 2018	March 31, 2019	June 30, 2019	September 30, 2019	December 31, 2019
	(Unaudited, in thousands, except per share amounts)							
Revenue:								
CPaaS revenue	$ 38,897	$ 39,833	$ 41,537	$ 44,148	$ 45,013	$ 47,989	$ 51,499	$ 53,443
Other revenue	14,115	8,471	8,917	8,195	8,308	8,790	8,992	8,560
Total revenue	53,012	48,304	50,454	52,343	53,321	56,779	60,491	62,003
Cost of revenue:								
CPaaS cost of revenue	21,905	23,137	23,996	25,258	25,300	26,473	29,297	29,273
Other cost of revenue	3,459	3,429	3,478	3,483	3,466	3,637	3,807	3,706
Total cost of revenue	25,364	26,566	27,474	28,741	28,766	30,110	33,104	32,979
Gross profit:	27,648	21,738	22,980	23,602	24,555	26,669	27,387	29,024
Operating expenses:								
Research and development	3,781	4,435	5,895	6,786	7,717	7,656	7,939	8,149
Sales and marketing	4,522	4,654	5,422	6,133	8,349	8,514	8,784	9,373
General and administrative	10,569	11,490	11,576	13,953	14,333	14,282	15,269	14,963
Total operating expenses	18,872	20,579	22,893	26,872	30,399	30,452	31,992	32,485
Operating income (loss)	8,776	1,159	87	(3,270)	(5,844)	(3,783)	(4,605)	(3,461)
Other income:								
Interest income, net	49	90	103	59	201	719	778	748
Other income (expense), net	—	—	—	—	—	10	(1)	14
Realized gain (loss) on investments	—	—	—	—	—	—	4	(4)
Total other income	49	90	103	59	201	729	781	758
Income (loss) before income taxes	8,825	1,249	190	(3,211)	(5,643)	(3,054)	(3,824)	(2,703)
Income tax (provision) benefit	(2,634)	9,263	2,320	1,921	7,635	6,526	2,810	747
Net income (loss)	$ 6,191	$ 10,512	$ 2,510	$ (1,290)	$ 1,992	$ 3,472	$ (1,014)	$ (1,956)
Unrealized (loss) gain on marketable securities, net of income tax benefit	(6)	4	(1)	2	8	13	(21)	1
Foreign currency translation	—	—	—	—	—	12	(46)	75
Total comprehensive income (loss), net of income tax	$ 6,185	$ 10,516	$ 2,509	$ (1,288)	$ 2,000	$ 3,497	$ (1,081)	$ (1,880)
Net income (loss) per share:								
Basic	$ 0.35	$ 0.58	$ 0.13	$ (0.07)	$ 0.10	$ 0.15	$ (0.04)	$ (0.08)
Diluted	$ 0.30	$ 0.50	$ 0.12	$ (0.07)	$ 0.09	$ 0.14	$ (0.04)	$ (0.08)

Liquidity and Capital Resources

To date, our principal sources of liquidity have been the proceeds of $74.4 million from our initial public offering in November 2017 and $147.4 million from our follow-on public offering in March 2019, each net of underwriting discounts and commissions, in addition to free cash flow driven by payments received from customers using our services. We believe that our cash and cash equivalents balances, our marketable securities portfolio, our credit facility and the cash flows generated by our operations will be sufficient to satisfy our anticipated cash needs for working capital and capital expenditures for at least the next 12 months. However, our belief may prove to be incorrect, and we could utilize our available financial resources sooner than we currently expect. Our future capital requirements and the adequacy of available funds will depend on many factors, including those set forth in the section titled "Risk Factors." We may be required to seek additional equity or debt financing in order to meet these future capital requirements. In the event that additional financing is required from outside sources, we may not be able to raise it on terms acceptable to us, or at all. If we are unable to raise additional capital when desired, our business, results of operations and financial condition would be adversely affected.

Statement of Cash Flows

The following table summarizes our cash flows for the periods indicated:

	Year ended December 31,		
	2017	2018	2019
		(In thousands)	
Net cash provided by (used in) operating activities	$ 14,623	$ 24,633	$ (1,253)
Net cash used in investing activities	(7,963)	(31,683)	(7,653)
Net cash provided by financing activities	24,182	10,681	152,418
Effect of exchange rate changes on cash, cash equivalents and restricted cash	—	—	(9)
Net increase in cash, cash equivalents, and restricted cash	$ 30,842	$ 3,631	$ 143,503

Cash Flows from Operating Activities

In 2019, cash used in operating activities was $1.3 million, consisting of net income of $2.5 million adjusted for non-cash items. These non-cash items included depreciation and amortization expense of $9.6 million, stock-based compensation expenses of $6.6 million, right-of-use asset amortization of $4.3 million, loss on disposal of property and equipment of $0.5 million, offset by deferred tax benefit of $17.5 million, cash used by changes in operating assets and liabilities of $6.6 million, and accretion of bond discount of $0.7 million. Cash generated from operating assets and liabilities included an increase in accrued expenses and other liabilities of $5.5 million, an increase in accounts payable of $1.1 million, and an increase in deferred revenue and advanced billings of $0.6 million. Offsetting these cash generating items in assets and liabilities were an increase in accounts receivable of $6.2 million, an increase in prepaid expenses and other assets of $4.2 million, and a decrease in operating right-of-use liability of $3.4 million.

In 2018, cash provided by operating activities was $24.6 million, consisting of net income of $17.9 million adjusted for non-cash items. These non-cash items included depreciation and amortization expense of $5.8 million, stock-based compensation expenses of $3.3 million, deferred tax benefit of $10.8 million and cash provided by changes in operating assets and liabilities of $8.3 million. Cash generated from operating assets and liabilities included an increase in deferred revenue and advanced billings of $6.0 million, an increase in accrued expenses and other liabilities of $4.8 million, increase in deferred rent of $2.1 million and a decrease in deferred costs of $0.2 million. Offsetting these cash generating items in assets and liabilities were an increase in accounts receivable of $2.8 million, an increase in prepaid expenses and other assets of $1.9 million and a decrease in accounts payable of $0.2 million, respectively.

In 2017, cash provided by operating activities was $14.6 million, consisting of net income of $6.0 million adjusted for non-cash items. These non-cash items included depreciation and amortization expense of $5.7 million, deferred tax expense of $6.2 million, stock-based compensation expenses of $1.8 million and cash used for changes in operating assets and liabilities of $5.7 million. Cash outflows from operating assets and liabilities included increases in accounts receivable of $4.4 million, prepaid expenses and other assets of $1.6 million, deferred costs of $0.9 million along with a decrease in accounts payable of $2.4 million. Offsetting these cash outflows was an increase in deferred rent of $0.2 million, increase in deferred revenue and advanced billings of $2.6 million and an increase in accrued expenses and other liabilities of $1.0 million.

Cash Flows from Investing Activities

In 2019, cash used in investing activities was $7.7 million from the proceeds from the sales and maturities of marketable securities of $86.4 million, offset by the investment in marketable securities of $68.4 million, the purchase of property and equipment of $22.2 million and capitalized internally developed software costs of $3.5 million.

In 2018, cash used in investing activities from continuing operations was $31.7 million from the investment in marketable securities of $35.2 million, the purchase of property and equipment of $12.4 million and capitalized internally developed software costs of $2.0 million, partially offset by maturities of marketable securities of $18.0 million.

In 2017, cash used in investing activities from continuing operations was $8.0 million from the purchase of property and equipment of $5.0 million and capitalized internally developed software costs of $2.9 million.

Cash Flows from Financing Activities

In 2019, cash provided by financing activities was $152.4 million consisting primarily of $147.4 million in proceeds from the follow-on public offering, $7.4 million in proceeds from the issuance of stock options, partially offset by $1.4 million in value of equity awards withheld for tax liabilities, $0.8 million in payments related to the cost of the follow-on public offering and $0.2 million in payments of debt issuance cost.

In 2018, cash provided by financing activities from continuing operations was $10.7 million consisting primarily of $11.1 million in proceeds from the exercises of stock options, partially offset by $0.3 million in payments related to the cost of our initial public offering and $0.1 million in payments on capital leases.

In 2017, cash provided by financing activities from continuing operations was $24.2 million consisting primarily of $74.4 million in net proceeds from our initial public offering, $0.2 million in proceeds from the issuances of common stock as a result of options exercised, and $0.1 million in proceeds from exercise of warrants, partially offset by net repayments of $9.0 million on our line of credit, $0.1 million in payments on capital leases, and $40.0 million in repayments on our term loan.

Debt

On March 1, 2019, we amended and restated our Credit and Security Agreement with KeyBank National Association. The agreement is for a $25.0 million revolving loan, which includes a swing line of up to $1.0 million and limits letters of credit commitments to a maximum of $2.5 million. The term of the amended and restated Credit and Security Agreement is three years and matures on March 1, 2022. This agreement requires that a specified minimum liquidity amount must be maintained in cash and cash equivalents at all times and that we meet a minimum revenue level on a quarterly basis.

On June 4, 2019, KeyBank National Association and Pacific Western Bank entered into an Assignment and Acceptance Agreement, whereby KeyBank National Association, as the Assignor, sold and assigned $10.0 million of our Revolving Credit Commitment to Pacific Western Bank, the Assignee. KeyBank National Association retains $15.0 million of our Revolving Credit Commitment.

As of December 31, 2019, we had $0 outstanding on the revolving loan and were in compliance with all financial and non-financial covenants for all periods presented. The available borrowing capacity under our revolving credit facility loan was $25.0 million as of December 31, 2019.

As of December 31, 2019, the outstanding unamortized loan fees for the revolving loan were $0.1 million and were included in prepaid expenses and other current assets, and other long-term assets in the Company's consolidated balance sheets.

Contractual Obligations and Other Commitments

The following table summarizes our non-cancellable contractual obligations as of December 31, 2019:

	Total	Less than 1 year	1 to 3 Years	3 to 5 Years	More than 5 years
			(In thousands)		
Operating leases (1)	$ 27,658	$ 5,907	$ 12,889	$ 7,913	$ 949
Purchase obligations (2)	9,765	6,115	1,949	1,701	—
Total	$ 37,423	$ 12,022	$ 14,838	$ 9,614	$ 949

(1) Operating leases represent total future minimum rent payments under non-cancellable operating lease agreements.

(2) Purchase obligations represent total non-cancelable purchase commitments and future minimum payments under contracts to various service providers, excluding agreements that are cancellable without penalty.

Off-Balance Sheet Arrangements

We have not entered into any off-balance sheet arrangements and do not have any holdings in variable interest entities.

Critical Accounting Policies and Significant Judgments and Estimates

Our consolidated financial statements are prepared in accordance with GAAP. The preparation of these financial statements requires our management to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenue, costs, and expenses and related disclosures. Our estimates are based on our historical experience and on various other factors that we believe are reasonable under the circumstances, the results of which form the basis for making judgments about the carrying value of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these judgments and estimates under different assumptions or conditions and any such differences may be material.

We believe the accounting policies discussed below are critical to the process of making significant judgments and estimates in the preparation of our financial statements, and to understanding our historical and future performance.

Revenue Recognition and Deferred Revenue

We generate revenue primarily from the sale of communication services to enterprise customers. Revenue recognition commences upon transfer of control of promised goods or services to customers in an amount that we expect to receive in exchange for those goods or services.

The majority of our revenue is generated from usage-based fees earned from customers accessing our communications platform. Access to the communications platform is considered a series of distinct services, with continuous transfer of control to the customer, comprising one performance obligation. Usage-based fees are recognized in revenue in the period the traffic traverses our network.

Revenue from service-based fees, such as the provision and management of phone numbers and emergency services access, is recognized on a ratable basis as the service is provided, which is typically one month.

We generally enter into arrangements with customers that are typically 2 to 3 years in length with an auto-renewal feature. When required as part of providing service, revenues and associated expenses related to nonrefundable, upfront service activation and setup fees are deferred and recognized over the longer of the associated service contract period or estimated period of benefit.

Our arrangements do not contain general rights of return or provide customers with the right to take possession of the software supporting the applications. Amounts that have been invoiced are recorded in accounts receivable and in revenue or deferred revenue depending on whether the revenue recognition criteria have been met.

We maintain a reserve for sales credits. Credits are accounted for as variable consideration and are estimated based on several inputs including historical experience and current trends of credit issuances. Adjustments to the reserve are recorded against revenue.

Goodwill and Intangible Assets

Goodwill

Goodwill represents the excess of the aggregate fair value of consideration transferred in a business combination, over the fair value of assets acquired, net of liabilities assumed. Goodwill is not amortized, but is subject to an annual impairment test. We test goodwill for impairment annually on December 31 of each calendar year or more frequently if events or changes in business circumstances indicate the asset might be impaired. Goodwill is tested for impairment at the reporting unit level. In evaluating the recoverability of goodwill, we perform a qualitative analysis to determine whether events and circumstances exist that indicate that it is more likely than not that goodwill is impaired. The qualitative factors we consider include but are not limited to, macroeconomic conditions, industry and market conditions, company-specific events and changes in circumstances. We completed our annual goodwill impairment analysis in each of the years ended December 31, 2017, 2018 and 2019 and no impairment charges were recorded. As of December 31, 2019 goodwill was $6.9 million.

Long-Lived Assets

Long-lived assets, including intangible assets with definite lives, are amortized over their estimated useful lives and are reviewed for impairment if indicators of impairment arise.

We evaluate the recoverability of our long-lived assets for impairment whenever events or circumstances indicate that the carrying amount of the assets may not be recoverable. Recoverability of long-lived assets are measured by comparison of the carrying amount of the asset to the future undiscounted cash flows the asset is expected to generate. If the asset is considered to be impaired, the amount of any impairment is measured as the difference between the carrying value and the fair value of the impaired asset. As of December 31, 2019, intangible assets, net of accumulated amortization, were $6.6 million, which consists primarily of client relationships and client contracts. No indicators of impairment were identified for the years ended December 31, 2017, 2018 and 2019.

Internal-Use Software Development Costs

Internal-use software includes software that has been acquired, internally developed, or modified exclusively to meet the Company's needs. We capitalize qualifying internal-use software development costs that are incurred during the application development stage. Capitalization of costs begins when two criteria are met: (i) the preliminary project stage is completed and (ii) it is probable that the software will be completed and used for its intended function. Capitalization ceases when the software is substantially complete and ready for its intended use, including the completion of all significant testing. We also capitalize costs related to specific upgrades and enhancements when it is probable the expenditures will result in additional functionality and expense costs incurred for maintenance and minor upgrades and enhancements. Costs related to preliminary project activities and post-implementation operating activities are expensed as incurred.

Capitalized costs of platform and other software applications are included in property and equipment. These costs are amortized over the estimated useful life of the software on a straight-line basis over three years, which is recorded in cost of revenue in the statement of operations. We evaluate the useful life of these assets on an annual basis and test for impairment whenever events or changes in circumstances occur that could impact the recoverability of these assets.

Income Taxes

We account for income taxes under the asset and liability method, which requires the recognition of deferred tax assets and liabilities for the expected future tax consequences of events that are included in the financial statements. Under this method, deferred tax assets and liabilities are determined based on the differences between the financial statements and tax basis of assets and liabilities using enacted tax rates in effect for the year in which the differences are expected to reverse. The effect of a change in tax rates on deferred tax assets and liabilities is recognized in income in the period that includes the enactment date.

We reduce the measurement of a deferred tax asset, if necessary, by a valuation allowance if it is more likely than not that we will not realize some or all the deferred tax asset. Quarterly, we review the deferred tax assets for recoverability based on historical taxable income, projected future taxable income, the expected timing of the reversals of existing temporary differences, the implementation of prudent and feasible tax planning strategies, and results of recent operations. The evaluation of the recoverability of deferred tax assets requires judgment in assessing future profitability. Should there be a change in the ability to recover deferred tax assets, our income tax provision would increase or decrease in the period in which the assessment is changed.

We account for uncertain tax positions by recognizing the financial statement effects of a tax position only when, based upon technical merits, it is more likely than not that the position will be sustained upon examination. The tax benefit recognized is measured as the largest amount of benefit determined on a cumulative probability basis that we believe is more likely than not to be realized upon ultimate settlement of the position. We recognize potential accrued interest and penalties associated with unrecognized tax positions in income tax expense.

