

UNITED STATES SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549
FORM 10-K

(Mark One)

ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
 For the fiscal year ended December 31, 2018

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: 001-33852

VirnetX Holding Corporation
 (Exact name of registrant as specified in its charter)

Delaware
 (State or other jurisdiction of incorporation or organization)

77-0390628

(I.R.S. Employer Identification Number)

308 Dorla Court, Suite 206
 Zephyr Cove, Nevada
 (Address of principal executive offices)

89448
 (Zip Code)

Registrant's telephone number, including area code: 775-548-1785
 Former name, former address and former fiscal year, if changed since last report: N/A
 Securities registered pursuant to Section 12(b) of the Act:

| Title of Class | Name of Exchange on Which Registered |
|--|--------------------------------------|
| Common Stock, par value \$0.0001 per share | NYSE American LLC |

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

None

Indicate by check mark if the Registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes o 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 o 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 o

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

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

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, 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. (Check one):

Large accelerated filer o Accelerated filer Smaller reporting company o
 Non-accelerated filer o Emerging growth company o

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. o

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

The aggregate market value of the voting and non-voting common equity held by non-affiliates of the Registrant as of June 30, 2018, was \$189,351,416 based upon the closing price of the common shares of the Registrant on June 29, 2018. This calculation does not reflect a determination that certain persons are affiliates of the Registrant for any other purpose.

68,084,001 shares of Registrant's Common Stock were outstanding as of March 14, 2019.

DOCUMENTS INCORPORATED BY REFERENCE

The information required by Part III of this Annual Report on Form 10-K, to the extent not set forth herein, is incorporated by reference from the Registrant's definitive proxy statement to be filed with the Securities and Exchange Commission not later than 120 days after December 31, 2018 relating to the Registrant's 2019 Annual Meeting of Stockholders.

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SPECIAL NOTE REGARDING FORWARD LOOKING STATEMENTS

We have included or incorporated by reference in this Annual Report on Form 10-K (including in the section entitled Management's Discussion and Analysis of Financial Condition and Results of Operations), and from time to time we may make statements that may constitute "forward-looking statements" within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. These forward-looking statements are based upon our current expectations, estimates, assumptions and beliefs concerning future events and conditions and may discuss, among other things, anticipated future performance (including sales and earnings), expected growth, future business plans and costs and potential liability for environmental-related matters. Any statement that is not historical in nature is a forward-looking statement and may be identified by the use of words and phrases such as "anticipates," "believes," "estimates," "expects," "intends," "plans," "predicts," "projects," "will be," "will continue," "will likely result in," and similar expressions. These statements include our beliefs and statements regarding general industry and market conditions and growth rates, as well as general domestic and international economic conditions. Readers are cautioned not to place undue reliance on forward-looking statements. Forward-looking statements are necessarily subject to risks, uncertainties and other factors, many of which are outside our control, which could cause actual results to differ materially from such statements and from our historical results and experience. These risks, uncertainties and other factors include, but are not limited to those described in Item 1A - Risk Factors of this Annual Report on Form 10-K and elsewhere in the Annual Report and those described from time to time in our future reports filed with the Securities and Exchange Commission. Readers are cautioned that it is not possible to predict or identify all the risks, uncertainties and other factors that may affect future results and that the risks described herein should not be considered to be a complete list. Any forward-looking statement speaks only as of the date on which such statement is made, and we undertake no obligation to update or revise any forward-looking statement, whether as a result of new information, future events or otherwise.

Among others, the forward-looking statements appearing in this annual report that may not occur include statements that:

- We have been awarded damages in the amount of \$439.7 million in the *VirnetX Inc. v. Cisco Systems, Inc. et al.* (Case 6:10-CV-00417-LED) ("Apple I") litigation and \$595.9 million in the *VirnetX Inc. v. Apple, Inc.* (Case 6:12-CV-00855-LED) ("Apple II") litigation. Taken together, these statements may imply that we may soon receive over \$1 billion in cash. Recently United States Court of Appeals for the Federal Circuit ("USCAFC") issued a Rule 36 order affirming the District Court Judgment in the Apple I case. However, (1) Apple has appealed the awards in both of the Apple I and Apple II litigations and the court's or jury's decisions may be reversed or amended upon appeal, or (2) we may be unsuccessful in our appeal of certain actions by the patent trial and appeals board that have been initiated by Apple or other parties -- if any of these occur, they may have the effect of thwarting entirely, or reducing and delaying payments to us. The continuation of these litigations is distracting to our management and expensive, and this distraction and expense may continue.
- We have undertaken activities to commercialize our products and patent portfolio in and outside the United States. These statements may imply that the worldwide market for our commercialized products is large and will result in significant future revenues for us. However, commercialization of products such as ours are subject to significant obstacles and risks, including but not limited to a perception by some potential partners and customers that they should await the outcome of the Apple I and Apple II litigations before entering or considering to enter any agreement with us, and that or other factors may lead us to be unsuccessful in obtaining further licensing agreements or making arrangements or entering contracts which create significant future revenues for us.

PART I

Item 1. Business

The Company

We are an Internet security software and technology company with patented technology for secure communications including 5G and 4G LTE security. Our software and technology solutions, including our Secure Domain Name Registry and GABRIEL Connection Technology™, are designed to facilitate secure communications and provide the security platform required by next-generation Internet-based applications such as instant messaging, or IM, voice over Internet protocol, or VoIP, mobile services, streaming video, file transfer, remote desktop and Machine-to-Machine, or M2M communications. Our technology generates secure connections on a “zero-click” or “single-click” basis, significantly simplifying the deployment of secure real-time communication solutions by eliminating the need for end-users to enter any encryption information. Our portfolio of intellectual property is the foundation of our business model. We currently own approximately 185 total patents and pending applications, including 70 U.S. patents/patent applications and 115 foreign patents/validations/pending applications. Our patent portfolio is primarily focused on securing real-time communications over the Internet, as well as related services such as the establishment and maintenance of a secure domain name registry. Our patented methods also have additional applications in the key areas of device operating systems and network security for Cloud services, M2M communications in the new initiatives like “Smart City”, “Connected Car” and “Connected Home” that would connect everything from social services and citizen engagement to public safety, transportation and economic development to the internet to enable more productivity, features and efficiency in our everyday lives. The subject matter of all our U.S. and foreign patents and pending applications relates generally to securing communication over the internet, and as such covers all our technology and other products. Our issued U.S. and foreign patents expire at various times during the period from 2019 to 2024. Some of our issued patents and pending patent applications were acquired by our principal operating subsidiary; VirnetX, Inc., from Leidos, Inc., or Leidos, (f/k/a Science Applications International Corporation, or SAIC) in 2006 and we are required to make payments to Leidos, based on cash or certain other values generated from those patents. The amount of such payments depends upon the type of value generated, and certain categories are subject to maximums and other limitations.