Other Contingencies

We are subject to legal proceedings and litigation arising in the ordinary course of business. Periodically, we evaluate the status of each legal matter and assess our potential financial exposure. If the potential loss from any legal proceeding or litigation is considered probable and the amount can be reasonably estimated, we accrue a liability for the estimated loss. Significant judgment is required to determine the probability of a loss and whether the amount of the loss is reasonably estimable. The outcome of any proceeding is not determinable in advance. As a result, the assessment of a potential liability and the amount of any accruals recorded are based only on the information available to us at the time. As additional information becomes available, we reassess the potential liability related to the legal proceeding or litigation, and may revise our estimates. Any revisions could have a material effect on our results of operations.

We conduct operations in many tax jurisdictions throughout the United States. In many of these jurisdictions, non-income-based taxes and fees, such as sales and use taxes, telecommunications taxes, and regulatory fees including those associated with (or potentially associated with) VoIP telephony services or 911 services, are assessed or may be assessed on our operations. We are subject to indirect taxes, and may be subject to certain other taxes and surcharges in some of these jurisdictions. We generally bill and collect from our customers these taxes and surcharges. We record a liability for tax collected from customers but not yet paid to the appropriate jurisdiction. In addition, we record a provision for non-income based taxes and fees in jurisdictions where it is both probable that liability has been incurred and the amount of the exposure can be reasonably estimated. As a result, we have recorded a liability of $3.0 million, $4.7 million and $5.4 million as of December 31, 2017, 2018 and 2019, respectively. These estimates are based on several key assumptions, including the taxability of our services, the jurisdictions in which we believe we have nexus and the sourcing of revenue to those jurisdictions. In the event these jurisdictions challenge our assumptions and analysis, our actual exposure could differ materially from our current estimates.

Recently Issued Accounting Guidance

See Note 2, "Summary of Significant Accounting Policies," to the consolidated financial statements included elsewhere in this Annual Report on Form 10-K, for a summary of recently adopted accounting standards and recent accounting pronouncements not yet adopted.

Item 7A. Quantitative and Qualitative Disclosures about Market Risk

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

Interest Rate Risk

Our primary exposure to market risk relates to interest rate changes. We had cash and cash equivalents of $184.4 million and no marketable securities as of December 31, 2019, which were held for working capital purposes. Our cash and cash equivalents are comprised primarily of interest bearing checking accounts, money market accounts and time deposits. Marketable securities consist of U.S. treasury securities not otherwise classified as cash equivalents.

Such interest-earning instruments carry a degree of interest rate risk. To date, fluctuations in interest income have not been significant. The primary objective of our investment activities is to preserve principal while maximizing income without significantly increasing risk. We do not enter into investments for trading or speculative purposes and have not used any derivative financial instruments to manage our interest rate risk exposure. Due to the short-term nature of our investments, we have not been exposed to, nor do we anticipate being exposed to, material risks due to changes in interest rates.

Our debt is comprised of a revolving line of credit account, which had no amount outstanding as of December 31, 2019. Loans under the Credit Agreement will bear interest at the highest of (i) the bank's prime rate, (ii) the federal funds effective rate plus 0.5 percent, and (iii) the London Interbank Offered Rate plus 1.00 percent. A hypothetical 10% change in interest rates during any of the periods presented would not have had a material impact on our consolidated financial statements.

Foreign Currency Risk

Our customers consume our services primarily in the United States. Our revenue and expenses are primarily denominated in U.S. dollars and as a result we have minimal foreign currency risk as of December 31, 2019.

The local currencies of our foreign subsidiaries are the Euro and the British Pound. Our subsidiaries remeasure monetary assets and liabilities at period-end exchange rates, while non-monetary items are remeasured at historical rates. Revenue and expense accounts are remeasured at the average exchange rate in effect during the year. If there is a change in foreign currency exchange rates, the conversion of our foreign subsidiaries' financial statements into U.S. dollars would result in a realized gain or loss which is recorded in other income, net in our consolidated statements of operations. We do not currently engage in any hedging activity to reduce our potential exposure to currency fluctuations, although we may choose to do so in the future. A hypothetical 10% change in foreign exchange rates during any of the periods presented would not have had a material impact on our consolidated financial statements.

Inflation

We do not believe inflation has had a material effect on our business, financial condition or results of operations. We continue to monitor the impact of inflation in order to minimize its effects through pricing strategies, productivity improvements and cost reductions. If our costs were to become subject to significant inflationary pressures, we may not be able to fully offset such higher costs through price increases. Our inability or failure to do so could harm our business, financial condition and results of operations.

Item 8. Financial Statements and Supplementary Data

BANDWIDTH INC.

Index to Consolidated Financial Statements

Report of Independent Registered Public Accounting Firm

To the Stockholders and the Board of Directors of Bandwidth Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Bandwidth Inc. (the Company) as of December 31, 2019 and 2018, the related consolidated statements of operations, comprehensive income, changes in redeemable convertible preferred stock and stockholders' (deficit) equity and cash flows for each of the three years in the period ended December 31, 2019, and the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2019 and 2018, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2019, in conformity with 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, 2019, 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 February 21, 2020 expressed an unqualified opinion thereon.

Adoption of ASU No. 2016-02

As discussed in Note 2 to the consolidated financial statements, the Company changed its method of accounting for leases in 2019 due to the adoption of Accounting Standards Update (ASU) No. 2016-02, Leases (Topic 842), and the related amendments.

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 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 Matter

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

Revenue Recognition

Description of the Matter	As discussed in Note 2, the Company recognizes revenue from the sale of communications services offered through software solutions, which are generally derived from usage and monthly service fees from both the CPaaS and Other segments. Usage revenue includes voice communication (primarily driven by inbound minutes, outbound minutes and toll-free minutes) and messaging communication (driven by the number of messages) that traverse the platform and network. Revenue for these services is recognized in the period the usage occurs. Monthly service fees include the provisioning and management of phone numbers and 911-enabled phone number services, which are recognized based on the quantity of phone numbers in service and the quantity of phone numbers with 911-enabled services during the month, respectively. The processing and recording of revenue from voice and messaging data usage is highly automated and involves capturing and pricing significant volumes of data across multiple systems. Similarly, the provisioning and management of phone numbers and emergency services access is also highly automated and involves capturing and pricing the quantity of phone numbers in service and the quantity of phone numbers with 911-enabled services during the month. Given the complex automated systems utilized to capture, process, and ultimately record revenue, performing procedures to audit revenue required a high degree of auditor judgment and extensive audit effort.
How We Addressed the Matter in Our Audit	We obtained an understanding, evaluated the design, and tested the operating effectiveness of controls that address the risks of material misstatement relating to the measurement and occurrence of revenue. This included involvement of audit professionals with significant experience in the use of information technology (IT) to support business operations and related controls. With the involvement of our IT professionals, we identified the significant systems used to capture and process voice usage, phone number services, 911-enabled phone number services, and messaging services, and tested the IT general controls over those systems, including testing of user access and change management controls. In addition, our audit procedures included testing of other manual reconciliation controls designed to determine the accuracy and completeness of data processed and transferred across multiple platforms in connection with the recognition of revenue for voice and messaging usage, the quantity of phone numbers in service, and the quantity of phone numbers with 911-enabled services during the period. To test the Company's revenue, our audit procedures included, among other procedures, testing a sample of revenue transactions, which included evaluating the transaction price based on inspection of customer contracts and approved rate tables, as well as testing the mathematical accuracy of the recorded revenue based on the voice and messaging usage, as well as the quantity of phone numbers in service and quantity of phone numbers with 911-enabled services during the period.

/s/ Ernst & Young LLP

We have served as the Company's auditor since 2012.

Raleigh, North Carolina
February 21, 2020

Report of Independent Registered Public Accounting Firm

To the Stockholders and the Board of Directors of Bandwidth Inc.

Opinion on Internal Control Over Financial Reporting

We have audited Bandwidth Inc.'s internal control over financial reporting as of December 31, 2019, 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, Bandwidth Inc. (the Company) maintained, in all material respects, effective internal control over financial reporting as of December 31, 2019, based on the COSO criteria.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets of the Company as of December 31, 2019 and 2018, the related consolidated statements of operations, comprehensive income, changes in redeemable convertible preferred stock and stockholders' (deficit) equity and cash flows for each of the three years in the period ended December 31, 2019, and the related notes and our report dated February 21, 2020 expressed an unqualified opinion thereon.

Basis for Opinion

The Company's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting included in the accompanying Management's Annual 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

Raleigh, North Carolina
February 21, 2020

BANDWIDTH INC.

Consolidated Balance Sheets

(In thousands, except share and per share amounts)

	As of December 31,	
	2018	**2019**
Assets		
Current assets:		
Cash, cash equivalents and restricted cash	$ 41,501	$ 185,004
Marketable securities	17,400	—
Accounts receivable, net of allowance for doubtful accounts	24,009	30,187
Prepaid expenses and other current assets	6,114	9,260
Deferred costs	2,630	2,498
Total current assets	91,654	226,949
Property and equipment, net	25,136	41,654
Operating right-of-use asset	—	21,031
Intangible assets, net	7,089	6,569
Deferred costs, non-current	1,828	1,952
Other long-term assets	487	1,533
Goodwill	6,867	6,867
Deferred tax asset	17,359	34,861
Total assets	$ 150,420	$ 341,416
Liabilities and stockholders' equity		
Current liabilities:		
Accounts payable	$ 3,418	$ 4,190
Accrued expenses and other current liabilities	21,393	27,328
Current portion of deferred revenue	5,324	5,177
Advanced billings	2,588	4,167
Operating lease liability, current	—	4,876
Total current liabilities	32,723	45,738
Operating lease liability, net of current portion	—	19,868
Deferred rent, net of current portion	2,503	—
Deferred revenue, net of current portion	6,424	5,720
Total liabilities	41,650	71,326
Commitments and contingencies		
Stockholders' equity:		
Preferred stock; $0.001 par value; 10,000,000 shares authorized; 0 shares issued	—	—
Class A voting common stock; $0.001 par value; 100,000,000 shares authorized as of December 31, 2018 and 2019; 12,912,747 and 18,584,478 shares issued and outstanding as of December 31, 2018 and 2019, respectively	13	19
Class B voting common stock, $0.001 par value; 20,000,000 shares authorized as of December 31, 2018 and 2019; 6,510,732 and 4,927,401 shares issued and outstanding as of December 31, 2018 and 2019, respectively	6	5
Additional paid-in capital	116,600	275,553
Accumulated deficit	(7,848)	(5,528)
Accumulated other comprehensive (loss) income	(1)	41
Total stockholders' equity	108,770	270,090
Total liabilities and stockholders' equity	$ 150,420	$ 341,416

See accompanying notes.

BANDWIDTH INC.
Consolidated Statements of Operations
(In thousands, except share and per share amounts)

	Year ended December 31,		
	2017	2018	2019
Revenue:			
CPaaS revenue	$ 131,572	$ 164,415	$ 197,944
Other revenue	31,383	39,698	34,650
Total revenue	162,955	204,113	232,594
Cost of revenue:			
CPaaS cost of revenue	75,859	94,296	110,343
Other cost of revenue	13,403	13,849	14,616
Total cost of revenue	89,262	108,145	124,959
Gross profit	73,693	95,968	107,635
Operating expenses:			
Research and development	10,789	20,897	31,461
Sales and marketing	11,218	20,731	35,020
General and administrative	37,069	47,588	58,847
Total operating expenses	59,076	89,216	125,328
Operating income (loss)	14,617	6,752	(17,693)
Other (expense) income:			
Interest (expense) income, net	(1,728)	301	2,446
Other income, net	—	—	23
Total other (expense) income	(1,728)	301	2,469
Income (loss) before income taxes	12,889	7,053	(15,224)
Income tax (provision) benefit	(6,918)	10,870	17,718
Net income	$ 5,971	$ 17,923	$ 2,494
Earnings per share:			
Net income	$ 5,971	$ 17,923	$ 2,494
Income allocated to participating securities	644	—	—
Net income attributable to common stockholders	$ 5,327	$ 17,923	$ 2,494
Net income per share:			
Basic	$ 0.42	$ 0.96	$ 0.11
Diluted	$ 0.37	$ 0.85	$ 0.10
Weighted average number of common shares outstanding:			
Basic	12,590,221	18,573,067	22,640,461
Diluted	14,543,170	21,140,382	23,923,777

See accompanying notes.

BANDWIDTH INC.

Consolidated Statements of Comprehensive Income

(In thousands)

	Year ended December 31,		
	2017	2018	2019
Net income	$ 5,971	$ 17,923	$ 2,494
Other comprehensive (loss) income			
Unrealized (loss) gain on marketable securities, net	—	(1)	1
Foreign currency translation	—	—	41
Total other comprehensive (loss) income	—	(1)	42
Total comprehensive income	$ 5,971	$ 17,922	$ 2,536

See accompanying notes.

BANDWIDTH INC.

Consolidated Statements of Changes in Redeemable Convertible Preferred Stock and Stockholders' (Deficit) Equity

(In thousands, except share amounts)

	Series A redeemable convertible preferred stock		Class A voting common stock		Class B voting common stock		Old Class A voting common Stock		Old Class B non-voting common Stock		Additional paid-in capital	Accumulated other comprehensive (loss) income	Accumulated deficit	Total stockholders' (deficit) equity
	Shares	Amount	Shares	Amount	Shares	Amount	Shares	Amount	Shares	Amount				
Balance at December 31, 2016	**710,000**	**$ 21,818**	**—**	**$ —**	**—**	**$ —**	**11,779,975**	**$ 12**	**18,590**	**$ —**	**$ 9,356**	**$ —**	**$ (31,742)**	**$ (22,374)**
Issuance of Old Class A voting common stock	—	—	—	—	—	—	31,510	—	—		94	—	—	94
Issuance of Old Class B non-voting common stock	—	—	—	—	—	—	—	—	16,250	—	109	—	—	109
Exercise of warrants to purchase common stock	—	—	—	—	17,260	—	—	—	—	—	91	—	—	91
Stock-based compensation	—	—	—	—	—	—	—	—	—	—	1,803	—	—	1,803
Purchase of common stock	—	—	—	—	(29)	—	—	—	—	—	—	—	—	—
Conversion of Series A preferred stock to Old Class A voting common stock	(710,000)	(21,818)	—	—	—	—	1,775,000	1	—	—	21,817	—	—	21,818
Conversion of Old Class A voting common stock to Class B voting common stock	—	—	—	—	13,586,485	13	(13,586,485)	(13)	—	—	—	—	—	—
Conversion of Old Class B non-voting common stock to Class A voting common stock	—	—	34,840	—	—	—	—	—	(34,840)	—	—	—	—	—
Issuance of common stock in connection with initial public offering, net of underwriting discounts	—	—	4,000,000	4	—	—	—	—	—	—	74,396	—	—	74,400
Costs in connection with initial public offering	—	—	—	—	—	—	—	—	—	—	(5,385)	—	—	(5,385)

BANDWIDTH INC.

Consolidated Statements of Changes in Redeemable Convertible Preferred Stock and Stockholders' (Deficit) Equity

(In thousands, except share amounts)

	Series A redeemable convertible preferred stock		Class A voting common stock		Class B voting common stock		Old Class A voting common Stock		Old Class B non-voting common Stock		Additional paid-in capital	Accumulated other comprehensive (loss) income	Accumulated deficit	Total stockholders' (deficit) equity
	Shares	Amount	Shares	Amount	Shares	Amount	Shares	Amount	Shares	Amount				
Conversion of Class B voting common stock to Class A voting common stock	—	—	162,991	—	(162,991)	—	—	—	—	—	—	—	—	—
Termination of Shareholders' anti-dilutive arrangement	—	—	—	—	—	—	—	—	—	—	184	—	—	184
Net income	—	—	—	—	—	—	—	—	—	—	—	—	5,971	5,971
Balance at December 31, 2017	—	—	**4,197,831**	**4**	**13,440,725**	**13**	—	—	—	—	**102,465**	—	**(25,771)**	**76,711**
Exercises of vested stock options	—	—	1,724,689	2	—	—	—	—	—	—	11,044	—	—	11,046
Vesting of restricted stock units	—	—	11,000	—	—	—	—	—	—	—	—	—	—	—
Exercise of warrants to purchase common stock	—	—	48,904	—	—	—	—	—	—	—	37	—	—	37
Conversion of Class B voting common stock to Class A voting common stock	—	—	6,929,993	7	(6,929,993)	(7)	—	—	—	—	—	—	—	—
Issuance of Class A voting common stock	—	—	330	—	—	—	—	—	—	—	11	—	—	11
Costs in connection with initial public offering	—	—	—	—	—	—	—	—	—	—	(285)	—	—	(285)
Unrealized loss on marketable securities	—	—	—	—	—	—	—	—	—	—	—	(1)	—	(1)
Stock based compensation	—	—	—	—	—	—	—	—	—	—	3,328	—	—	3,328
Net income	—	—	—	—	—	—	—	—	—	—	—	—	17,923	17,923

BANDWIDTH INC.

Consolidated Statements of Changes in Redeemable Convertible Preferred Stock and Stockholders' (Deficit) Equity

(In thousands, except share amounts)

	Series A redeemable convertible preferred stock		Class A voting common stock		Class B voting common stock		Old Class A voting common Stock		Old Class B non-voting common Stock		Additional paid-in capital	Accumulated other comprehensive (loss) income	Accumulated deficit	Total stockholders' (deficit) equity
	Shares	Amount	Shares	Amount	Shares	Amount	Shares	Amount	Shares	Amount				
Balance at December 31, 2018	—	—	**12,912,747**	**13**	**6,510,732**	**6**	—	—	—	—	**116,600**	**(1)**	**(7,848)**	**108,770**
Issuance of common stock in connection with follow on public offering, net of underwriting discounts	—	—	2,875,000	3	—	—	—	—	—	—	147,388	—	—	147,391
Costs in connection with public offering	—	—	—	—	—	—	—	—	—	—	(834)	—	—	(834)
Exercises of vested stock options	—	—	1,075,482	1	—	—	—	—	—	—	7,356	—	—	7,357
Vesting of restricted stock units	—	—	163,944	—	—	—	—	—	—	—	—	—	—	—
Equity awards withheld for tax liability	—	—	(26,026)	—	—	—	—	—	—	—	(1,583)	—	—	(1,583)
Conversion of Class B voting common stock to Class A voting common stock	—	—	1,583,331	2	(1,583,331)	(1)	—	—	—	—	—	—	—	1
Adjustment to opening retained earnings due to adoption of ASC 606	—	—	—	—	—	—	—	—	—	—	—	—	(174)	(174)
Unrealized gain on marketable securities	—	—	—	—	—	—	—	—	—	—	—	1	—	1
Foreign currency translation	—	—	—	—	—	—	—	—	—	—	—	41	—	41
Stock based compensation	—	—	—	—	—	—	—	—	—	—	6,626	—	—	6,626
Net income	—	—	—	—	—	—	—	—	—	—	—	—	2,494	2,494
Balance at December 31, 2019	**—**	**$ —**	**18,584,478**	**$ 19**	**4,927,401**	**$ 5**	**—**	**$ —**	**—**	**$ —**	**$275,553**	**$ 41**	**$ (5,528)**	**$ 270,090**

See accompanying notes.

BANDWIDTH INC.

Consolidated Statements of Cash Flows

(In thousands)

	Year ended December 31,		
	2017	2018	2019
Cash flows from operating activities			
Net income	$ 5,971	$ 17,923	$ 2,494
Adjustments to reconcile net income to net cash provided by (used in) operating activities			
Depreciation and amortization	5,712	5,824	9,538
Right-of-use asset amortization	—	—	4,269
Accretion of bond discount	—	(164)	(700)
Gain on sale of marketable securities	—	—	(4)
Amortization of debt issuance costs	376	64	177
Stock-based compensation	1,803	3,339	6,626
Deferred taxes	6,168	(10,833)	(17,502)
Loss on disposal of property and equipment	91	191	456
Changes in operating assets and liabilities:			
Accounts receivable	(4,387)	(2,784)	(6,178)
Prepaid expenses and other assets	(1,622)	(1,926)	(4,176)
Deferred costs	(906)	243	(69)
Accounts payable	(2,429)	(169)	1,145
Accrued expenses and other liabilities	1,040	4,826	5,474
Deferred revenue and advanced billings	2,573	6,019	554
Operating right-of-use liability	—	—	(3,357)
Deferred rent	233	2,080	—
Net cash provided by (used in) operating activities	14,623	24,633	(1,253)
Cash flows from investing activities			
Purchase of property and equipment	(5,021)	(12,419)	(22,215)
Capitalized software development costs	(2,942)	(2,028)	(3,544)
Purchase of marketable securities	—	(35,236)	(68,361)
Proceeds from sales and maturities of marketable securities	—	18,000	86,467
Net cash used in investing activities	(7,963)	(31,683)	(7,653)
Cash flows from financing activities			
Borrowings on line of credit	4,000	—	—
Repayments on line of credit	(9,000)	—	—
Payments on capital leases	(73)	(92)	—
Repayments on term loan	(40,000)	—	—
Payment of costs related to the initial public offering	(5,385)	(285)	—
Payment of costs related to the follow-on public offering	—	—	(757)
Proceeds from the initial public offering, net of underwriting discounts	74,400	—	—
Proceeds from the follow-on public offering, net of underwriting discounts	—	—	147,391
Payment of debt issuance costs	(25)	(25)	(167)
Proceeds from exercises of stock options	174	11,046	7,357
Proceeds from exercises of warrants	91	37	—
Value of equity awards withheld for tax liabilities	—	—	(1,406)
Net cash provided by financing activities	24,182	10,681	152,418
Effect of exchange rate changes on cash, cash equivalents and restricted cash	—	—	(9)

BANDWIDTH INC.

Consolidated Statements of Cash Flows

(In thousands)

Net increase in cash, cash equivalents, and restricted cash		30,842		3,631		143,503
Cash, cash equivalents, and restricted cash, beginning of period		7,028		37,870		41,501
Cash, cash equivalents, and restricted cash, end of period	$	37,870	$	41,501	$	185,004
Supplemental disclosure of cash flow information						
Cash paid during the year for interest	$	1,535	$	107	$	341
Cash paid (refunded) for taxes	$	855	$	155	$	(178)
Right-of-use assets obtained in exchange for new operating lease liabilities	$	—	$	—	$	4,528
Supplemental disclosure of noncash investing and financing activities						
Purchase of property and equipment, accrued but not paid	$	886	$	1,204	$	1,375
Equity awards withheld for tax liabilities, accrued but not paid	$	—	$	—	$	177

See accompanying notes.

1. Organization and Description of Business

Bandwidth Inc. (together with its subsidiaries, “Bandwidth” or the “Company”) was founded in July 2000 and incorporated in Delaware on March 29, 2001. The Company’s headquarters are located in Raleigh, North Carolina, and the Company has subsidiaries in the Netherlands, United Kingdom, Germany and Spain. The Company is a cloud-based, software-powered communications platform-as-a-service (“CPaaS”) provider that enables enterprises to create, scale and operate voice or messaging communications services across any mobile application or connected device.

The Company has two operating and reportable segments, CPaaS and Other. CPaaS revenue is derived from usage and monthly services fees charged for usage of Voice, Messaging, 911 and Phone Numbers solutions through the Company’s proprietary CPaaS software application programming interfaces. Other revenue consists of fees charged for services provided such as: SIP trunking, data resale, and a hosted Voice-over Internet Protocol (“VoIP”). The Other segment also includes revenue from traffic generated by other carriers, SMS registration fees and other miscellaneous product lines.

Initial Public Offering

On November 9, 2017, the Company’s Registration Statement on Form S-1 relating to the initial public offering (“IPO”) of its Class A common stock was declared effective by the SEC. In connection with the Company’s IPO, 4,000,000 shares of the Company’s Class A common stock were sold at an initial public offering price of $20.00 per share for proceeds of approximately $74,400, net of underwriting discounts and commissions of $5,600. On November 14, 2017, the outstanding term loan of $38,500 was paid in full with proceeds from the IPO.

Follow-on Public Offering

On March 11, 2019, the Company completed a follow-on public equity offering in which the Company sold 2,875,000 shares of its Class A common stock, including 375,000 shares sold pursuant to the exercise by the underwriters of an option to purchase additional shares, at a public offering price of $54.25 per share. The Company received aggregate proceeds of $146,557, after deducting underwriting discounts and offering expenses paid by the Company.

2. Summary of Significant Accounting Policies

Basis of Presentation

The consolidated financial statements and accompanying notes were prepared in accordance with accounting principles generally accepted in the United States of America (“U.S. GAAP”).

Reclassification

The Company reclassified certain prior year amounts to conform to the current year presentation. These reclassifications had no impact on the previously reported total assets, liabilities, stockholder’s deficit or net income.

Principles of Consolidation

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

Use of Estimates

The preparation of the Company's consolidated financial statements in conformity with GAAP requires the Company to make estimates and judgments that affect the amounts reported in these financial statements and accompanying notes. Although the Company believes that the estimates it uses are reasonable, due to the inherent uncertainty involved in making these estimates, actual results reported in future periods could differ from those estimates. These estimates in the consolidated financial statements include, but are not limited to, allowance for doubtful accounts, reserve for sales credits, recoverability of long lived and intangible assets, estimated period of benefit, valuation allowances on deferred tax assets, certain accrued expenses, and contingencies.

Revenue Recognition

Adoption of Accounting Standards Codification ("ASC") 606, "Revenue from Contracts with Customers"

On January 1, 2019, the Company adopted the guidance of ASC 606, *Revenue from Contracts with Customers,* using the modified retrospective method applied to those contracts which were not completed as of January 1, 2019. The Company's results for reporting periods beginning after January 1, 2019 are presented in accordance with the provisions under ASC 606 and prior period amounts have not been adjusted and continue to be reported in accordance with the Company's revenue recognition policy as further described in Note 2, *Summary of Significant Accounting Policies,* to its Annual Report on Form 10-K for the year ended December 31, 2018.

In connection with the adoption of ASC 606, the Company recognized a net increase to its opening accumulated deficit of $174 as of January 1, 2019, related to a discount present in one of its contracts.

Prior to the adoption of ASC 606, the Company recognized the majority of its revenue based on the usage of its customers in the period the traffic traversed the Company's network. The Company determined that ASC 606 continues to support the recognition of revenue over time for the majority of the Company's contracts due to the continuous transfer of control to the customer.

The adoption of ASC 606 did not result in a change in the Company's accounting for its commission costs, which will continue to be expensed as incurred. The Company pays commissions over time and a corresponding requisite substantive service condition exists for the employee to receive the commission. The Company determined the timing of the commission payments and the underlying service performed by the employee were commensurate.

The impact on the Company's balance sheet presentation includes separately presenting customer refundable prepayments as advanced billings, whereas under ASC 605 these were included in the current portion of deferred revenue and advanced billings.

Revenue Recognition Policy

Revenue recognition commences upon transfer of control of promised goods or services to customers in an amount that the Company expects to receive in exchange for those products or services.

The Company determines revenue recognition through the following steps:

- identification of the contract, or contracts, with a customer;
- identification of the performance obligations in the contract;
- determination of the transaction price;
- allocation of the transaction price to the performance obligations in the contract; and
- recognition of revenue, when, or as, the Company satisfies a performance obligation.

Nature of Products and Services

Revenue consists primarily of the sale of communications services offered through Application Programming Interface ("API") software solutions to large enterprise, as well as small and medium-sized business, customers and is generally derived from usage and service fees in both the CPaaS and Other segments. Usage revenue includes voice communication (primarily driven by inbound minutes, outbound minutes and toll-free minutes) and messaging communication (driven by the number of messages) that traverse the platform and network. Service fees include the provision and management of phone numbers and emergency services access.

The majority of the Company's revenue is generated from usage-based fees earned from customers accessing the Company's communications platform. Access to the Company's communication platform is considered a series of distinct services, with continuous transfer of control to the customer, comprising one performance obligation and usage-based fees are recognized in revenue in the period the traffic traverses the Company's network. For the years ended December 31, 2017, 2018 and 2019 the revenue from usage-based fees represented $76,148, $105,481 and $131,626 of CPaaS revenue, respectively, and $22,473, $32,524 and $29,012 of Other revenue, respectively.

Revenue from service fees is recognized on a ratable basis as the service is provided, which is typically one month. For the years ended December 31, 2017, 2018 and 2019 the revenue from service fees represented $52,580, $55,719 and $61,193 of CPaaS revenue, respectively, and $8,910, $7,174 and $5,638 of Other revenue, respectively.

The remaining $2,844, $3,215 and $5,125 of CPaaS revenue for the years ended December 31, 2017, 2018 and 2019 respectively, are generated from other miscellaneous services.

Infrequently, Bandwidth's contracts with customers may include multiple performance obligations. For such arrangements, revenues are allocated to each performance obligation based on its relative standalone selling price. Generally, standalone selling prices are determined based on the prices charged to similar customers for similar services.

When required as part of providing service, revenues and associated expenses related to nonrefundable, upfront service activation and setup fees are deferred and recognized over the longer of the associated service contract period or estimated customer life.

The Company's contracts do not contain general rights of return. However, occasionally credits may be issued. The Company's contracts do not provide customers with the right to take possession of the software supporting the applications. Amounts that have been invoiced are recorded in accounts receivable and in revenue or deferred revenue depending on whether the revenue recognition criteria have been met.

The Company maintains a reserve for sales credits. Credits are accounted for as variable consideration and are estimated based on several inputs including historical experience and current trends of credit issuances. Adjustments to the reserve are recorded against revenue.

The Company has various sales commission plans for which eligible employees can earn commissions from the sale of products and services to customers. Eligible employees must be employed at the time of payment in order to receive a commission. The Company pays commissions over time and a corresponding requisite substantive service condition exists for the employee to receive the commission. The Company determined that the timing of the commission payments and the underlying service performed by the employee were commensurate. Accordingly, sales commissions are generally expensed as incurred. These costs are recorded within sales and marketing expenses.

(In thousands, except share and per share amounts)

Contract Assets and Liabilities

The following table provides information about receivables and contract liabilities from contracts with customers:

	December 31, 2019
Receivables (1)	$ 30,187
Contract liabilities (2)	10,897

(1) Included in accounts receivable, net of allowance for doubtful accounts on the consolidated balance sheet.
(2) Included in current portion of deferred revenue and deferred revenue, net of current portion on the consolidated balance sheet.

Deferred revenue is recorded when cash payments are received in advance of future usage on contracts. Revenue is typically recognized in the following month when service is rendered or, in the case of nonrefundable upfront fees, over the estimated period of benefit. Customer refundable payments are recorded as advanced billings. During the year ended December 31, 2019, the Company recognized revenue of $5,324 related to contract liabilities recorded at the beginning of the year. The Company expects to recognize $5,177 in revenue over the next twelve months related to its contract liabilities as of December 31, 2019.

Cost of Revenue

CPaaS cost of revenue consists primarily of fees paid to other network service providers from whom the Company buys services such as minutes of use, phone numbers, messages, porting of customer numbers, and network circuits. Cost of revenue also contains costs related to the support of the network, web services and cloud infrastructure, capacity planning and management, rent for network facilities, software licenses, hardware and software maintenance fees, and network engineering services. Personnel costs (including non-cash stock-based compensation expenses) associated with personnel who are responsible for the delivery of services, operation and maintenance of the communications network, customer support, as well as, third party support agreements, and depreciation are also recorded as cost of revenue.

Other cost of revenue consists of amortization of capital software development costs related to platform applications supporting non-CPaaS services including circuit costs paid to third party providers, internet connectivity expenses, minutes of use, contractors, regulatory fees and surcharges, depreciation, and software and hardware maintenance fees.

Operating Expenses

Research and Development

Research and development expenses consist primarily of personnel costs (including non-cash stock-based compensation expenses), outsourced software development and engineering services and cloud infrastructure fees for staging and development outsourced engineering services.