Our product GABRIEL Secure Communication Platform™, unlike other collaboration and communication products and services on the market today, does not require access to user’s confidential data and reduces the threat of hacking and data mining. It enables individuals and organizations to maintain complete ownership and control over their personal and confidential data, secured within their own private network, while enabling authorized secure encrypted access from anywhere at any time. Our GABRIEL Collaboration Suite™ is a set of applications that run on top of our GABRIEL Secure Communication Platform™. It enables seamless and secure cross-platform communications between user’s devices that have our software installed. Our GABRIEL Collaboration Suite™ is available for download and free trial, for Android, iOS, Windows, Linux and Mac OS X platforms, at <http://www.gabrielsecure.com/>. We continue to enhance our products and add new functionality to our products. We will provide updates to new and existing customers as they are released to the general public. Over 80 small and medium businesses have installed our GABRIEL Secure Communication Platform™ and GABRIEL Collaboration Suite™ products in their corporate networks. We intend to continue to expand our customer base with targeted promotions and direct sales initiatives.

We are actively recruiting best-of-breed partners in various vertical markets including, healthcare, finance, government, etc, to help us rapidly expand our enterprise customer base. A number of International Association of Certified ISAO (IACI) including, ISAO's for Maritime & Ports, ISAO Credit Union ISAO, City of Chicago, ISAO Human Trafficking ISAO have chosen to deploy our software as private and secure e-technology to protect their communications. Several other ISAOs are completing their evaluations before deploying our products within their networks.

We have executed a number of patent and technology licenses and intend to seek further licensees for our technology, including our GABRIEL Connection Technology™ to original equipment manufacturers, or OEMs, of chips, servers, smart phones, tablets, e-Readers, laptops, net books and other devices, within the IP-telephony, mobility, fixed-mobile convergence and unified communications markets including 5G and 4G/LTE Advanced.

We have submitted a declaration with the 3rd Generation Partnership Project, or 3GPP, identifying a group of our patents and patent applications that we believe are or may become essential to certain developing specifications in the 3GPP LTE, Systems Architecture Evolution, or SAE project. We have agreed to make available a non-exclusive

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patent license under fair, reasonable and non-discriminatory terms and conditions, with compensation, or FRAND, to 3GPP members desiring to implement the technical specifications identified by us. We believe that we are positioned to license our essential security patents to 3GPP members as they move into deploying 5G and 4G/LTE Advanced devices and solutions.

We have an ongoing GABRIEL Licensing Program under which we offer licenses to a portion of our patent portfolio, technology and software, including our secure domain name registry service, to domain infrastructure providers, communication service providers as well as to system integrators. Our GABRIEL Connection Technology™ License is offered to OEM customers who want to adopt the GABRIEL Connection Technology™ as their solution for establishing secure connections using secure domain names within their products. We have developed GABRIEL Connection Technology™ Software Development Kit (SDK) to assist with rapid integration of these techniques into existing software implementations with minimal code changes and include object libraries, sample code, testing and quality assurance tools and the supporting documentation necessary for a customer to implement our technology. Customers who want to develop their own implementation of the VirnetX patented techniques for supporting secure domain names, or other techniques that are covered by our patent portfolio for establishing secure communication links, can purchase a patent license. The number of patents licensed, and therefore the cost of the patent license to the customer, will depend upon which of the patents are used in a particular product or service. These licenses will typically include an initial license fee, as well as an ongoing royalty.

We have signed Patent License Agreements with Avaya Inc., Aastra USA, Inc., Microsoft Corporation, Mitel Networks Corporation, NEC Corporation and NEC Corporation of America, Siemens Enterprise Communications GmbH & Co. KG, and Siemens Enterprise Communications Inc. to license certain of our patents, for a one-time payment and/or an ongoing royalty for all future sales through the expiration of the licensed patents with respect to certain current and future IP-encrypted products. We have engaged IPVALUE Management Inc. to assist us in commercializing our portfolio of patents on securing real-time communications over the Internet. Under the multi-year agreement, IPVALUE is expected to originate and assist us with negotiating transactions related to patent licensing worldwide with respect to certain third parties.

We believe that the market opportunity for our software and technology solutions is large and expanding as secure domain names are now an integral part of securing the next generation 5G and 4G/LTE Advanced wireless networks and M2M communications in areas including Smart City, Connected Car and Connected Home. We also believe that all 5G and 4G/LTE Advanced mobile devices will require unique secure domain names and become part of a secure domain name registry.

We intend to continue to license our patent portfolio, technology and software, including our secure domain name registry service, to domain infrastructure providers, communication service providers as well as to system integrators. We intend to seek further license of our technology, including our GABRIEL Connection Technology™ to enterprise customers, developers and original equipment manufacturers, or OEMs, of chips, servers, smart phones, tablets, e-Readers, laptops, net books and other devices, within the IP-telephony, mobility, fixed-mobile convergence and unified communications markets including 5G and 4G/LTE.

Our employees include the core development team behind our patent portfolio, technology and software. This team has worked together for over ten years and is the same team that invented and developed this technology while working at Leidos, Inc. (“Leidos”). Leidos is a FORTUNE 500® scientific, engineering and technology applications company that uses its deep domain knowledge to solve problems of vital importance to the nation and the world, in national security, energy and the environment, critical infrastructure and health. The team has continued its research and development work started at Leidos and expanded the set of patents we acquired in 2006 from Leidos, into a larger portfolio of approximately 185 U.S. and Foreign patents, patent validations and pending applications. This portfolio now serves as the foundation of our licensing business and planned service offerings and is expected to generate the majority of our future revenue in license fees and royalties. We intend to continue our research and development efforts to further strengthen and expand our patent portfolio.

Please see Item 7 – Management’s Discussion and Analysis of Financial Condition and Results of Operations – Operations – Research and Development Expenses for a description of our research and development expenses for the past three fiscal years.

We intend to continue using an outsourced and leveraged model to maintain efficiency and manage costs as we grow our licensing business by, for example, offering incentives to early licensing targets or asserting our rights for use of our patents. We also intend to expand our design pilot in participation with leading 5G and 4G/LTE companies (domain infrastructure providers, chipset manufacturers, service providers and others) and build our secure domain name registry.