Sales and Marketing

Sales and marketing expenses consist primarily of personnel costs, including commissions for sales employees and non-cash stock-based compensation expenses. Sales and marketing expenses also include expenditures related to advertising, marketing, brand awareness activities, sales support and professional services fees.

General and Administrative

General and administrative expenses consist primarily of personnel costs for support personnel and executives in accounting, finance, legal, information services, human resources and administrative functions. General and administrative expenses also include costs related to product management and reporting, data services, customer billing and collection functions, and other professional services fees, credit card processing fees, rent associated with the Company's headquarters in Raleigh, North Carolina, depreciation and amortization.

Cash, Cash Equivalents and Restricted Cash

The Company classifies all highly liquid investments with stated maturities of three months or less from the date of purchase as cash equivalents and all highly liquid investments with stated maturities of greater than three months from the date of purchase as current marketable securities. Cash deposits are primarily in financial institutions in the US. However, cash for monthly operating costs of international operations are deposited in banks outside the US. The Company has a policy of making investments only with commercial institutions that have at least an investment grade credit rating. The Company invests its cash primarily in government securities and obligations, corporate debt securities, money market funds and reverse repurchase agreements ("RRAs"). RRAs are collateralized by deposits in the form of Government Securities and Obligations for an amount not less than 102% of their value. The Company does not record an asset or liability as the Company is not permitted to sell or repledge the associated collateral. The Company has a policy that the collateral has at least an "A" (or equivalent) credit rating. The Company utilizes a third-party custodian to manage the exchange of funds and ensure that collateral received is maintained at 102% of the value of the RRAs on a daily basis. RRAs with stated maturities of greater than three months from the date of purchase are classified as marketable securities. As of December 31, 2018 and 2019, cash and cash equivalents were $41,261 and $184,414, respectively.

Restricted cash consists primarily of customer deposits, employee withholding tax liability and employee benefits contributions not yet remitted. The Company has classified this asset as a short-term asset in order to match the expected period of restriction. As of December 31, 2018 and 2019, restricted cash was $240 and $590, respectively.

Accounts Receivable and Allowance for Doubtful Accounts

Accounts receivable are stated at realizable value, net of an allowance for doubtful accounts. The allowance for doubtful accounts is based on management's assessment of the collectability of its customer accounts. The Company regularly reviews the composition of the accounts receivable aging, historical bad debts, changes in payment patterns, customer creditworthiness and current economic trends. If the financial condition of customers were to deteriorate, resulting in their inability to make required payments, additional provisions for doubtful accounts would be required and would increase bad debt expense. Management has evaluated the collectability of trade accounts receivable and determined that allowances of approximately $906 and $769 for uncollectible accounts and customer balances that are disputed were required as of December 31, 2018 and 2019, respectively. Refer to Note 4, "Financial Statement Components," for a rollforward of the components of the allowance for doubtful accounts as of December 31, 2018 and 2019.

The Company includes unbilled receivables in its accounts receivable balance. Generally, these receivables represent services provided to customers, which will be billed in the next billing cycle. All amounts are considered collectible and billable. As of December 31, 2018 and 2019, unbilled receivables were $11,174 and $16,200, respectively.

Concentration of Credit Risk

Financial instruments that are exposed to concentration of credit risk consist primarily of cash and cash equivalents, marketable securities and trade accounts receivable. Cash deposits may be in excess of insured limits. The Company believes that the financial institutions that hold its cash deposits are financially sound and, accordingly, minimal credit risk exists with respect to these balances.

With regard to customers, credit evaluation and account monitoring procedures are used to minimize the risk of loss. The Company believes that no additional credit risk beyond amounts provided for by the allowance for doubtful accounts are inherent in accounts receivable. As of December 31, 2018, one individual customer represented approximately 18% of the Company's accounts receivable, net of allowance for doubtful accounts. As of December 31, 2019, no individual customer represented more than 10% of the Company's accounts receivable, net of allowance for doubtful accounts.

For the years ended December 31, 2017, 2018 and 2019, no individual customer represented more than 10% of the Company's total revenue.

Property and Equipment, net

Property and equipment, net is stated at cost, less accumulated depreciation and amortization. Depreciation and amortization is calculated on a straight-line basis over the estimated useful lives of those assets as follows:

Computer hardware and software	2 to 5 years
Internal-use software development costs	3 years
Furniture and fixtures	2 to 7 years
Leasehold improvements	Shorter of the estimated lease term or useful life

Maintenance and repairs are charged to expense as incurred.

Deferred Costs

The Company defers certain direct and incremental upfront costs related to the generation of a revenue stream or obtaining a new customer agreement. These costs include installment fees, activation and other telecommunication fees. The Company capitalizes these costs and amortizes them over the longer of the term of the customer contract or the estimated period of benefit, which is approximately three years.

Internal-Use Software Development Costs

Internal-use software includes software that has been acquired, internally developed, or modified exclusively to meet the Company's needs. The Company capitalizes qualifying internal-use software development costs that are incurred during the application development stage. Capitalization of costs begins when two criteria are met: (i) the preliminary project stage is completed, and (ii) it is probable that the software will be completed and used for its intended function. Capitalization ceases when the software is substantially complete and ready for its intended use, including the completion of all significant testing. The Company also capitalizes costs related to specific upgrades and enhancements when the expenditures will result in additional functionality, and expenses costs incurred for maintenance and minor upgrades and enhancements. Costs related to preliminary project activities and post-implementation operating activities are expensed as incurred.

Capitalized costs of platform and other software applications are included in property and equipment. These costs are amortized over the estimated useful life of the software on a straight-line basis over three years. Management evaluates the useful life of these assets on an annual basis and tests for impairment whenever events or changes in circumstances occur that could impact the recoverability of these assets.

Debt Issuance Costs

The Company incurred debt issuance costs associated with obtaining and entering into credit agreements. These costs customarily include non-refundable structuring fees, commitment fees, up-front fees and syndication expenses. The Company has a policy to defer and amortize these costs based on the effective interest method over the term of the credit agreements.

Goodwill

The Company reviews goodwill and indefinite-lived intangible assets at least annually, as of December 31, for possible impairment. Goodwill and indefinite-lived intangible assets are reviewed for possible impairment at an interim date if an event occurs or circumstances change that would more likely than not reduce the fair value of the reporting unit or indefinite-lived intangible asset below its carrying value. The Company tests goodwill at the reporting unit level and has determined that it has two-reporting units, CPaaS and Other. All Goodwill is allocated to the CPaaS reporting unit. Management may first evaluate qualitative factors to assess if it is more likely than not that the fair value of a reporting unit is less than its carrying amount and to determine if a two-step impairment test is necessary. Management may choose to proceed directly to the two-step evaluation, bypassing the initial qualitative assessment. The first step of the impairment test involves comparing the fair value of the reporting unit to its net book value, including goodwill. If the carrying value exceeds its fair value, then the Company would perform the second step of the goodwill impairment test to determine the amount of the impairment loss. The impairment loss would be calculated by comparing the implied fair value of the goodwill to its carrying value. In calculating the implied fair value of goodwill, the fair value of the entity would be allocated to all of the other assets and liabilities based on their fair values. The excess of the fair value of the entity over the amount assigned to other assets and liabilities is the implied fair value of goodwill. An impairment loss would be recognized when the carrying amount of goodwill exceeds its implied fair value.

The Company makes assumptions regarding estimated future cash flows, discount rates, long-term growth rates and market values to determine each reporting unit's and indefinite-lived intangible asset's estimated fair value. If these estimates or related assumptions change in the future, the Company may be required to record an impairment charge. As of December 31, 2018 and 2019, the Company has recorded goodwill of $6,867. No goodwill impairment charges were recorded for the years ended December 31, 2017, 2018 and 2019.

Impairment of Long-Lived Assets

The Company evaluates long-lived assets, including property and equipment and definite lived intangible assets, for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. Recoverability of assets held and used is measured by a comparison of the carrying amount of an asset or an asset group to estimated undiscounted future net cash flows expected to be generated by the asset or asset group. If such evaluation indicates that the carrying amount of the asset or the asset group is not recoverable, any impairment loss would be equal to the amount the carrying value exceeds the fair value.

Advertising Costs

The Company expenses advertising costs as incurred. Advertising costs totaled $464, $953 and $1,528 for the years ended December 31, 2017, 2018 and 2019, respectively, which are included in sales and marketing expenses in the accompanying consolidated statements of operations.

Commissions

Commissions consist of variable compensation earned by sales personnel and third-party resellers. Sales commissions associated with the acquisition of a new customer contract are paid over time, based on monthly revenues, and are recognized as sales and marketing expense in the period incurred.

Stock-Based Compensation

The Company accounts for stock-based compensation expense related to all stock-based awards based on the fair value of the award on the grant date. Stock-based compensation expense is recognized on a straight-line basis over the requisite service period, which is generally four years. The fair value of the restricted stock units is determined using the fair value of the Company's Class A common stock on the date of grant. The Company uses the Black-Scholes option pricing model, net of estimated forfeitures, to measure the fair value of its stock options.

The Company has elected to estimate expected forfeitures, and, as such, the Company must also determine a forfeiture rate to calculate the stock-based compensation for awards. Through December 31, 2019, the Company recognized compensation for only the portion of options expected to vest using an estimated forfeiture rate that was derived from historical employee termination behavior. If any of the assumptions used in the Black-Scholes option pricing model change, stock-based compensation for future options may differ materially compared to that associated with previous grants.

Income Taxes

The Company accounts for income taxes under the asset and liability method. Under this method, deferred tax assets and liabilities are determined based on temporary differences between the financial statement and tax basis of assets and liabilities using enacted tax rates. The Company recognizes the effect of a change in tax rates on deferred tax assets and liabilities in the period that includes the enactment date.

The Company reduces the measurement of a deferred tax asset, if necessary, by a valuation allowance if it is more likely than not that it will not realize some or all the deferred tax asset. Quarterly, the Company reviews the deferred tax assets for recoverability based on historical taxable income, projected future taxable income, the expected timing of the reversals of existing temporary differences and the implementation of prudent and feasible tax planning strategies. The evaluation of the recoverability of deferred tax assets requires judgment in assessing future profitability. Should there be a change in the ability to recover deferred tax assets, the Company's income tax provision would increase or decrease in the period in which the assessment is changed.

The Company accounts for uncertain tax positions by recognizing the financial statement effects of a tax position only when, based upon technical merits, it is more likely than not that the position will be sustained upon examination. The tax benefit recognized is measured as the largest amount of benefit determined on a cumulative probability basis that the Company believes is more likely than not to be realized upon ultimate settlement of the position. The Company recognizes potential accrued interest and penalties associated with unrecognized tax positions in income tax expense.

Operating Segments

Operating segments are defined as components of an enterprise for which separate financial information is available and evaluated regularly by the chief operating decision maker ("CODM") in deciding how to make operating decisions, allocate resources and in assessing performance. The Company has two operating segments, CPaaS and Other, which are deemed to be reportable segments. The Company's CODM is its Chief Executive Officer. The CODM evaluates the performance of the Company's operating segments primarily based on revenue and gross profit. The Company does not analyze discrete segment balance sheet information related to long-term assets. All other financial information is evaluated on a consolidated basis.

Earnings per Share

Basic earnings per share attributable to common stockholders is calculated by dividing the net income attributable to common stockholders by the weighted-average number of shares of common stock outstanding for the period.

Diluted net income per share is calculated by giving effect to all potentially dilutive common stock when determining the weighted-average number of common shares outstanding. For purposes of the diluted net income (loss) per share calculation, options and warrants to purchase common stock and redeemable convertible preferred stock are considered to be potential common stock.

Historically, the Company issued securities other than common stock that participated in dividends ("Participating Securities"), and therefore utilized the two-class method to calculate net income per share. These Participating Securities included the Series A redeemable convertible preferred stock. The two-class method requires a portion of net income to be allocated to the Participating Securities to determine the net income attributable to common stockholders. Net income attributable to the common stockholders is equal to the net income less dividends paid on preferred stock with any remaining earnings allocated in accordance with the bylaws between the outstanding common and redeemable convertible preferred stock as of the end of each period. On November 9, 2017, the Participating Securities were converted into shares of Old Class A common stock, which converted to Class B common stock immediately prior to the IPO.

Foreign currency translation

The Company has foreign operations with non-USD functional currencies. The Euro and British Pound are the functional currencies for the Company's international operations. Foreign exchange gains and losses, which result from the process of remeasuring foreign currency transactions into the appropriate functional currency, are included in other income, net in the Company's consolidated statements of operations. The Company recorded $9 in related gains during the year ended December 31, 2019.

The impact of changes in foreign currency exchange rates resulting from the translation of foreign currency financial statements into U.S. dollars for financial reporting purposes is included in other comprehensive (loss) income, which is a separate component of stockholders' equity. Assets and liabilities are translated into U.S. dollars at exchange rates in effect at the balance sheet date. Income and expense items are translated at average rates for the period.

Fair Value of Financial Instruments

The carrying amounts of cash and cash equivalents, marketable securities, accounts receivable, accounts payable and accrued expenses approximate fair value as of December 31, 2018 and December 31, 2019 because of the relatively short duration of these instruments. Marketable securities consist of U.S. treasury securities not otherwise classified as cash equivalents. All marketable securities are considered to be available-for-sale and are recorded at their estimated fair values. Unrealized gains and losses for available-for-sale securities are recorded in other comprehensive (loss) income.

The Company minimizes its credit risk associated with investments by investing primarily in investment grade, liquid securities. The Company policy is designed to preserve capital, maintain liquidity and minimize credit risk, and the policy limits exposure to any one issuer and also establishes minimum credit ratings of approved investments. Periodic evaluations of relative credit standing of those issuers are considered in the Company's investment strategy.

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

- **Level 1.** Observable inputs based on unadjusted quoted prices in active markets for identical assets or liabilities;
- **Level 2.** Inputs, other than quoted prices in active markets, that are observable either directly or indirectly; and
- **Level 3.** Unobservable inputs for which there is little or no market data, which requires the Company to develop its own assumptions.

A financial instrument's categorization within the valuation hierarchy is based upon the lowest level of input that is significant to the fair value measurement.

Comprehensive Income

Comprehensive income refers to net income and other revenue, expenses, gains and losses that, under generally accepted accounting principles, are recorded as an element of stockholders' equity but are excluded from the calculation of net income.

For the year ended December 31, 2017, the Company's operations did not give rise to any material items in comprehensive income, which were not already in net income. Accordingly, for that period, the Company's comprehensive income is the same as its net income.

Recently Adopted Accounting Standards

In February 2016, the Financial Accounting Standards Board ("FASB") issued ASU 2016-02, *Leases (Topic 842)*, which was further clarified in July 2018 by ASU 2018-10, *Codification Improvements to Topic 842, Leases*, ASU 2018-11, *Leases-Targeted Improvements*, and ASU 2019-01, *Leases (Topic 842): Codification Improvements,*. ASU 2018-10 provides narrow amendments to clarify how to apply certain aspects of the new lease standard. ASU 2018-11 addresses implementation issues related to the new lease standard. ASU 2019-01 clarifies how to apply certain aspects of the new lease standard. Under the new standard, lessees are required to recognize in the balance sheet the right-of-use ("ROU") assets and lease liabilities that arise from operating leases. As a result of the Company no longer qualifying for emerging growth Company filing status based on its public float as of the most recent second fiscal quarter, the ASU was adopted as of December 31, 2019 with an effective date as of the beginning of the Company's fiscal year, January 1, 2019. The standard was applied to the operating leases that existed on that date using the optional alternative method on a prospective basis. Prior year comparative financial information was not recast under the new standard and continues to be presented under ASC 840. The Company elected to utilize the package of practical expedients available for expired or existing contracts which allowed the Company to carryforward historical assessments of (a) whether contracts are or contain leases, (b) lease classification, and (c) initial direct costs. The Company also elected to apply the short-term lease exception for all leases. The Company did not elect the use of hindsight practical expedient in determining the lease term and assessing the likelihood that lease renewal, termination or purchase option will be exercised. Under the short-term lease exception, the Company will not recognize ROU assets or lease liabilities for leases that, at the acquisition date, have a remaining lease term of 12 months or less.