Industry Overview

We believe that the rapid growth of mobile devices (smartphones/tablets/ultra-mobile PCs), with always-on network access, and need to socially interact with friends and family while maintaining a constant online presence has transformed the “Internet of Web 2.0” into the “The Internet of the People”. It has become an evolving, rich and complex medium used by individuals and businesses to conduct commerce, share information and engage in real-time communications including email, text messaging, IM, and voice and video calls. We believe the user demand for high speed broadband access along with the quality of experience wherever they are and whatever BYOD (bring your own device) they may be using; Mobility, IP video delivery, and the move to cloud have dramatically changed the way service providers deliver services. While wireline networks remain the primary mechanism for delivering premium and high bandwidth services, its growth has held steady compared to the growth of the mobile communications. The cost barrier to obtaining a mobile device with data access has disappeared allowing billions of people to have online access on fixed and mobile networks, and those users accessing social networking websites, using peer-to-peer, or P2P applications, and uploading live content over the internet, which in turn is downloaded by billions, has led to significant growth in packet traffic. Not only is traffic growing and changing in nature, its location of origin and timing has become completely unpredictable. There is a significant impact on the mobile signaling network, brought on by smartphone penetration and consumer use of “chatty” applications that conduct frequent network queries.

Before all the security issues related to the signaling protocols in 4G/Advanced LTE and other hybrid networks could be resolved, some service providers are forging ahead with early deployments of the emerging 5G standard. The researchers are increasingly worried that these existing vulnerabilities may get carried over into the 5G networks. Due to 5G’s high-speed bandwidth along with billions of connected IoT devices with suspected SIM vulnerabilities, an insecure 5G network sets the stage for increasingly widespread attacks with exponentially large number of available attack points. It’s not difficult to imagine a business using IoT sensors within a factory setting and getting shut down due to a DDoS attack.

We believe that as the users become more comfortable with using their smartphones/tablets and other connected devices, they will increasingly treat their mobile and fixed/WiFi networks as a single network and demand seamless transition from one network type to another without any disruption of service. The 4G/LTE standard was developed with the goal of creating a single IP network that is efficient, flexible, open up new business models and services revenues and eventually lead to true “virtual networks” or software-defined networks (SDN). The service providers were forced to perform complete overhaul of their telecom network infrastructure in order to move from TDM paradigm to next generation IP networks based on 4G/LTE for dealing with this rapidly growing demand. Before these network overhauls could be completed, some service providers decided to label their hybrid 3.5G/HSPA+/partial LTE implementations as 4G networks in order to mitigate the risk of losing revenue. We believe this has led to significant confusion and misunderstanding among users.

Adding to the demand for mobile and fixed broadband services is the fast adoption of connected machines or devices, or embedded systems capable of M2M communication. These M2M communications are made possible by a device (non-phone/tablet/pc such as a sensor) that is attached to a machine to capture an event that is relayed over a network via 3G/4G routers or fixed broadband lines, delivering data or events (such as temperature, location, consumption, heart rate, stress levels, light, movement, altitude and speed) to applications creating an “Internet of Things” or IoT. As the service providers start deploying true 4G (Long Term Evolution-Advanced, or LTE-Advanced) and this pace picks up, we believe that almost every device will get its own unique identity and a high-speed connection to the internet over a high-speed IP (Internet Protocol) based telecommunication network making it an “Internet of Everything”.

We believe that growing security concerns and vulnerabilities in a large number of use-case scenarios due to the inherent “open” nature of this architecture can throttle the successful adoption of these technologies. Security can no longer exist as a point solution, and enterprises are currently upgrading core IT infrastructure (systems, networks, and management) to integrate security into everything. Because of the complexity of today’s networks and the

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requirement to connect users from any location at any time on any device, enterprise buyers looking to improve security posture have to evaluate everything from software solutions for smartphones to routers and switches with integrated security, massive security appliances for data centers, cloud-based security services, and security solutions for virtualized environments and public and private clouds.

We believe that telecommunication markets are rapidly changing and presenting new challenges to the equipment and service providers, including but not limited to increasing user demand for mobile, always-on connections with multiple devices. We also believe that traffic growth, video acceleration, cloud services and a rapidly growing number of subscribers challenge currently available network architectures and that, because of this, service providers and carriers will eventually use a single network for fixed and mobile communications, private/premium communications and Internet access, in spite of the difficulties involved challenging their business models and forcing the consideration of new network architectures. We believe that LTE technology will deliver users the benefits of faster data speeds and new services by creating a new radio access technology that's optimized for IP-based traffic and offers operators a simple upgrade path from 3G networks. Smartphones are multi-functional devices that handle a wide variety of business-critical applications and support increasingly complex functions including enhanced data processing, Internet access, e-mail access, calendars and scheduling, contact management and the ability to view electronic documents. Users have continual access to these applications while on the move making them an increasingly essential business tool for the mobile worker. These devices enable mobile workers to have similar functionality inside or outside the office thereby increasing employee efficiency. However, it is critical that this mobile environment have the same level of security as an enterprise's internal network.

Embedded mobile broadband computing devices include PCs, netbooks, tablets, and mobile Internet devices (MIDs) with embedded mobile broadband modems to enable Internet access via a mobile broadband network. A growing number of these devices are now shipping enabled with LTE/4G. Mobile Internet devices (MIDs) include handheld mobile Internet devices; e.g. eReader, gaming console, digital picture frame, digital camera, with embedded mobile broadband modems. Mobile broadband routers have mobile broadband modems or antenna as the broadband connection; have multiple Ethernet ports and integrated wireless access points for local area connectivity and bandwidth sharing; can have integrated hub or switch; may have an integrated stateful firewall or IPSec VPN and are also known as mobile hotspot routers.

Machine-to-Machine, or M2M, connected devices, or embedded systems; connected machines are fast becoming the eyes and ears of the enterprise. By adding sensors and networking technologies to the products they sell and the equipment they employ, companies are finding new ways to gather powerful insights and use new forms of data, thus creating a vast "internet of things". This communication is made possible by a device (such as an intelligent sensor) that is attached to a machine to capture an event, such as temperature, location, consumption, heart rate, stress levels, light, movement, altitude and speed, that is relayed over a network delivering data to applications. The potential applications for this technology are numerous and as such include smart meters in energy and utilities (the "smart grid"), connected vehicles in automotive and logistics, heart monitors in healthcare, RFID tagged inventory in retail and manufacturing, and digital signage in media and communications to name a few. Another fast-growing application is in the wearable technology products namely, fitness and wellness, infotainment (information-based media content), healthcare and medical, and industrial and military. The fitness and wellness segment comprise products like smart clothing and smart sensors, activity monitors, sleep sensors and others, whereas the Infotainment sector consists of products like smart watches, heads-up displays, smart glasses and others. The products like continuous glucose monitor, drug delivery, monitors, wearable patches and others have been covered under healthcare and medical segment and products like hand worn terminals, augmented reality headsets and others have been mentioned under industrial and military segment. We believe that the large revenue potential for M2M services that has attracted the attention of carriers globally risks being thwarted by the growing security concerns in M2M applications. Porous security is exposing vulnerabilities in a large number of use-case scenarios, including Automobiles, energy management systems, telemedicine, and telemetry. While built-in security is a high priority in all other information and communication technologies, it is yet to be considered, even at a basic level, in most M2M applications. The rapid and successful adoption of M2M in automobiles, healthcare, industrial installations, and consumer homes may be jeopardized if communication security is not designed in to all M2M devices and applications. All these new devices will require a unique identity addressable by a secure domain name and all their communications, with application servers and other devices, completely secured automatically and on-demand. IP mobility services require an environment where wired and wireless phones work together with Internet Protocol to deliver services (voice, video, data and combinations thereof) uniformly across multiple access networks, including, among others, LTE, WiMAX, WiFi cellular and fixed.

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Voice over LTE (“VoLTE”) technology is the foundation for communication services on any device over LTE, Wi-Fi and 5G. VoLTE is delivered via the IP Multimedia Subsystem (“IMS”) and enables operators to offer high-quality, simultaneous voice and LTE data services on smartphones and other devices. There are currently more than 1,000 VoLTE-enabled device models, supporting different regions and frequencies. Wi-Fi calling is built on the same core network systems as VoLTE and enables operators to extend their voice service to places with limited cellular coverage. Over 50 Wi-Fi calling networks have been launched in more than 30 countries (Source: GSMA March 2017).

Based on our estimates, using several market data sources, we believe that growth in 5G network subscriptions will start picking up in 2020 and forecast to reach 2.6 billion in 2025, equivalent to more than one in every five mobile connections. Worldwide LTE based subscriptions are expected to grow from 3.6 billion in 2018 to 5.9 billion by 2024. VoLTE is now available in more than 125 networks spanning across approximately 60 countries. Based on recent measurements in operator networks, the number of VoLTE subscriptions is now projected to grow from 1.4 million to 6.1 billion by the end of 2024, making up more than 90 percent of all LTE subscriptions globally. Mobile Data Traffic per device, including smartphone and tablets, is expected to increase from 13.5 Gigabytes per month in 2018 to over 29 Gigabytes per month in 2023. We believe in order to realize the full functionality of IP mobility, several challenges including security must be overcome. When users are mobile, connections and data need to cross multiple network boundaries, each of which poses a security threat. Wireless networks may be threatened or compromised by rogue users who enter through insecure wireless access points. We believe that providing authenticated access to the M2M networks and enterprise applications are important requirements and represent a significant market opportunity for our patented technology and secure domain names to provide users or machines fully authenticated secure access on a “zero-click” or “single-click” basis.

Our Solutions

Our software and technology solutions, including our secure domain name registry, our patents and our GABRIEL Connection Technology™ are designed to secure real-time communications over the Internet. Our technology uses industry standard encryption methods with our patented Domain Name System, or DNS, lookup mechanisms to create a secure communication link between users intending to communicate in real time over the Internet. Our technology can be built into network infrastructure, operating systems or silicon chips developed for a communication or computing device to secure real-time communications over the Internet between numerous devices. Our technology automatically encrypts data allowing organizations and individuals to establish communities of secure, registered users and transmit information between multiple devices, networks and operating systems. These secure network communities, which we call secure private domains, or SPDs, are designed to be fully-customizable and support rich content applications such as IM, VoIP, mobile services, streaming video, file transfer and remote desktop in a completely secure environment. Our approach is a unique and patented solution that we believe provides the robust security platform required by these rich content applications and real-time communications over the Internet. We believe the key benefits and features of our technology include the following:

- **Automatic and seamless to the user.** After a one-time registration, users connect securely on a “zero-click” or “single-click” basis.
- **Secure data communications.** Users create secure networks with people they trust and communicate over a secure channel.
- **Control of data at all times.** Users can secure and customize their unified communication and collaboration applications such as file sharing and remote desktop with policy-based access and secure presence information.
- **Authenticated users.** Users know they are communicating with authenticated users with secure domain names.
- **Application-agnostic technology.** Our solution provides security at the IP layer of the network by using patented DNS lookup mechanisms to make connections between secure domain names, thereby obviating the need to provide application specific security.

Our Products

Our GABRIEL Secure Communication Platform™, unlike other collaboration and communication products and services on the market today, does not require access to users’ confidential data and reduces the threat of hacking and data mining. It enables individuals and organizations to maintain complete ownership and control over their personal

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and confidential data, secured within their own private network, while enabling authorized secure encrypted access from anywhere at any time. Our GABRIEL Collaboration Suite™ is a set of applications that run on top of our GABRIEL Secure Communication Platform™. It enables seamless and secure cross-platform communications between users' devices. The following applications are included in the current release and can be easily accessed through the GABRIEL interface:

- **Secure chat.** Allows users to quickly send and receive text, files and screen shots
- **Secure share.** Allows users to grant coworkers read/write access to desired folders
- **Secure video/voice.** Provides users ability to conduct audio and/or video conferencing securely with any other GABRIEL user
- **Secure mail.** Allows users to send email and attachments directly from sender to recipient without requiring a centralized mail server
- **Secure sync/backup.** Allows users to quickly push single files or automatically backup your files to one or multiple GABRIEL destinations

Our GABRIEL Collaboration Suite™ is available for download and free trial, for Android, iOS, Windows, Linux and Mac OS X platforms, at <http://www.gabrielsecure.com/>. We continue to enhance our products and add new functionality to our products. We will provide updates to new and existing customers as they are released publicly. Over 80 small and medium businesses have installed our GABRIEL Secure Communication Platform™ and GABRIEL Collaboration Suite™ products in their corporate networks. We intend to continue to expand our customer base with targeted promotions and direct sales initiatives.