As a result of losing emerging growth status on June 30, 2019, the Company implemented this guidance for the year ended December 31, 2019. The Company recognized a $20,772 operating ROU asset and a $23,808 operating lease liability in its consolidated balance sheet as of January 1, 2019, with no material impact to its consolidated statements of operations.

The Company measured the lease liability at the present value of the future lease payments as of January 1, 2019. The Company used its incremental borrowing rate to discount the lease payments as of January 1, 2019. The Company derived the discount rate, adjusted for differences in the term and payment patterns, from the information available at the adoption date. The right-of-use asset is valued at the amount of the lease liability adjusted for the remaining December 31, 2018, balance of unamortized lease incentives, prepaid rent and deferred rent. The lease liability is subsequently measured at the present value of unpaid future lease payments as of the reporting date with a corresponding adjustment to the right-of-use asset. Absent a lease modification, the Company will continue to utilize the January 1, 2019, incremental borrowing rate.

The Company recognizes operating lease costs on a straight-line basis and presents these costs as operating expenses within the consolidated statements of operations. Within the consolidated statements of cash flows the Company presents the lease payments made on the operating leases within cash flows from operating activities and principal payments made on the finance leases as part of financing activities.

The financial results for the year ended December 31, 2019 are presented under the new standard, while the comparative periods presented are not adjusted and continue to be reported in accordance with the Company's historical accounting policy.

See Note 5, "Right-of-Use Asset and Lease Liabilities" for further information.

Recent Accounting Pronouncements Not Yet Adopted

In December 2019, the FASB issued ASU 2019-12, I*ncome Taxes (Topic 740): Simplifying the Accounting for Income Taxes*, which is intended to simplify various aspects related to accounting for income taxes. ASU 2019-12 removes certain exceptions to the general principles in Topic 740 and also clarifies and amends existing guidance to improve consistent application. ASU 2019-12 is effective for fiscal years, and interim periods within those fiscal years, beginning after December 15, 2020. Early adoption is permitted, including adoption in an interim period. The Company is evaluating the effect of adopting this new accounting guidance, but does not expect adoption will have a material impact on the Company's financial statements.

In August 2018, the FASB issued ASU 2018-15, *Intangibles-Goodwill and Other-Internal-Use Software (Subtopic 350-40): Customer's Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement That is a Service Contract*. This standard aligns the requirements for capitalizing implementation costs incurred in a hosting arrangement that is a service contract with the requirements for capitalizing implementation costs incurred to develop or obtain internal-use software. ASU 2018-15 will be effective for the Company in interim and annual reporting periods beginning after December 15, 2019. The Company is currently evaluating the impact of the adoption of this standard on its consolidated financial statements.

In August 2018, the FASB issued ASU 2018-13, *Fair Value Measurement (Topic 820): Disclosure Framework – Changes to the Disclosure Requirements for Fair Value Measurement,* which eliminates certain disclosure requirements for fair value measurements for all entities, requires public entities to disclose certain new information and modifies some disclosure requirements. ASU 2018-13 is effective for the Company for fiscal years beginning after December 15, 2019 and for interim periods within those fiscal years. An entity is permitted to early adopt either the entire standard or only the provisions that eliminate or modify requirements. The Company is evaluating the effect of adopting this new accounting guidance, but does not expect adoption will have a material impact on the Company's financial statements.

In January 2017, the FASB issued ASU 2017-04, *Simplifying the Test for Goodwill Impairment*, which simplifies the accounting for goodwill impairment. The ASU requires impairment charges to be based on the first step in today's two-step impairment test. ASU 2017-04 is effective for the Company in periods beginning after December 15, 2019. Management does not expect the adoption of this guidance to have a significant impact on the Company's financial statements.

In June 2016, the FASB issued ASU 2016-13, *Financial Instruments–Credit Losses: Measurement of Credit Losses on Financial Instruments*, which changes the impairment model for most financial assets. The new model uses a forward-looking expected loss method, which will generally result in earlier recognition of allowances for losses. In November 2018, the FASB issued ASU 2018-19, *Codification Improvements to Topic 326, Financial Instruments – Credit Losses*, which clarifies that receivables arising from operating leases are not within the scope of Topic 326, Financial Instruments – Credit Losses. Instead, impairment of receivables arising from operating leases should be accounted for in accordance with Topic 842, Leases. In April 2019, the FASB issued ASU 2019-04, *Codification Improvements to Topic 326, Financial Instruments—Credit Losses, Topic 815, Derivatives and Hedging, and Topic 825, Financial Instruments,* which clarifies how to apply certain aspects of the new credit losses standard. In November 2019, the FASB issued ASU 2019-10, *Financial Instruments—Credit Losses (Topic 326), Derivatives and Hedging (Topic 815), and Leases (Topic 842): Effective Dates*, which amends certain effective dates for the new standard. In November 2019, the FASB issued ASU 2019-11, *Codification Improvements to Topic 326, Financial Instruments—Credit Losses*, which clarifies how to apply certain aspects of the new credit losses standard. The accounting standard is effective for the Company for annual and interim periods beginning after December 15, 2019. The Company is evaluating the effect of adopting this accounting guidance, but does not expect adoption will have a material impact to its consolidated financial statements.

(In thousands, except share and per share amounts)

3. Fair Value Measurements

The Company evaluated its financial assets and liabilities subject to fair value measurements on a recurring basis to determine the appropriate level in which to classify them for each reporting period.

The following table summarizes the assets measured at fair value as of December 31, 2018 and 2019:

	Amortized cost or carrying value	Unrealized gains	Unrealized losses	Fair value measurements on a recurring basis December 31, 2018			
				Level 1	Level 2	Level 3	Total
Financial assets:							
Cash and cash equivalents:							
Money market account	$ 8,194	$ —	$ —	$ 8,194	$ —	$ —	$ 8,194
U.S. Reverse repurchase agreements	26,000	—	—	—	26,000	—	26,000
Total included in cash and cash equivalents	34,194	—	—	8,194	26,000	—	34,194
Marketable securities:							
U.S. treasury securities	17,402	—	(2)	17,400	—	—	17,400
Total marketable	17,402	—	(2)	17,400	—	—	17,400
Total financial assets	$ 51,596	$ —	$ (2)	$ 25,594	$ 26,000	$ —	$ 51,594

	Fair value measurements on a recurring basis December 31, 2019			
	Level 1	Level 2	Level 3	Total
Financial assets:				
Cash and cash equivalents:				
Money market account	$ 25,000	$ —	$ —	$ 25,000
Time deposits	75,250		—	75,250
Total financial assets	$ 100,250	—	—	$ 100,250

The Company classifies its marketable securities as current assets as they are available for current operating needs. There were no marketable securities as of December 31, 2019.

The Company monitors the availability of observable market data to assess the appropriate classification of financial instruments within the fair value hierarchy. Changes in economic conditions or model-based valuation techniques may require the transfer of financial instruments from one fair value level to another. In such instances, the transfer is reported at the beginning of the reporting period. There were no transfers between Levels 1, 2 or 3 during the years ended December 31, 2018 and 2019.

The money market account is included in cash, cash equivalents and restricted cash in the consolidated balance sheets as of December 31, 2018 and 2019.

During the years ended December 31, 2017, 2018 and 2019 there were $0, $18,000 and $69,000 in maturities of marketable securities, respectively.

There were no sales of marketable securities for the years ended December 31, 2017 and 2018. Proceeds and gross realized gains from sales of marketable securities were $17,467 and $4, respectively, for the year ended December 31, 2019. The cost of the securities sold was based on the specific identification method and the gross realized gain is recorded as other income, net, in the consolidated statements of operations.

Interest earned on marketable securities was $0, $77 and $6 for the years ended December 31, 2017, 2018 and 2019 respectively, and is recorded within interest (expense) income, net, in the accompanying consolidated statements of operations.

(In thousands, except share and per share amounts)

4. Financial Statement Components

Accounts receivable, net of allowance for doubtful accounts consist of the following:

	As of December 31,	
	2018	2019
Trade accounts receivable	$ 13,620	$ 14,692
Unbilled accounts receivable	11,174	16,200
Allowance for doubtful accounts	(906)	(769)
Other accounts receivable	121	64
Total accounts receivable, net	$ 24,009	$ 30,187

Components of allowance for doubtful accounts are as follows:

	Year ended December 31,	
	2018	2019
Allowance for doubtful accounts:		
Balance, beginning of period	$ (32,463)	$ (906)
Charged to bad debt expense	(460)	(1,543)
Deductions (1)	1,138	1,680
Billings deemed not probable of collection (2)	(357)	—
Write-off of previously outstanding and fully reserved billings related to settlement	24,968	—
Revenue recognized from outstanding billings previously deemed uncollectible related to settlement	6,268	—
Balance, end of period	$ (906)	$ (769)

(1) Write off of uncollectible accounts after all collection efforts have been exhausted.

(2) Represents amounts billed in the period but where collectability is not probable based on customer's collection experience. Amounts were charged to a contra-revenue account.

On January 29, 2018, the Company and Verizon entered into a settlement agreement to resolve an ongoing dispute and litigation with Verizon, which is a CABS customer of the Company. The settlement agreement also resolved Verizon's counter-claims against the Company. Pursuant to the settlement agreement, Verizon made a lump sum payment to the Company on February 8, 2018 of $4,400, which was recognized as revenue. Immediately following receipt of the $4,400 payment, the Company issued to Verizon credits with respect to other CABS amounts previously billed to Verizon and fully reserved of $24,968. The amount credited to Verizon comprised the majority of the allowance for CABS revenue as of December 31, 2017. The Company recognized as revenue $6,268, including the $4,400 payment made on February 8, 2018 and the other current outstanding Verizon CABS receivables which had been previously reserved as uncollectible, but for which collection was no longer in doubt as a result of the settlement. The settlement agreement also specifies certain terms for the Company's CABS billings to Verizon prospectively.

Accrued expenses and other current liabilities consisted of the following:

	As of December 31,	
	2018	2019
Accrued expense	$ 8,292	$ 12,701
Accrued compensation and benefits	7,323	8,284
Accrued sales, use, and telecom related taxes	4,742	5,439
Deferred rent, current portion	298	—
Other accrued expenses	738	904
Total accrued expenses and other current liabilities	$ 21,393	$ 27,328

(In thousands, except share and per share amounts)

5. Right-of-Use Asset and Lease Liabilities

ROU assets represent the Company's right to use an underlying asset for the lease term, and lease liabilities represent the Company's obligation to make lease payments arising from the lease. The Company determines if an arrangement is a lease at inception. Operating lease ROU assets and liabilities are recognized at commencement date based on the present value of lease payments over the lease term. The Company did not have any finance leases as of December 31, 2019. As the Company's leases do not generally provide an implicit rate, the Company uses its incremental borrowing rate based on the information available at commencement date in determining the present value of lease payments. Lease expense for lease payments is recognized on a straight-line basis over the lease term. The Company's lease agreements do not contain any restrictive covenants, variable lease payments or residual value guarantees. All leases with an initial term of 12 months or less are not recorded on the balance sheet and are not material. The Company presents the operating leases in long-term assets and current and long-term liabilities in the accompanying consolidated balance sheet as of December 31, 2019.

The Company leases approximately 216,000 square feet of office space under operating lease agreements that expire at various dates beginning in 2022 and extend through 2025 in several locations within the United States including its headquarters, which is located in Raleigh, NC. The leases contain escalation clauses and various landlord concessions including tenant improvement allowances. On January 1, 2019, the Company entered into an amendment to an office building lease for the Company's headquarters. The amendment provides an additional 30,114 square feet to the previous 87,605 square feet and extends the lease term to January 31, 2024. In addition, this amendment gives the Company the option to extend the lease for an additional five-year term. The amendment to the office building lease commenced in April 2019. On May 29, 2019, the Company further amended the lease to provide an additional 2,322 square feet for a total of 120,041 square feet of office space. This amendment commenced in June 2019.

On April 4, 2019, the Company entered into an amendment to an office building lease. The amendment provides an additional 5,286 square feet to the previous 4,122 square feet for a total of 9,408 square feet of office space and extends the lease term to September 30, 2024. In addition, this amendment gives the Company the option to extend the lease for an additional five-year term. The amendment to the office building lease commenced in July 2019.

On January 1, 2019, the Company entered into an amendment to an office building lease relating to 40,657 square feet of office space, which the Company sub-leases to a related party, Republic Wireless, Inc. ("Republic"). The amendment gives the Company the options to extend the lease for an additional period of approximately 18 months and a subsequent additional five-year term. The amendment to the office building lease commenced in January 2019. On May 29, 2019, the Company further amended the sub-lease to reduce the square feet of office space sub-leased to 17,073. No other terms were amended. The amendment to the office building sub-lease commenced in June 2019.

Future minimum sub-lease receipts required under the non-cancellable lease are as follows:

	As of December 31, 2019
2020	$ 447
2021	457
2022	249
	$ 1,153

As of December 31, 2019, the Company had six leased properties, with remaining lease terms of 2.58 years to 5.67 years, some of which include options to extend the leases for up to five years. None of the options to extend the leases are recognized in operating lease ROU assets or lease liabilities. None of the leases include options to terminate the lease.

(In thousands, except share and per share amounts)

The components of lease expense recorded in the consolidated statement of operations were as follows:

	Year ended December 31, 2019	
Operating lease cost	$	5,548
Sublease income (1)		(643)
Total net lease cost	$	4,905

(1) See Note 15, "Related Parties" to these consolidated financial statements for additional details on sublease income.

Supplemental balance sheet information related to leases was as follows:

Leases	Classification	As of December 31, 2019	
Assets:			
Operating lease	Operating right-of-use asset, net of accumulated amortization (1)	$	21,031
Total leased assets		$	21,031
Liabilities:			
Current			
Operating	Operating lease liability, current	$	4,876
Non-current			
Operating	Operating lease liability, non-current		19,868
Total lease liabilities		$	24,744

(1) Operating lease assets are recorded net of accumulated amortization of $4,269 as of December 31, 2019.

Supplemental cash flow and other information related to leases was as follows:

	Year ended December 31, 2019	
Cash paid for amounts included in the measurement of operating lease liabilities:	$	3,357
Weighted average remaining operating lease term (in years):		4.35
Weighted average operating lease discount rate:		4.98 %

Maturities of operating lease liabilities were as follows:

	As of December 31, 2019	
2020	$	5,907
2021		6,587
2022		6,302
2023		5,926
2024		1,987
Thereafter		949
Total lease payments		27,658
Less: imputed interest		(2,894)
Less: accrued lease incentive		(20)
Total lease obligations		24,744
Less: current obligations		(4,876)
Long-term lease obligations	$	19,868

(In thousands, except share and per share amounts)

Disclosures related to periods prior to adoption of the New Lease Standard

Rent expense was $3,327 and $4,331 in the years ended December 31, 2017 and 2018, respectively.

Future minimum lease payment obligations under non-cancelable operating and finance leases were as follows:

	As of December 31, 2018
2019	$ 5,044
2020	5,180
2021	5,254
2022	3,438
2023	1,399
Thereafter	2,343
	$ 22,658

In conjunction with the sub-lease under the Facilities Service Agreement with Republic, the Company recorded a reduction of rent expense of $949 and $1,005 for the years ended December 31, 2017 and 2018, respectively, which is included in general and administrative expenses in the consolidated statements of operations.