Competitive Strengths

We believe the following competitive strengths will enable our success in the marketplace:

- **Unique patented technology.** We are focused on developing innovative technology for securing real-time communications over the Internet and establishing the exclusive secure domain name registry in the United States and other key markets around the world. Our unique solutions combine industry standard encryption methods and communication protocols with our patented techniques for automated DNS lookup mechanisms. Our technology and patented approach enables users to create a secure communication link by generating secure domain names. We currently own approximately 185 total patents and pending applications, including 70 U.S. patents/patent applications and 115 foreign patents/validations/pending applications. Our portfolio includes patents and pending patent applications in the United States and other key markets that support our secure domain name registry service for the Internet.
- **Scalable licensing business model.** We are actively engaged in pursuing additional licensing agreements with OEMs, service providers and system integrators within the IP-telephony, mobility, mobile-to-mobile communications, fixed-mobile convergence and unified communications end-markets.
- **Highly experienced research and development team.** Our research and development team is comprised of nationally recognized network security and encryption technology scientists and experts that have worked together as a team for over ten years. During their careers, this team has developed several cutting-edge technologies for U.S. national defense, intelligence and civilian agencies, many of which remain critical to our national security today. Prior to joining VirnetX, our team worked for Leidos, during which time they invented the technology that is the foundation of our technology, and software. Based on the collective knowledge and experience of our development team, we believe that we have one of the most experienced and sophisticated groups of security experts researching vulnerability and threats to real-time communication over the Internet and developing solutions to mitigate these problems.

Our Strategy

Our strategy is to become the market leader in securing real-time communications over the Internet and to establish our GABRIEL Communications Technology™ as the industry standard security platform. Key elements of our strategy are to:

- Actively recruit partners in various vertical markets, including healthcare, finance, government to help us rapidly expand our enterprise customer base.

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- Promote our Gabriel Secure Communication Platform™ and Gabriel Collaboration Suite™ products in the general market for sale to end-user enterprises, directly and with partners, with targeted promotions and other marketing programs.
- Continue to grow our technology licensing program to commercialize our intellectual property, including our GABRIEL Connection Technology™ by adding more licensees in partnership with IPValue.
- Establish VirnetX as the exclusive universal registry of secure domain names and to enable our customers to act as registrars for their users and broker secure communication between users on different registries.

We have submitted a declaration with the 3rd Generation Partnership Project, or 3GPP, identifying a group of our patents and patent applications that we believe are or may become essential to certain developing specifications in the 3GPP LTE, SAE project. We have agreed to make available a non-exclusive patent license under fair, reasonable and non-discriminatory terms and conditions, with compensation, or FRAND, to 3GPP members desiring to implement the technical specifications identified by us. We have also submitted a number of updates to our original declaration, identifying additional technical specifications that would also require a license to our U.S. and Foreign patents.

License and Service Offerings

We offer a diversified portfolio of license and service offerings focused on securing real-time communications over the Internet, including:

- **VirnetX technology licensing.** Customers who want to develop their own implementation of the VirnetX code module for supporting secure domain names, or who want to use their own techniques that are covered by our patent portfolio for establishing secure communication links, could purchase a technology license. We anticipate that these licenses would typically include an initial license fee, as well as an ongoing royalty. We expect that these licenses will include a one-time delivery of GABRIEL software development kit including object libraries, sample code, testing and quality assurance tools and the supporting documentation necessary for a customer to implement of the techniques we have developed.
- **GABRIEL Connection Technology™ Software Development Kit or SDK.** OEM customers who want to adopt the GABRIEL Connection Technology™ as their solution for establishing secure connections using secure domain names within their products could purchase an SDK license. The software development kit consists of object libraries, sample code, testing and quality assurance tools and the supporting documentation necessary for a customer to implement our technology. These tools are comprised of software for a secure domain name connection test server, a relay test server and a registration test server. We expect that customers would pay an up-front license fee to purchase an SDK license and a royalty fee for every product shipped with the embedded VirnetX code module.
- **Secure domain name registrar service.** Customers, including service providers, telecommunication companies, ISPs, system integrators and OEMs could purchase a license to our secure domain name registrar service. We would provide the software suite and technology support to enable such customers to provision devices with secure domain names and facilitate secure connections between registered devices. This suite includes the following server software modules:
- **Registrar server software.** We anticipate that our registrar server software would enable customers to operate as a secure domain name registrar that provisions devices with secure domain names. The registrar server software is designed to provide an interface for our customers to register new virtual private domains and sub-domain names. This server module must be enrolled with the VirnetX secure domain name master registry to obtain its credentials before functioning as an authorized registrar.
- **Connection server software.** We anticipate that our connection server software would allow customers to provide connection services to enrolled devices. The connection services include registration of presence information for authenticated users and devices, presence information query request services, enforcement of policies and support for communication with peers behind firewalls.
- **Relay server software.** We anticipate that our relay server software would allow customers to dynamically maintain connections and relay data to private IP addresses for network devices that reside behind firewalls.

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Secure domain name registrar service customers will enter into a technology licensing and revenue sharing agreement with VirnetX whereby we will typically receive an up-front licensing fee for the secure domain name registrar technology, as well as ongoing annual royalties for each secure domain name issued by the customer.

- **Secure domain name master registry and connection service.** As part of enabling the secure domain name registrar service, we expect that we will maintain and manage the secure domain name master registry. This service is expected to enroll all secure domain name registrar customers and generate the credentials required to function as an authorized registrar. It also is expected to provide connection services and universal name resolution, presence information and secure connections between authorized devices with secure domain names.
- **Technical support services.** We intend to provide high-quality technical support services to licensees and customers for the rapid customization and deployment of GABRIEL Connection Technology™ in an individual customer's products and services.

Our research and development team is the team responsible for inventing the claimed subject matter of the patents that form the foundation of our technology. This team has worked together for over ten years. We intend to leverage this experience and continue investing in research and development and, over time, expect to strengthen and expand our patent portfolio, technology, and software. While we are currently focused on securing real-time communications over the Internet and establishing the first and only secure domain name registry, we believe our existing and future intellectual property portfolio will extend to additional areas including, among others, network security and operating systems for fixed and mobile devices.

Customers

Our GABRIEL Collaboration Suite™ is available for download and free trial, for Android, iOS, Windows, Linux and Mac OS X platforms, at <http://www.gabrielsecure.com/>. We continue to enhance our products and add new functionality to our products. We will provide updates to new and existing customers as they are released publicly. Over 80 small and medium businesses have installed our GABRIEL Secure Communication Platform™ and GABRIEL Collaboration Suite™ products in their corporate networks. We continue to rapidly expand our customer base with targeted promotions and direct sales initiatives.

We have signed Patent License Agreements with Aastra USA, Inc. Avaya, Inc., Microsoft Corporation, Mitel Networks Corporation, NEC Corporation and NEC Corporation of America, Siemens Enterprise Communications GmbH & Co. KG, and Siemens Enterprise Communications Inc. to license certain of our patents, for a one-time payment and an ongoing royalty for all future sales through the expiration of the licensed patents with respect to certain current and future IP-encrypted products.