Future minimum sub-lease receipts required under the non-cancellable lease are as follows:

	As of December 31, 2018
2019	$ 1,042
2020	1,065
2021	1,089
2022	594
	$ 3,790

6. Property and Equipment

Property and equipment, net consisted of the following:

	As of December 31,	
	2018	2019
Furniture and fixtures	$ 1,741	$ 2,373
Computer and office equipment	7,662	4,627
Telecommunications equipment	28,889	44,324
Leasehold improvements	2,438	5,263
Software	1,805	2,018
Internal-use software development	16,293	17,952
Automobile	10	10
Total cost	58,838	76,567
Less—accumulated depreciation	(33,702)	(34,913)
Total property and equipment, net	$ 25,136	$ 41,654

(In thousands, except share and per share amounts)

The Company capitalizes the costs to design software for internal use related to the development of its platform during the application development stage of the projects. The costs are primarily comprised of salaries and benefits of the projects' engineers and product development teams. Internally developed software is reported at cost less accumulated amortization. Amortization begins once the project is substantially complete and ready for its intended use. The Company amortizes the asset on a straight-line basis over the useful life, which is estimated to be three years. Costs incurred prior to the application development stage, maintenance activities or minor upgrades are expensed in the period incurred. Unamortized software development costs were approximately $4,355 and $5,746 as of December 31, 2018 and 2019, respectively.

Amortization expense related to capitalized software development costs were $2,133, $1,482 and $2,024 for the years ended December 31, 2017, 2018 and 2019 respectively.

The Company recognized an impairment of $81, $158 and $275 during the years ended December 31, 2017, 2018 and 2019, respectively, related to capitalized software development costs that provided no future benefit and therefore were impaired. This expense is reflected within cost of revenue in the accompanying consolidated statements of operations.

The Company capitalized $2,942, $2,028 and $3,612 of software development costs in the years ended December 31, 2017, 2018 and 2019, respectively.

The Company recognized depreciation expense, which includes amortization of capitalized software development costs, as follows:

	Year ended December 31,		
	2017	**2018**	**2019**
Cost of revenue	$ 4,315	$ 4,490	$ 6,583
Research and development	81	161	268
Sales and marketing	27	51	112
General and administrative	450	568	2,055
Total depreciation expense	$ 4,873	$ 5,270	$ 9,018

7. Intangible Assets

Intangible assets, net consisted of the following as of December 31, 2018:

	Gross Amount	**Accumulated Amortization**	**Net Carrying Value**	**Amortization Period**
				(Years)
Customer relationships	$ 10,396	$ (4,071)	$ 6,325	20
Other, definite lived	3,933	(3,933)	—	2 - 7
Licenses, indefinite lived	764	—	764	Indefinite
Total intangible assets, net	$ 15,093	$ (8,004)	$ 7,089	

Intangible assets, net consisted of the following as of December 31, 2019:

	Gross Amount	**Accumulated Amortization**	**Net Carrying Value**	**Amortization Period**
				(Years)
Customer relationships	$ 10,396	$ (4,591)	$ 5,805	20
Other, definite lived	3,933	(3,933)	—	2 - 7
Licenses, indefinite lived	764	—	764	Indefinite
Total intangible assets, net	$ 15,093	$ (8,524)	$ 6,569	

(In thousands, except share and per share amounts)

Amortization expense for definite lived intangible assets was $839, $554 and $520 for the years ended December 31, 2017, 2018 and 2019, respectively. The remaining amortization period for definite lived intangible assets is 11 years.

Future estimated amortization expense for definite lived intangible assets is as follows:

	As of December 31, 2019
2020	$ 520
2021	520
2022	520
2023	520
2024	520
Thereafter	3,205
	$ 5,805

Costs associated with the acquisition and transfer of the CLEC perpetual licenses from other entities have been capitalized and have an indefinite life. The Company evaluates these indefinite lived intangible assets on an annual basis to assess if any impairment exists. The Company performed its annual assessment on December 31, 2018 and 2019 and concluded no impairment exists.

8. Debt

On March 1, 2019, the Company amended and restated its Credit and Security Agreement with KeyBank National Association ("KeyBank"). The agreement is for a $25,000 revolving loan, which includes a swing line of up to $1,000 and limits letters of credit commitments to a maximum of $2,500. The term of the amended and restated Credit and Security Agreement is three years and matures on March 1, 2022. Loans under the Credit Agreement will bear interest at the highest of (i) the bank's prime rate, (ii) the federal funds effective rate plus 0.5 percent, and (iii) the London Interbank Offered Rate plus 1.00 percent. This agreement requires that a specified minimum liquidity amount must be maintained in cash and cash equivalents at all times and that the Company meet a minimum revenue clause on a quarterly basis.

In connection with amending its Credit and Security Agreement on March 1, 2019, the Company incurred $142 in debt issuance costs. Unamortized debt issuance costs from the original Credit and Security Agreement of $106 were recorded as interest expense. In addition, the Company incurred and capitalized $25 of periodic loan fees. As of December 31, 2018, unamortized debt issuance costs, which were included in prepaid expenses and other current assets in the accompanying consolidated balance sheets, were $136. As of December 31, 2019 the outstanding debt issuance costs are $125, of which $70 are included in prepaid expenses and other current assets and $55 are included in other long-term assets.

On June 4, 2019, KeyBank and Pacific Western Bank entered into an Assignment and Acceptance Agreement, whereby KeyBank, as the Assignor, sold and assigned $10,000 of the Company's Revolving Credit Commitment to Pacific Western Bank, the Assignee. KeyBank retains $15,000 of the Revolving Credit Commitment.

As of December 31, 2018 and December 31, 2019, the Company had $0 outstanding on the revolving loan and was in compliance with all financial and non-financial covenants for all periods presented. The available borrowing capacity under the revolving loan was $25,000 as of December 31, 2019.

(In thousands, except share and per share amounts)

9. Segment and Geographic Information

The Company has two reportable segments, CPaaS and Other. Segments are primarily evaluated based on revenue and gross profit. The Company does not allocate operating expenses, interest expense or income tax expense to its segments. Accordingly, the Company does not report such information. Additionally, the Chief Operating Decision Maker does not evaluate the Company's operating segments using discrete asset information. The segments share the majority of the Company's assets. Therefore, no segment asset information is reported.

	Year ended December 31,		
	2017	2018	2019
CPaaS			
Revenue	$ 131,572	$ 164,415	$ 197,944
Cost of revenue	75,859	94,296	110,343
Gross profit	$ 55,713	$ 70,119	$ 87,601
Other			
Revenue	$ 31,383	$ 39,698	$ 34,650
Cost of revenue	13,403	13,849	14,616
Gross profit	$ 17,980	$ 25,849	$ 20,034
Consolidated			
Revenue	$ 162,955	$ 204,113	$ 232,594
Cost of revenue	89,262	108,145	124,959
Gross profit	$ 73,693	$ 95,968	$ 107,635

The Company's long-lived assets were primarily held in the United States as of December 31, 2018 and December 31, 2019. As of December 31, 2018 and December 31, 2019, long-lived assets held outside of the United States were $0 and $2,924, respectively.

The Company generates its revenue primarily in the United States. Revenue by geographic area is detailed in the table below (which is determined based on the customer billing address):

	Year ended December 31,		
	2017	2018	2019
CPaaS			
United States	$ 131,263	$ 164,135	$ 192,506
International	309	280	5,438
Total	$ 131,572	$ 164,415	$ 197,944
Other			
United States	$ 31,130	$ 39,432	$ 33,664
International	253	266	986
Total	$ 31,383	$ 39,698	$ 34,650

10. Stockholders' Equity

Prior to the IPO, the Company had three classes of stock: 1) Series A redeemable convertible preferred stock ("Series A preferred stock"), 2) Old Class A common stock, and 3) Old Class B common stock.

On October 19, 2017, the Company's Board of Directors approved, and on October 23, 2017 the Company effected, a 2.5-to-1 split of its common stock. In connection with the common stock split, each share of outstanding common stock, option to purchase common stock and warrant to purchase common stock was increased to 2.5 shares of common stock and the exercise price of each outstanding option or warrant to purchase common stock was proportionately decreased. The stock split has been reflected retrospectively in these consolidated financial statements. In connection with the stock split, the conversion ratio of each share of outstanding Series A preferred stock was also adjusted such that each share of outstanding Series A preferred stock converted into 2.5 shares of Old Class A common stock after the 2.5-to-1 split.

Redeemable Convertible Preferred Stock

As of December 31, 2016, the Company had 710,000 issued and outstanding shares of Series A preferred stock.

On November 9, 2017, each share of Series A preferred stock converted into 2.5 shares of Old Class A common stock at the stockholders' option resulting in the issuance of 1,775,000 shares of Old Class A common stock.

Preferred Stock

On November 9, 2017, the Company filed its second amended and restated certificate of incorporation and authorized 10,000,000 shares of undesignated preferred stock, par value $0.001, of which no shares were issued and outstanding as of December 31, 2018 and 2019.

Common Stock

As of December 31, 2016, the Company had two classes of common stock: (1) Old Class A common stock and (2) Old Class B common stock. The Old Class A common stock had one vote per share and the Old Class B common stock had no voting rights.

As of December 31, 2016, there were 11,779,975 shares of Old Class A common stock issued and outstanding at $0.001 par value per share.

As of December 31, 2016, there were 18,590 shares of Old Class B common stock issued and outstanding at $0.001 par value per share.

On November 9, 2017, the Company filed its second amended and restated certificate of incorporation. Upon the effectiveness of the Company's second amended and restated certificate of incorporation and the effectiveness of the Company's second amended and restated bylaws, i) each share of Old Class A common stock was reclassified as one share of Class B common stock with ten votes per share, ii) each share of Old Class B common stock was reclassified as one share of Class A common stock with one vote per share. Consequently, the Series A preferred stock, that had previously converted into 2.5 shares of the Old Class A common stock, at the option of the holder, was converted into 1,775,000 shares of Class B common stock.

Subsequent to the effectiveness of the Company's second amended and restated certificate of incorporation, the Company's common stock consists of 120,000,000 authorized shares, par value $0.001 per share, of which the authorized Class A common stock consists of 100,000,000 shares and the authorized Class B common stock consists of 20,000,000 shares as of December 31, 2018 and 2019.

As of December 31, 2018 and 2019, there were 12,912,747 and 18,584,478 shares, respectively, of Class A common stock issued and outstanding at $0.001 par value per share.

As of December 31, 2018 and 2019, there were 6,510,732 and 4,927,401 shares, respectively, of Class B common stock issued and outstanding at $0.001 par value per share.

Shares of Class B common stock are convertible into shares of Class A common stock upon the stockholder's voluntary written notice to the Company's transfer agent or a transfer by the stockholder, subject to limited exceptions for transfers for estate planning purposes.

Voting Rights

(In thousands, except share and per share amounts)

The holders of Class A common stock and Class B common stock have identical rights, except that holders of Class A voting common stock are entitled to one vote per share of Class A common stock and holder of Class B common stock are entitled to ten votes per share of Class B common stock.

Dividends

Any dividends or distributions paid or payable to the holders of shares of Class A common stock and Class B common stock shall be paid pro-rata, on an equal priority. During the years ended December 31, 2017, 2018 and 2019, no dividends were declared.

Dividend payments are subject to a restriction by the Company's Credit and Security Agreement prohibiting the Company to pay any dividends or any other distribution or payment on account of or in redemption, retirement or purchase of any capital stock through the term of the agreement.

Reserved Shares

The Company had reserved shares of Class A common stock for issuance under stock-based award agreements as follows:

	As of December 31,	
	2018	**2019**
Stock options issued and outstanding	1,937,370	853,399
Nonvested restricted stock units issued and outstanding	324,252	392,351
Stock-based awards available for grant under the 2017 Plan	896,760	1,310,354
	3,158,382	2,556,104

11. Stock Based Compensation

2010 Stock Option Plan

As of July 26, 2010, the Company adopted the 2010 Equity Compensation Plan (the "2010 Plan"). On August 24, 2017, the 2010 Plan was amended to provide for a total of 3,466,275 shares of common stock reserved for issuance under the 2010 Plan.

Eligible plan participants include employees, directors and consultants. The 2010 Plan permits the granting of incentive stock options and non-qualified stock options.

On November 9, 2017, the 2010 Plan was terminated in connection with the Company's IPO. Accordingly, no shares are available for future issuance under the 2010 Plan. However, the 2010 Plan continues to govern the terms and conditions of the outstanding awards granted thereunder.

On November 9, 2017, the Company filed its second amended and restated certificate of incorporation. Upon the effectiveness of the Company's second amended and restated certificate of incorporation and the effectiveness of the Company's second amended and restated bylaws, options exercisable into shares of Old Class A common stock and Old Class B common stock became exercisable into shares of Class B common stock and Class A common stock, respectively.

2017 Incentive Award Plan

The Company's 2017 Incentive Award Plan (the "2017 Plan") became effective on November 9, 2017. The 2017 Plan provides for the grant of stock options, including incentive stock options and non-qualified stock options, stock appreciation rights, restricted stock, dividend equivalents, restricted stock units, and other stock or cash based awards to employees, consultants and directors of the Company. A total of 1,050,000 shares of the Company's Class A common stock were originally reserved for issuance under the 2017 Plan. These available shares automatically increase each January 1, beginning on January 1, 2018, by 5% of the number of shares of the Company's Class A common stock outstanding on the final day of the immediately preceding calendar year. On January 1, 2019, the shares available for grant under the 2017 Plan were automatically increased by 645,637 shares.

The terms of the stock option grants are determined by the Company's Board of Directors. The Company's stock options vest based on terms of the stock option agreements, which is generally over four years. The stock options have a contractual life of ten years.

Restricted stock units ("RSU") granted under the 2017 Plan are subject to a time-based vesting condition. The compensation expense related to these awards is based on the grant date fair value of the RSUs and is recognized on a ratable basis over the applicable service period. The Company granted restricted stock units to its non-employee Board of Directors, some of which vested immediately while others vest 25% as of each calendar quarter immediately following the grant date. Certain RSUs awarded to executives vest over four years with 50% vesting in the first year in 12.5% increments on each calendar quarter immediately following the grant date and the remaining 50% earned over years two, three and four. Other RSUs awarded to executives and employees generally are earned over a service period of four years.

Stock OptionsThe following summarizes the stock option activity for the periods presented:

	Number of options outstanding	Weighted-average exercise price (per share)	Weighted-average remaining contract life (in years)	Aggregate intrinsic value (in thousands)
Outstanding as of December 31, 2018	1,937,370	$ 7.41	4.00	$ 64,596
Granted	—	—		
Exercised	(1,075,482)	6.84		57,159
Forfeited or cancelled	(8,489)	12.36		
Outstanding as of December 31, 2019	853,399	$ 8.07	3.41	$ 47,770
Options vested and exercisable at December 31, 2019	752,402	$ 7.27	2.88	$ 42,722
Options vested and expected to vest as of December 31, 2019	851,389	$ 8.06	3.40	$ 47,672

Aggregate intrinsic value is computed based on the difference between the option exercise price and the fair value of the Company's common stock as of December 31, 2019 based on the Company's Class A common stock price as reported on the NASDAQ Global Select Market.

The weighted average grant-date fair value of stock options granted was $7.72 and $11.10 for the years ended December 31, 2017 and 2018, respectively. No options were granted for the year ended December 31, 2019.

The total estimated grant date fair value of options vested was $1,299, $979 and $729 for the years ended December 31, 2017, 2018 and 2019, respectively.

As of December 31, 2019, total unrecognized compensation cost related to all non-vested stock options was $519, which will be amortized over a weighted-average period of 1.42 years.

(In thousands, except share and per share amounts)

Restricted Stock Units

The following summarizes the restricted stock unit activity for the periods presented:

	Number of awards outstanding	Weighted-average grant date fair value (per share)
Nonvested RSUs as of December 31, 2018	324,252	$ 26.95
Granted	241,376	44.76
Vested	(163,944)	32.79
Forfeited or cancelled	(9,333)	37.60
Nonvested RSUs as of December 31, 2019	392,351	$ 35.22

As of December 31, 2019, total unrecognized compensation cost related to non-vested RSUs was $11,252, which will be amortized over a weighted-average period of 2.76 years.

Stock-Based Compensation Expense

The Company recognized total stock-based compensation expense as follows:

	Year ended December 31,		
	2017	2018	2019
Cost of revenue	$ 80	$ 114	$ 211
Research and development	155	555	1,461
Sales and marketing	172	511	1,199
General and administrative (1) (2)	1,396	2,159	3,755
Total	$ 1,803	$ 3,339	$ 6,626

(1) On September 1, 2017, the Company reached a separation agreement with an executive. The agreement resulted in a modification of the former employee's 194,234 outstanding options to purchase common stock, which accelerated the vesting period and extended the exercise period, resulting in the recognition of $394 of additional stock compensation expense for the year ended December 31, 2017.

(2) On December 21, 2018, the Company reached a separation agreement with an executive. The agreement resulted in a modification of the former employee's 17,725 non-vested restricted stock units, which accelerated the vesting period, resulting in the recognition of $535 of additional stock compensation expense for the year ended December 31, 2018.

12. Commitments and Contingencies

Operating Leases

The Company leases office space under operating lease agreements that expire over the next 5.67 years. See Note 5, "Right-of-Use Asset and Lease Liabilities" to the consolidated financial statements for additional details on the Company's operating lease commitments.

(In thousands, except share and per share amounts)

Contractual Obligations

On October 25, 2015, the Company entered into an agreement with a telecommunications service provider. The service agreement requires the Company to pay a monthly recurring charge beginning on January 1, 2016 associated with the services received. The service agreement is non-cancellable and contains annual minimum commitments of $1,200, to be fulfilled over five years or for as long as the Company continues to receive services from this vendor. In addition, as of December 31, 2019 the Company has $8,565 in other non-cancellable purchase obligations, consisting of primarily network equipment maintenance and software license contracts, of which $4,915 will be fulfilled within a year.

Legal Matters

The Company is involved as a defendant in various lawsuits alleging that the Company failed to bill, collect and remit certain taxes and surcharges associated with the provision of 911 services pursuant to applicable laws in various jurisdictions. In August 2016, the Company received a Civil Investigative Demand from the Consumer Protection Division of the North Carolina Department of Justice, though the Company has not been served with a complaint in connection with that investigation. The North Carolina Department of Justice is investigating the billing, collection and remission of certain taxes and surcharges associated with 911 service pursuant to applicable laws of the State of North Carolina.

While the results of these legal proceedings cannot be predicted with certainty, in the opinion of management, the ultimate resolution of these matters will not have a material adverse effect on the Company's financial position or results of operations.

13. Employee Benefit Plan

The Company sponsors a defined contribution 401(k) plan which allows eligible employees to defer a portion of their compensation. The Company, at its discretion, may make matching contributions. The Company made matching contributions of $806, $1,117 and $1,731 for the years ended December 31, 2017, 2018 and 2019, respectively.

14. Income Taxes

The following table presents domestic and foreign components of income (loss) before income taxes for the tax years ended December 31, 2017, 2018 and 2019:

	Year ended December 31,		
	2017	2018	2019
United States	$ 12,889	$ 7,053	$ (15,229)
International	—	—	5
Income (loss) before income taxes	$ 12,889	$ 7,053	$ (15,224)

(In thousands, except share and per share amounts)

(Provision) benefit for income taxes from operations consists of the following:

	Year ended December 31,		
	2017	**2018**	**2019**
Current:			
Federal	$ (448)	$ 162	$ 81
State	(302)	(125)	132
Foreign	—	—	3
Total	(750)	37	216
Deferred:			
Federal	(5,983)	8,945	15,205
State	(185)	1,888	2,297
Total	(6,168)	10,833	17,502
Income tax (provision) benefit	$ (6,918)	$ 10,870	$ 17,718

The following table presents a reconciliation of the statutory federal tax rate and the Company's effective tax rate for the years ended December 31, 2017, 2018 and 2019:

	Year ended December 31,		
	2017	**2018**	**2019**
Federal Tax Rate	34.0 %	21.0 %	21.0 %
State Tax Rate	4.7	6.3	3.1
Non-deductible expenses	1.2	1.7	(1.6)
Research credit	(1.5)	(13.6)	7.2
Stock-based compensation	0.1	(168.0)	88.6
Deferred tax rate change	16.1	(0.7)	(0.3)
Other	(0.9)	(0.8)	(1.6)
Total	53.7 %	(154.1)%	116.4 %

(In thousands, except share and per share amounts)

The following table presents the significant components of the Company's net deferred tax assets:

	As of December 31,	
	2018	**2019**
Deferred tax assets:		
Allowance for doubtful accounts	$ 57	$ 97
Accrued liabilities	2,755	2,083
Operating lease liabilities	—	6,335
Deferred revenue	734	1,682
Intangibles	85	—
Stock-based compensation - deferred tax asset	3,486	2,109
Tax credits	2,690	3,710
Net operating losses	11,359	30,835
Other deferred tax assets	61	90
Net deferred tax assets	21,227	46,941
Deferred tax liabilities:		
Property and equipment	2,993	5,793
Goodwill	729	855
Intangibles	—	41
Operating lease assets	—	5,295
Other liability	146	96
Total deferred tax liabilities	3,868	12,080
Net deferred tax asset	$ 17,359	$ 34,861

The Company's accounting for deferred taxes involves the evaluation of a number of factors concerning the realizability of its net deferred tax assets. The Company primarily considered the historic performance of Bandwidth, the nature of the Company's deferred tax assets and the timing, likelihood and amount, if any, of future taxable income during the periods in which those temporary differences and carryforwards become deductible. Based on an analysis of these factors, the Company determined that in 2019 no valuation allowance against deferred tax assets was required.

As of December 31, 2019, the Company had approximately $125,367 in federal net operating loss carryforwards and $5,078 in federal tax credits. All federal net operating loss carryforwards were generated after the enactment of the Tax Cuts and Jobs Act (the "Act") and as such do not expire, but can only be utilized to offset up to 80% of taxable income in any given year. The federal tax credits start to expire at various dates beginning in 2032.

As of December 31, 2019, the Company had approximately $79,890 in state net operating loss carryforwards. If not utilized, some state net operating loss carryforwards will expire at various dates beginning in 2023.

(In thousands, except share and per share amounts)

A reconciliation of the beginning and ending amount of unrecognized tax benefits is as follows:

	Year ended December 31,	
	2018	2019
Unrecognized tax benefits—January 1,	$ 731	$ 1,046
Gross increases—tax positions in prior period	56	—
Gross decreases—tax positions in prior period	—	(15)
Gross increases—tax positions in current period	287	367
Lapse of statute of limitations	(28)	—
Unrecognized tax benefits—December 31,	$ 1,046	$ 1,398

If the $1,398 of unrecognized tax benefit is recognized, it would impact the effective tax rate.

The Company has not incurred any material tax interest or penalties with respect to income taxes in the years ended December 31, 2017, 2018 and 2019.

The Company expects no material changes in the twelve months following December 31, 2019 in its uncertain tax positions.

The Company files U.S. federal income tax returns as well as income tax returns in many U.S. states. The tax years 2014 - 2018 remain open to examination by the major jurisdictions in which the Company is subject to tax due to the carryforward of net operating losses.

15. Related Parties

On April 20, 2015, the Company created a wholly owned subsidiary, Republic, which was incorporated in Delaware. On November 30, 2016, the Company completed a pro-rata distribution of the common stock of Republic to its stockholders of record as of the close of business. Each of its stockholders received one share of Republic common stock for each share of Bandwidth common or redeemable convertible preferred stock held as of the close of business on November 30, 2016.

In addition, the Company distributed $30,000 in cash to Republic in connection with the Spin-Off. Accordingly, the net assets distributed to the stockholders in connection with the Spin-Off was $28,899. Bandwidth has not otherwise provided nor does it intend to provide financial support to Republic.

Given the nature of the Spin-Off transaction, the equity holders of Bandwidth are comprised of substantially the same individuals and entities that are the equity owners of Republic. The Company determined the equity owners of Republic are related parties of Bandwidth. As described below, the Company has certain involvement with Republic via ongoing services arrangements, with these ongoing services arrangements creating a variable interest in Republic. The Company assessed the relationship with Republic under guidance for variable interest entities, and because investors in Republic have disproportionate voting rights, the Company concluded that Republic is a VIE.

Republic is a provider of Wi-Fi centric mobile services directly to retail consumers. Bandwidth determined it is not the primary beneficiary of Republic, as Bandwidth and its related parties do not individually have power to direct the activities that most significantly impact Republic's economic performance and power is not shared. Bandwidth's involvement with Republic involves providing certain support services through the Transition Services Agreement, which does not give it power over key activities. Key activities are directed by the Board of Directors Republic, which require majority approval. Bandwidth does not have direct representation on the Board of Republic and is not able to exert power over its key activities. Bandwidth does not have an implicit variable interest in Republic. Republic is financed primarily through the cash distribution in connection with the Spin-off and its own ongoing operations.

The Company's maximum exposure to loss relating to this variable interest entity is limited to amounts due under the service agreements between Bandwidth and Republic as described further below.

The Company believes that for US Federal income tax purposes, the Spin-Off qualifies as tax-free for Republic, Bandwidth and its stockholders. The Company entered into a tax sharing agreement with Republic that governs rights and obligations after the Spin-Off regarding income taxes and other taxes, including tax liabilities and benefits, attributes, returns and contests.

In connection with the Spin-Off on November 30, 2016, the Company and Republic entered into certain agreements in order to govern the ongoing relationships between the two companies after the Spin-Off and to provide for an orderly transition. The agreements include a Transition Services Agreement, Facilities Sharing Agreement, Tax Sharing Agreement, and Master Services Agreement. The equity holders of Bandwidth pre-initial public offering are comprised of substantially the same individuals and entities that are the equity owners of Republic.

The Transition Services Agreement specified certain services to be provided by the Company for a period of up to two years from the Spin-Off, which ended in November 2018. These services included insurance administration, billing and collections, and other technical support as well as legal services related to intellectual property. The Company was compensated by Republic for these services based on costs incurred by the Company. The Company received net compensation under the Transition Services Agreement of $575 and $80 for the years ended December 31, 2017 and 2018, respectively, which is included in general and administrative expenses in the consolidated statements of operations. No amounts were due to the Company under the Transition Services Agreement as of December 31, 2018.

The Facilities Sharing Agreement specifies that the Company will sublet office space to Republic for at least 63 months. The Company recorded a reduction of rent expense under the Facilities Sharing Agreement of $949, $1,005 and $643 for the years ended December 31, 2017, 2018 and 2019, respectively, which is included in general and administrative expenses in the consolidated statements of operations. No amounts were due to the Company under the Facilities Sharing Agreement as of December 31, 2018 and 2019.

The Tax Sharing Agreement governs rights and obligations after the Spin-Off regarding income taxes and other taxes, including tax liabilities and benefits, attributes, returns and contests. There were no amounts outstanding or payable under this agreement as of December 31, 2018 and 2019.

The Master Services Agreement specifies certain wholesale telecommunications services to be provided by the Company. The agreement is cancellable at any time by either party. The Company provided telecommunication services to Republic of $2,451, $3,884 and $2,602 for the years ended December 31, 2017, 2018 and 2019, respectively. The Company recognized such amounts as revenue in the accompanying consolidated statements of operations. As of December 31, 2018 and 2019, the Company had a receivable of $327 and $161, respectively, under the Master Services Agreement.

On March 1, 2019, an amendment to the current Master Services Agreement was executed. Pursuant to the terms of the new agreement, Republic receives reduced pricing on its messaging services, effective April 1, 2019. All other terms and conditions of the existing agreement remain. On June 20, 2019, Republic executed a further amendment to the current Master Services Agreement. Pursuant to the terms of the June 20, 2019 amendment, Republic receives reduced pricing on its outbound voice services effective on June 20, 2019. Republic also executed a revenue commitment schedule on June 20, 2019. Pursuant to the revenue commitment schedule, Republic agreed to spend a minimum of $100 per month during the 11-month period commencing July 1, 2019 through May 31, 2020.

Subsequent to the expiration of the 180-day IPO blackout window on May 9, 2018, Republic employees that held Bandwidth stock options began exercising their options. Upon exercise, Bandwidth withholds the employee tax amounts due from the proceeds. Bandwidth had collected on behalf of, and remitted withholding tax to, Republic of $0, $9,213 and $1,781 for the years ended December 31, 2017, 2018 and 2019 respectively. There were no amounts outstanding or payable as of December 31, 2018 and 2019.

On September 30, 2019, the Company entered into a services agreement with Republic. Pursuant to the terms of the new agreement, Republic receives services performed by the Company's legal department, effective September 30, 2019. The Company is compensated by Republic for these services based on costs incurred by the Company. The Company received net compensation under this agreement of $31 for the year ended December 31, 2019, which is included in general and administrative expenses in the consolidated statements of operations. As of December 31, 2019, the Company had a receivable of $10 under this agreement.

16. Basic and Diluted Income per Common Share

During the year ended December 31, 2017, the Company used the two-class method to compute net income per common share, because it had issued securities, other than common stock, that contractually entitled the holders to participate in dividends and earnings. These participating securities included the Company's redeemable convertible preferred stock which had non-forfeitable rights to participate in any dividends declared on the Company's common stock. The two-class method requires earnings for the period to be allocated between common stock and participating securities based upon their respective rights to receive distributed and undistributed earnings.

Under the two-class method, for periods with net income, basic net income per common share is computed by dividing the net income attributable to common stockholders by the weighted average number of shares of common stock outstanding during the period. Net income attributable to common stockholders is computed by subtracting from net income the portion of current period earnings that the participating securities would have been entitled to receive pursuant to their dividend rights had all of the period's earnings been distributed. No such adjustment to earnings is made during periods with a net loss, as the holders of the participating securities have no obligation to fund losses.

Diluted net income per common share is computed under the two-class method by using the weighted average number of shares of common stock outstanding, plus, for periods with net income attributable to common stockholders, the potential dilutive effects of stock options and warrants. The Company analyzed the potential dilutive effect of any outstanding dilutive securities under the "if-converted" method and treasury-stock method when calculating diluted earnings per share, in which it is assumed that the outstanding participating securities convert into common stock at the beginning of the period or date of issuance, if later. The Company reports the more dilutive of the approaches (two-class or "if-converted") as its diluted net income per share during the period.

Subsequent to the IPO in November 2017, the Company no longer had outstanding securities other than common stock, which required holders' participation in dividends and earnings; therefore, the Company was no longer required to calculate EPS under the two-class method. Basic net income per share is computed by dividing net income by the weighted-average number of shares of common stock outstanding during the period. Diluted net income per share is computed by giving effect to all potential shares of common stock, including stock options, stock related to unvested restricted stock awards, and outstanding warrants to the extent dilutive.

(In thousands, except share and per share amounts)

The components of basic and diluted income per share are as follows:

	Year ended December 31,		
	2017	2018	2019
Earnings per share			
Net income	$ 5,971	$ 17,923	$ 2,494
Less: net income allocated to participating securities	644	—	—
Net income attributable to common stockholders	$ 5,327	$ 17,923	$ 2,494
Net income per share:			
Basic	$ 0.42	$ 0.96	$ 0.11
Diluted	$ 0.37	$ 0.85	$ 0.10
Weighted Average Number of Common Shares Outstanding			
Basic	12,590,221	18,573,067	22,640,461
Dilutive effect of stock options, restricted stock units, and warrants	1,952,949	2,567,315	1,283,316
Diluted	14,543,170	21,140,382	23,923,777

The following common share equivalents have been excluded from the calculation of weighted-average common shares outstanding, because the effect is anti-dilutive for the periods presented:

	Year ended December 31,		
	2017	2018	2019
Anti-dilutive disclosure			
Series A redeemable convertible preferred stock outstanding	1,522,123	—	—
Stock options issued and outstanding	50,604	—	—

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

None.

Item 9A. Controls and Procedures

Evaluation of disclosure controls and procedures

Our management, with the participation of our Chief Executive Officer and our Chief Financial Officer, have evaluated our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act) as of the end of the period covered by this Annual Report on Form 10-K. Based on that evaluation, our Chief Executive Officer and our Chief Financial Officer have concluded that, as of the end of the period covered by this Annual Report on Form 10-K, our disclosure controls and procedures are designed at a reasonable assurance level and are effective to provide reasonable assurance that information we are required to disclose in reports that we file or submit under the Exchange Act is recorded, processed, summarized, and reported within the time periods specified in SEC rules and forms, and that such information is accumulated and communicated to our management, including our Chief Executive Officer and Chief Financial Officer, as appropriate, to allow timely decisions regarding required disclosure.