We are seeking further licensing of our technology, including our GABRIEL Connection Technology™ to developers and original equipment manufacturers, or OEMs, of chips, servers, smart phones, tablets, e-Readers, laptops, net books and other devices, within the IP-telephony, mobility, fixed-mobile convergence and unified communications markets including 4G/LTE. We have published our royalty rates and guidelines on our website. All forward moving licenses have adhered to these guidelines and have met or exceeded these rates and we will use these rates and guidelines in all future license negotiations.

Marketing and Sales

We plan to employ a leveraged, partner-oriented, marketing strategy for our technology licenses and software product offerings. In 2017, we successfully signed a number of Resellers & Managed Service Provider in various market segments, including, healthcare, finance, government, etc, to assist us in selling our software products to their customers. Some of our key partners include:

- ASCARD MSP (Healthcare)
- Above PAR Advisors (Financial)
- Max Cybersecurity (Government)

In 2019, we plan to continue working on a number of sales and marketing promotions, in the U.S. and Japan, to recruit more resellers and partners along with direct sales programs as we seek to extend out our customer base internationally.

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We plan to directly market our Gabriel Secure Communication Platform™ and Gabriel Collaboration Suite™ products, domain name registry services to our service provider and system integrator customers. We market our Gabriel line of products directly to small and medium businesses using online marketing programs and tools. A number of International Association of Certified ISAO (IACI) including, ISAO's for Maritime & Ports, ISAO Credit Union ISAO, City of Chicago ISAO and Human Trafficking ISAO have chosen to deploy our software as private and secure e-technology to protect their communications. Several other ISAOs are completing their evaluations before deploying our products within their networks.

We expect to leverage our relationship with Leidos, to extend our offering to departments and agencies within the federal government. Leidos is a FORTUNE 500® scientific, engineering and technology applications company that uses its deep domain knowledge to solve problems of vital importance to the nation and the world, in national security, energy and the environment, critical infrastructure, and health. We intend to leverage our sales team for managing current accounts and pursuing sales opportunities with new customers.

In 2017, we began to pursue opportunities to market our GABRIEL™ Collaboration Suite and other products in Japan. In 2017, we entered into an Amended and Restated Revenue Sharing Agreement (the "Revenue Sharing Agreement") and an Amended and Restated Gabriel License Agreement (the "Gabriel License Agreement," together with the Revenue Sharing Agreement, the "PITA Agreements") with Public Intelligence Technology Associates ("PITA") as well as a related engagement letter with Wirthlin, a Dentons Innovation Group Partnership, to facilitate our marketing efforts in Japan. However, since the execution of these agreements, these arrangements have not produced any meaningful results. The engagement letter terminated automatically on July 28, 2017. On March 16, 2018, we delivered a letter to PITA acknowledging the termination of the PITA Agreements but also notifying PITA that, though we consider the PITA Agreements effectively terminated, the letter also constituted a notice of termination pursuant to the relevant termination provisions of each PITA Agreement. More recently, we have begun to explore alternative strategies to pursue opportunities to work with other third parties in Japan, and elsewhere, using an approach that will seek to capitalize on these opportunities in part by placing more emphasis on the use of our own employees.

Competition

We believe our technology and solutions will compete primarily against various proprietary security solutions. We group these solutions into three main categories:

- Proprietary or home-grown application specific security solutions have been developed by vendors and integrated directly into their products for our target markets including IP-telephony, mobility, fixed-mobile convergence, and unified communications. These proprietary solutions have been developed due to the lack of standardized approaches to securing real-time communications. This approach has led to corporate networks that are isolated and, as a result, restrict enterprises to using these next-generation networks within the boundaries of their private network. These solutions generally do not provide security for communications over the Internet or require network administrators to manually exchange keys and other security parameters with each destination network outside their corporate network boundary. The cost-savings and other benefits of IP-based real-time communications are significantly limited by this approach to securing real-time communications.
- A session border controller, or SBC, is a device used in networks to exert control over the signaling and media streams involved in establishing, conducting and terminating VoIP calls. A traditional firewall or network address translation, or NAT, device typically block information like endpoint IP addresses and port numbers required by signaling protocols, such as SIP and XMPP, to reach and communicate with their intended destination. SBCs are used in physical networks to address these limitations and enable real-time session traffic to cross the boundaries created by firewalls and other NAT devices and enable VoIP calls to be established successfully. However, SBCs must decrypt and analyze every single data packet for the information to be transmitted successfully, thereby preventing end-to-end encryption. This network design results in SBCs becoming a single point of congestion on the network, as well as a single point of failure. SBCs are also limited to the physical network they secure.
- SIP firewalls, or SIP-aware firewalls, and application layer gateways, manage and protect the traffic, flow and quality of VoIP and other SIP-related communications. They perform real-time network address translation, dynamic firewall functions; support multiple signaling protocols, and media functionality, allowing secure interconnection and the flow of IP media streams across multiple networks. While SIP

firewalls assist in analyzing SIP traffic transmitted over the corporate network to filter out various threats, they do not necessarily encrypt the traffic. As a result, this traffic is not entirely secure from end-to-end nor is it protected against threats like man-in-middle and eavesdropping.

Intellectual Property and Patent Rights

Our intellectual property is primarily comprised of trade secrets, patented know-how, issued and pending patents, copyrights and technological innovation.

We currently own approximately 185 total patents and pending applications, including 70 U.S. patents/patent applications and 115 foreign patents/validations/pending applications. Our portfolio includes a number of patents that describe unique systems and methods for securing real-time communications over the Internet, as well as related services such as the establishment and maintenance of a secure domain name registry. Our software and technology solutions also may have additional applications relating to operating systems and network security. A complete list of our U.S. patents is available on our website located at www.virnetx.com. Each patent is publicly accessible on the Internet website of the U.S. Patent and Trademark Office at www.uspto.gov. The term of each of our issued U.S. and foreign patents will expire during the period from 2019 to 2024.

Notwithstanding anything to the contrary set forth in any of our filings under the Securities Act of 1933 or the Securities Exchange Act of 1934 that might incorporate future filings, the information set forth on the United States Patent and Trademark Office, or the USPTO Website, shall not be deemed to be a part of or incorporated by reference into any such filings. The Company does not warrant the accuracy, or completeness or adequacy of the USPTO Website, and expressly disclaims liability for errors or omissions on such website.

Assignment of Patents

Some of our issued patents and pending patent applications were acquired by our principal operating subsidiary, VirnetX, Inc., from Leidos, pursuant to an Assignment Agreement dated December 21, 2006, and a Patent License and Assignment Agreement dated August 12, 2005, as amended on November 2, 2006, including documents prepared pursuant to the November amendment, and as further amended on March 12, 2008. We recorded the assignment from Leidos, with the U.S. Patent Office on December 21, 2006.

Key terms of these agreements are as follows:

- Patent Assignment. Leidos, unconditionally and irrevocably conveyed, transferred, assigned and quitclaimed all its right, title and interest in and to the patents and patent applications, as specifically set forth on Exhibit A to the assignment document recorded with the U.S. Patent Office, including, without limitation, the right to sue for past infringement.
- License to Leidos, Outside the Field of Use. Effective March 12, 2008, we granted to Leidos, a non-exclusive, royalty free, fully paid, perpetual, worldwide, irrevocable, sub licensable and transferable right and license permitting Leidos, and its assignees to make, have made, import, use, offer for sale, and sell products and services covered by, and to make improvements to, the patents and patent applications we acquired from Leidos, solely outside our field of use.
- Compensation Obligations. As consideration for the assignment of the patents and for the rights we obtained from Leidos, as amended, we are required to make payments to Leidos, based on cash or certain other values generated from those patents. The amount of such payments depends upon the type of value generated, and certain categories are subject to maximums and other limitations. As of June 30, 2010, we met our maximum royalty payment requirement; however, Leidos is also entitled under certain circumstances to receive a portion of the proceeds paid to us for certain acquisitions of VirnetX and the settlement of certain patent infringement claims of ours.

Government Regulation

The laws governing online secure communications remain largely unsettled, even in areas where there has been legislative action. It may take years to determine whether and how existing laws governing intellectual property, privacy, data protection and libel apply to online communications and media. Such legislation may interfere with the growth in use of online secure communications and decrease the acceptance of online secure communications as a viable solution, which could adversely affect our business.

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Due to the Internet's popularity and increasing use, new laws regulating secure communications may be adopted. These laws and regulations may cover, among other things, issues relating to privacy, data protection, pricing, taxation, telecommunications over the Internet, content, copyrights, distribution and quality of products and services. We intend to comply with all new laws and regulations as they are adopted.

The U.S. government has controlled the authoritative domain name system, or DNS, root server since the inception of the Internet. On July 1, 1997, the President of the United States directed the U.S. Secretary of Commerce to privatize the management of the domain name system in a manner that increases competition and facilitates international participation in its management.

On September 29, 2006, the U.S. Department of Commerce extended its delegation of authority by entering into a new agreement with the Internet Corporation for Assigned Names and Numbers, or ICANN, a California non-profit corporation headquartered in Marina Del Rey, California. ICANN is responsible for managing the accreditation of registry providers and registrars that manage the assignment of top-level domain names associated with the authoritative DNS root directory. Although it is possible to create and manage other DNS root directories privately without accreditation from ICANN, the possibility of conflicting name and number assignments makes it less likely that users would widely adopt a top-level domain name associated with an alternative DNS root directory provided by a non-ICANN-accredited registry service.

Employees

As of December 31, 2018, we had 21 full and part-time employees.

Corporate Overview and History

We are a holding company and conduct our operations through our wholly-owned subsidiary, VirnetX, Inc. VirnetX, Inc., was incorporated in the State of Delaware in August 2005. In November 2006, VirnetX, Inc. acquired certain patents from SAIC, now Leidos. In July 2007, we effected a merger by and among VirnetX, Inc., VirnetX Holding Corporation and a wholly-owned subsidiary of VirnetX Holding Corporation, whereby VirnetX, Inc. merged with, and became, a wholly-owned subsidiary of VirnetX Holding Corporation and VirnetX Holding Corporation issued shares of its common stock to the stockholders of VirnetX, Inc. as consideration for the merger. As a result of this merger, the former security holders of VirnetX, Inc. came to own a majority of our outstanding common stock. On October 29, 2007, we changed our name from PASW, Inc. to VirnetX Holding Corporation.

Available Information

We file or furnish various reports, such as registration statements, periodic and current reports, proxy statements and other materials with the SEC. Our Internet website address is www.virnetx.com. You may obtain, free of charge on our Internet website, copies of our annual report on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, and amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Exchange Act, as soon as reasonably practicable after we electronically file such material with, or furnish it to, the SEC. The information we post is intended for reference purposes only; none of the information posted on our website is part of this report or incorporated by reference herein.

In addition to the materials that are posted on our website, you may read and copy any materials we file with the SEC at the SEC's Public Reference Room at 100 F Street, NE, Washington, DC 20549. You may obtain information on the operation of the Public Reference Room by calling the SEC at 1-800-SEC-0330. The SEC also maintains an Internet site that contains reports, proxy and other information statements, and other information regarding issuers, including us, that file electronically with the SEC. The Internet address of the SEC's Internet site is <http://www.sec.gov>

Item 1A. Risk Factors

Our operations and financial results are subject to various risks and uncertainties, including those described below, which could adversely affect our business, financial condition, results of operations, cash flows, and the trading price of our common and capital stock. You should carefully consider the risks and uncertainties described below in addition to the other information set forth 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 condensed consolidated financial statements and related notes, before making any investment in our common stock. The risks

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and uncertainties described below are not the only ones we face. Additional risks and uncertainties not presently known to us or that we currently believe to be immaterial may also adversely affect our business. If any of these risk factors occur, you could lose substantial value or your entire investment in our shares.

Risks Related to Our Business and Our Financial Reporting:

We are involved and will continue to be involved in litigation defending our patent portfolio, which can be time-consuming and costly, and we cannot anticipate the results.

We spend a significant amount of our financial and management resources to pursue our current litigations. We believe that these litigations and others that we may pursue in the future could continue for years and consume significant financial and management resources. The counterparties to our litigation include large, well-financed companies with substantially greater resources than us. Patent litigation is risky, and the outcome is uncertain, and we cannot assure you that any of our current or future litigation matters will result in a favorable outcome for us. In addition, even if we obtain favorable interim rulings or verdicts, they may be inconsistent with the ultimate resolution of the dispute. Also, we cannot assure you that we will not be exposed to claims or sanctions against us which may be costly or impossible for us to defend. Unfavorable or adverse outcomes may result in losses, exhaustion of financial resources or other adverse effects, which could encumber our ability to develop and commercialize our products.

We may need to raise additional capital to support our business growth, and this capital will be dilutive, may cause our stock price to drop or may not be available on acceptable terms, if at all.