Management's Annual Report on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Exchange Act Rules 13a-15(f) and 15d-15(f). Under the supervision and with the participation of our management, including our Chief Executive Officer and Chief Financial Officer, we conducted an evaluation of the effectiveness of our internal control over financial reporting as of December 31, 2019 based on the guidelines established in the Internal Control—Integrated Framework (2013 framework) issued by the Committee of Sponsoring Organizations of the Treadway Commission. Our internal control over financial reporting includes policies and procedures that provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external reporting purposes in accordance with GAAP. Based on the results of our evaluation, our management concluded that our internal control over financial reporting was effective as of December 31, 2019.

The effectiveness of our internal control over financial reporting as of December 31, 2019 has been audited by Ernst & Young LLP, an independent registered public accounting firm, as stated in its report which is included in Item 8 of this Annual Report on Form 10-K.

Changes in internal control over financial reporting

There were no changes in our internal control over financial reporting identified in connection with the evaluation required by Rule 13a-15(d) and 15d-15(d) of the Exchange Act during the quarter ended December 31, 2019, that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Inherent limitation on the effectiveness of internal control

The effectiveness of any system of internal control over financial reporting, including ours, is subject to inherent limitations, including the exercise of judgment in designing, implementing, operating, and evaluating the controls and procedures, and the inability to eliminate misconduct completely. Accordingly, any system of internal control over financial reporting, including ours, no matter how well designed and operated, can only provide reasonable, not absolute assurances. In addition, 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. We intend to continue to monitor and upgrade our internal controls as necessary or appropriate for our business, but cannot assure you that such improvements will be sufficient to provide us with effective internal control over financial reporting.

Item 9B. Other Information.

Not applicable.

PART III

Item 10. Directors, Executive Officers and Corporate Governance

The information required by this item is incorporated by reference to our Proxy Statement relating to our 2020 Annual Meeting of Shareholders. The Proxy Statement will be filed with the Securities and Exchange Commission within 120 days of the fiscal year ended December 31, 2019.

Codes of Business Conduct and Ethics

Our board of directors has adopted a Code of Business Conduct and Ethics that applies to all officers, directors and employees, which is available on our website at (https://investors.bandwidth.com/corporate-governance/governance-overview) under “Governance Documents”. We intend to satisfy the disclosure requirement under Item 5.05 of Form 8-K regarding amendments to, or waiver from, a provision of our Code of Business Conduct and Ethics and by posting such information on the website address and location specified above.

Item 11. Executive Compensation

The information required by this item is incorporated by reference to our Proxy Statement relating to our 2020 Annual Meeting of Shareholders. The Proxy Statement will be filed with the Securities and Exchange Commission within 120 days of the fiscal year ended December 31, 2019.

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

The information required by this item is incorporated by reference to our Proxy Statement relating to our 2020 Annual Meeting of Shareholders. The Proxy Statement will be filed with the Securities and Exchange Commission within 120 days of the fiscal year ended December 31, 2019.

Item 13. Certain Relationships and Related Transactions and Director Independence

The information required by this item is incorporated by reference to our Proxy Statement relating to our 2020 Annual Meeting of Shareholders. The Proxy Statement will be filed with the Securities and Exchange Commission within 120 days of the fiscal year ended December 31, 2019.

Item 14. Principal Accountant Fees and Services

The information required by this item is incorporated by reference to our Proxy Statement relating to our 2020 Annual Meeting of Shareholders. The Proxy Statement will be filed with the Securities and Exchange Commission within 120 days of the fiscal year ended December 31, 2019.

PART IV

Item 15. Exhibits and Financial Statement Schedules

(a) The following documents are filed as part of this report:

1. Financial Statements

    See Index to Financial Statements at Item 8 herein.

2. Financial Statement Schedules

    Schedules not listed above have been omitted because they are not required, not applicable, or the required information is otherwise included.

3. Exhibits

Exhibit Index

Exhibit number	Description of Exhibit	Form	File No.	Exhibit	Filing Date
2.1	Reorganization Agreement, dated as of November 30, 2016, by and between Bandwidth.com, Inc. and Republic Wireless, Inc.	S-1	333-220945	2.1	10/13/2017
3.1	Second Amended and Restated Certificate of Incorporation.	10-Q	001-38285	3.1	12/14/2017
3.2	Second Amended and Restated Bylaws.	10-Q	001-38285	3.2	12/14/2017
4.1	Investors' Rights Agreement.	S-1	333-220945	4.2	10/13/2017
4.2	Form of Buy-Sell Agreement.	S-1	333-220945	4.3	10/13/2017
4.3	Description of Registrant's Securities.				Filed herewith
10.1	Form of Indemnification Agreement between Bandwidth Inc. and each of its Executive Officers and Directors.	S-1A	333-220945	10.2	10/30/2017
10.2	2001 Stock Option Plan and forms of awards thereunder.	S-1	333-220945	10.3	10/13/2017
10.3	2010 Equity Compensation Plan and forms of awards thereunder.	S-1	333-220945	10.4	10/13/2017
10.4	Employment Agreement, dated as of October 1, 2008, by and between Bandwidth.com, Inc. and John Murdock.	S-1	333-220945	10.5	10/13/2017
10.5	Employment Agreement, dated as of May 3, 2010, by and between Bandwidth.com, Inc. and W. Christopher Matton.	S-1	333-220945	10.6	10/13/2017
10.6	Employment Agreement, dated as of September 16, 2011, by and between Bandwidth.com, Inc. and Jeff Hoffman.	S-1	333-220945	10.7	10/13/2017
10.7	Employment Agreement, dated as of January 1, 2015, as amended on March 9, 2017, by and between Bandwidth.com, Inc. and David A. Morken.	S-1	333-220945	10.8	10/13/2017
10.8	Office Lease, by and between Venture Center LLC and Bandwidth.com, Inc., dated January 22, 2013, as amended to date.	S-1	333-220945	10.11	10/13/2017
10.9	Sublease, by and between Allied Telesis Capital Corporation and Bandwidth.com, Inc., dated December 1, 2015.	S-1	333-220945	10.12	10/13/2017
10.10	Facilities Sharing Agreement, by and between Bandwidth.com, Inc. and Republic Wireless, Inc., dated November 30, 2016.	S-1	333-220945	10.13	10/13/2017
10.11	Transition Services Agreement, by and between Bandwidth.com, Inc. and Republic Wireless, Inc., dated November 30, 2016.	S-1	333-220945	10.14	10/13/2017
10.12	Transition Services Agreement, by and between Republic Wireless, Inc. and Bandwidth.com, Inc., dated November 30, 2016.	S-1	333-220945	10.15	10/13/2017
10.13	Tax Sharing Agreement, by and between Bandwidth.com, Inc. and Republic Wireless, Inc., dated November 30, 2016.	S-1	333-220945	10.16	10/13/2017
10.14	Employee Matters Agreement, by and between Bandwidth.com, Inc. and Republic Wireless, Inc., dated November 30, 2016.	S-1	333-220945	10.17	10/13/2017
10.15	Master Services Agreement, by and between Bandwidth.com, Inc. and Republic Wireless, Inc., dated November 30, 2016.	S-1	333-220945	10.18	10/13/2017
10.16	Master Service Agreement, by and between Level 3 Communications, LLC and Bandwidth.com, Inc, dated March 14, 2008, as amended to date.	S-1	333-220945	10.19	10/13/2017
10.17	Form of Conversion Lock-up Agreement between Bandwidth Inc. and the Key Holders.	S-1A	333-220945	10.20	10/30/2017
10.18	2017 Incentive Award Plan, and forms of award agreements thereunder.	S-1A	333-220945	10.21	10/30/2017

10.19	Office Lease, by and between Keystone-Centennial II, LLC and Bandwidth.com, Inc., dated January 12, 2018.	10-K	001-38285	10.22	2/26/2018
10.20	Office Lease, by and between WP Propco III, LLC and Bandwidth Inc., dated January 1, 2019, Venture III amendment.	10-K	001-38285	10.23	2/15/2019
10.21	Office Lease, by and between WP Propco III, LLC and Bandwidth Inc., dated January 1, 2019, Venture I amendment.	10-K	001-38285	10.24	2/15/2019
10.22	Credit and Security Agreement, dated as of November 4, 2016 as amended and restated as of March 1, 2019, among Bandwidth Inc., KeyBank National Association, and KeyBanc Capital Markets Inc.	8-K	001-38285	10.1	3/04/2019
10.23	Employment Agreement, dated April 10, 2019, between the Company and Jeffrey A. Hoffman.	8-K	001-38285	10.1	4/12/2019
10.24	Amended Facilities Sharing Agreement, by and between Bandwidth.com, Inc. and Republic Wireless, Inc., dated May 29, 2019.	8-K	001-38285	10.1	6/3/2019
10.25	Bill of Sale, dated May 29, 2019.	8-K	001-38285	10.2	6/3/2019
10.26	Assignment and Acceptance Agreement, between KeyBank National Association and Pacific Western Bank, dated June 4, 2019.	10-Q	001-38285	10.4	8/2/2019
10.27	Revenue Commitment Schedule, by and between Bandwidth Inc. and Republic Wireless, Inc., dated July 1, 2019.	10-Q	001-38285	10.5	8/2/2019
10.28	Services Agreement, by and between Bandwidth Inc. and Republic Wireless, Inc. dated September 30, 2019.	10-Q	001-38285	10.1	11/7/2019
10.29	Employment Agreement, dated as of December 6, 2019, by and between Bandwidth.com, Inc. and W. Christopher Matton.				Filed herewith
10.30	Employment Agreement, dated as of December 6, 2019, by and between Bandwidth.com, Inc. and Rebecca Bottorff.				Filed herewith
10.31	Employment Agreement, dated as of December 6, 2019, by and between Bandwidth.com, Inc. and Noreen Allen.				Filed herewith
21.1	List of subsidiaries of Bandwidth Inc.				Filed herewith
23.1	Consent of Ernst & Young LLP, Independent Registered Public Accounting Firm.				Filed herewith
31.1	Certificate of the Chief Executive Officer pursuant to Exchange Act Rules 13a-14(a) and 15d-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 13a-14(a) and 15d-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 and Chief Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act 2002.				Furnished herewith
101.INS	XBRL Instance Document - the Instance Document does not appear in the interactive data file because its XBRL tags are embedded within the Inline XBRL Document.				Filed herewith
101.SCH	XBRL Taxonomy Schema Document.				Filed herewith
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document.				Filed herewith
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document.				Filed herewith
101.LAB	XBRL Taxonomy Extension Label Linkbase Document.				Filed herewith
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document.				Filed herewith

* The certifications furnished in Exhibit 32.1 hereto are deemed to accompany this Annual Report 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.

Item 16. Form 10-K Summary

None.

SIGNATURES

Pursuant to the requirements of the Section 13 or 15(d) of the Securities Exchange Act of 1934, as amended, the Registrant has duly caused this report 10-K to be signed on its behalf by the undersigned, thereunto duly authorized.

BANDWIDTH INC.

Date:	February 21, 2020	By:	/s/ David A. Morken
			David A. Morken Chief Executive Officer (Principal Executive Officer)
Date:	February 21, 2020	By:	/s/ Jeffrey A. Hoffman
			Jeffrey A. Hoffman Chief Financial Officer (Principal Accounting and Financial Officer)
Date:	February 21, 2020	By:	/s/ John C. Murdock
			John C. Murdock Director
Date:	February 21, 2020	By:	/s/ Brian D. Bailey
			Brian D. Bailey Director
Date:	February 21, 2020	By:	/s/ Lukas M. Roush
			Lukas M. Roush Director
Date:	February 21, 2020	By:	/s/ Douglas A. Suriano
			Douglas A. Suriano Director

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Exhibit 31.1

**CERTIFICATION PURSUANT TO RULE 13a-14(a) OR 15d-14(a) OF
THE SECURITIES EXCHANGE ACT OF 1934,
AS ADOPTED PURSUANT TO SECTION 302 OF
THE SARBANES-OXLEY ACT OF 2002**

I, David A. Morken, certify that:

1. I have reviewed this Annual Report on Form 10-K of Bandwidth Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a—15(e) and 15d—15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
    a. Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
    b. Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
    c. Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
    d. Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

e. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
    a. All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
    b. Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: February 21, 2020

/s/ David A. Morken

David A. Morken
Chief Executive Officer
(Principal Executive Officer)

Exhibit 31.2

CERTIFICATION PURSUANT TO RULE 13a-14(a) OR 15d-14(a) OF THE SECURITIES EXCHANGE ACT OF 1934, AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Jeffrey A. Hoffman certify that:

1. I have reviewed this Annual Report on Form 10-K of Bandwidth Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a—15(e) and 15d—15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
    a. Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
    b. Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
    c. Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
    d. Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

e. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
    a. All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
    b. Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: February 21, 2020

/s/ Jeffrey A. Hoffman

Jeffrey A. Hoffman
Chief Financial Officer
(Principal Accounting and Financial Officer)

Exhibit 32.1

CERTIFICATION OF CHIEF EXECUTIVE OFFICER AND CHIEF FINANCIAL OFFICER PURSUANT TO 18 U.S.C. SECTION 1350, AS ADOPTED PURSUANT TO SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

Pursuant to the requirement set forth in Rule 13a-14(b) of the Securities Exchange Act of 1934, as amended, (the "Exchange Act") and Section 1350 of Chapter 63 of Title 18 of the United States Code (18 U.S.C. §1350), David A. Morken, Chief Executive Officer of Bandwidth Inc. (the "Company"), and Jeffrey A. Hoffman, Chief Financial Officer of the Company, each hereby certifies that, to the best of his knowledge:

1. The Company's Annual Report on Form 10-K for the full year ended December 31, 2019, to which this Certification is attached as Exhibit 32.1 (the "Periodic Report"), fully complies with the requirements of Section 13(a) or Section 15(d) of the Exchange Act; and
2. The information contained in the Periodic Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: February 21, 2020

/s/ David A. Morken

David A. Morken
Chief Executive Officer
(Principal Executive Officer)

/s/ Jeffrey A. Hoffman

Jeffrey A. Hoffman
Chief Financial Officer
(Principal Accounting and Financial Officer)

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LEADERSHIP

David A. Morken
Chief Executive Officer & President

Jeffrey A. Hoffman
Chief Financial Officer

W. Christopher Matton
General Counsel and Secretary

Noreen Allen
Chief Marketing Officer

Rebecca Bottorff
Chief People Officer

Ryan Henley
Chief Customer Officer

Scott Mullen
Chief Technology Officer

Kade Ross
Chief Information Officer

Gabriela Gonzalez
Controller and Assistant Treasurer

Scott Taylor
Treasurer

BOARD OF DIRECTORS

David A. Morken
Chairman of the Board, Chief Executive Officer and President of Bandwidth

Brian D. Bailey [1*, 2*]
Managing Partner, Carmichael Partners

John C. Murdock
Former President, Bandwidth

Lukas M. Roush [1, 2]
Managing Partner, Sovereign's Capital

Douglas A. Suriano [1, 2]
Former Senior Vice President and General Manager, Oracle Communications

[1] Audit Committee [2] Compensation Committee
*Committee Chairman

bandwidth

CORPORATE INFORMATION

Corporate Headquarters
900 Main Campus Drive, Suite 100
Raleigh, NC 27606

Stock Transfer Agent and Registrar
American Stock Transfer & Trust Company
6201 15th Avenue
Brooklyn, NY 11219
www.astfinancial.com

+1 718-921-8300 +1 800-937-5449

Independent Registered Public Accounting Firm
Ernst & Young LLP
4130 Parklake Avenue, Suite 500
Raleigh, NC 27612

SEC Annual Report on Form 10-K
Additional copies of our fiscal 2019 Annual Report on Form 10-K, as filed with the Securities and Exchange Commission, including the financial statements and the financial statement schedules but not including the exhibits contained therein, are available without charge upon written request, directed to:

Investor Relations Department
Bandwidth Inc.
900 Main Campus Drive, Suite 100
Raleigh, NC 27606

We will furnish any exhibit to our fiscal 2019 Annual Report on Form 10-K upon receipt of payment for our reasonable expenses in furnishing such exhibit.

bandwidth