We may need to raise additional capital, which may not be available to us when needed or may not be available on terms acceptable to us, to support our business growth or to respond to business opportunities, challenges or unforeseen circumstances, including sales under our ATM or our universal shelf registration statement. Our ability to obtain additional capital, if and when required, will depend on our business plans, investor demand, our operating performance, the condition of the capital markets, the terms of our current contractual obligations and other factors. If we raise additional funds through the issuance of equity, equity-linked or debt securities, including those under our ATM or our universal shelf registration statement, those securities may have rights, preferences, or privileges senior to the rights of our common stock, and our existing stockholders may experience dilution. Additionally, we are unable to predict the future success of our ATM offering or any other offering. Sales of a substantial number of shares of our common stock in the public market, or the perception that these sales or other financings might occur, could depress the market price of our common stock and could also impair our ability to raise capital through the sale of additional equity securities. If we issue debt securities or incur indebtedness, we could experience increased future payment obligations and a need to comply with restrictive covenants, such as limitations on our ability to incur additional debt, limitations on our ability to acquire, sell or license intellectual property rights and other operating restrictions that could adversely impact our ability to conduct our business. If we are unable to obtain additional capital or are unable to obtain additional capital on satisfactory terms, our ability to continue to support our business growth or to respond to business opportunities, challenges, or other circumstances could be adversely affected, and our business may be harmed.

We have terminated our revenue sharing and licensing arrangement with PITA and we cannot be sure any of our potential alternative strategies in Japan, or elsewhere, will be successful.

As previously disclosed in our public filings, the PITA Agreements terminated in March 2018. PITA may dispute the effectiveness of that termination and litigation, which may be expensive and distracting to management, may ensue. Although we intend to pursue alternative strategies in our expansion efforts in Japan and other countries, including potential partnerships, joint ventures and other arrangements with third parties, we cannot be sure these efforts will be successful or be favorable to us.

We may not be able to capitalize on market opportunities related to our licensing strategy or our patent portfolio.

Our business strategy includes licensing our patents and technology to other companies in order to reach a larger end-user base than we could reach through direct sales and marketing efforts; as such, our business strategy and revenues will depend on intellectual property licensing fees and royalties for the majority of our revenues. We currently derive minimal revenue from licensing activities and we cannot assure you that we will successfully capitalize on our market opportunities or that our current business strategy will succeed. Factors that may affect our ability to execute our current business strategy include, but are not limited to, the following:

- Although to date we have entered into a limited number of settlement and license agreements, we may not be successful in entering into further licensing relationships, or if we are successful in entering into such relationships, the acquisition of them may be expensive, and they, as well as our existing settlement and our existing and pending license agreements may not generate the financial results we expect;
- Third parties challenge to the validity of our patents;
- The pendency of our various litigations may cause potential licensees not to do business with us;
- Intense competition from new and established competitors who may have superior products and services or better marketing, financial or other capacities than we do; and
- The possibility that one or more of our potential customers or licensees develops or otherwise sources products or technologies similar to, competitive with or superior to ours.

If we are not able to adequately protect our patent rights, our business would be negatively impacted.

We believe our patents are valid, enforceable and valuable. Notwithstanding this belief, third parties may make claims of infringement or invalidity claims with respect to our patents and such claims could give rise to material cost for defense or settlement or both, jeopardize or substantially delay a successful outcome of litigation we are or may become involved in, divert resources away from our other activities, limit or cease our revenues related to such patents, or otherwise materially and adversely affect our business. Similar challenges could also prevent us from obtaining additional patents in the future. Additionally, several of our patents are currently, and other patents may in the future be, subject to United States Patent and Trademark Office (“USPTO”) post-grant inter partes review proceedings (“IPR”) which may result in all or part of these patents being invalidated, or the claims of our patents being limited. Unfavorable or adverse outcomes in our litigation or IPRs may result in losses, exhaustion of financial resources, reduction in our ability to enforce our intellectual property rights, or other adverse effects, which could encumber our ability to develop and commercialize our products. Even if we are successful in enforcing our intellectual property rights, our patents may not ultimately provide us with any competitive advantages and may be less valuable than we currently expect. These risks may be heightened in countries other than the United States where laws regarding patent protection are less developed and may be negatively affected by the fact that legal standards in the United States and elsewhere for protection of intellectual property rights in Internet-related businesses are uncertain and still evolving. In addition, there are a significant number of United States and foreign patents and patent applications in our areas of interest, and we expect that significant litigation in these areas will continue and will add uncertainty to the value of certain patents and other intellectual property rights in our areas of interest. If we are unable to protect our intellectual property rights or otherwise realize value from them, our business would be negatively affected.

We can provide no assurances that the licensing of our essential security patents under FRAND will be successful.

At the request of the European Telecommunications Standards Institute (“ETSI”), and the Alliance for Telecommunications Industry Solutions (“ATIS”), we agreed to update our licensing declaration to ETSI and ATIS under their respective Intellectual Property Rights policies. This was in response to our Statement of Patent Holder identifying a group of our patents and patent applications that we believe are or may become essential to certain developing specifications in the 3rd Generation Partnership Project (“3GPP”) Long Term Evolution (“LTE”), Systems Architecture Evolution (“SAE”) project. We will make available a non-exclusive patent license under FRAND (fair, reasonable and non-discriminatory terms and conditions, with compensation) for the patents identified by us that are or become essential, to applicants desiring to implement the Technical Specifications identified by us, as set forth in the updated licensing declaration under the ATIS and ETSI Intellectual Property Rights policies. Our licensing declarations under the ATIS and ETSI Intellectual Property Rights policies may limit our flexibility in

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determining royalties and license terms for certain of our patents. Consequently, we cannot assure you that the licensing of the essential security patents will be successful or that third parties will be willing to enter into licenses with us on reasonable terms or at all, which could have an adverse effect on our business and harm our competitive position.

Because our business is conducted or expected to be conducted in an environment that is subject to rapid change, we may be subject to various developments in regulation, law and consumer preferences to which we may not be able to adapt successfully.

The current regulatory environment for our products and services remains unclear. We can give no assurance that our planned product offerings will be in compliance with laws and regulations of local, state, United States federal or foreign authorities. Further, we can give no assurance that we will not unintentionally violate such laws or regulations or that such laws or regulations will not be modified, or that new laws or regulations will be enacted in the future which would cause us to be in violation of such laws or regulations. For example, Voice-Over-Internet Protocol (“VoIP”) services are not currently subject to all the same regulations that apply to traditional telephony, but it is possible that similar regulations may be applied to VoIP in the future and that these could result in substantial costs to us which could adversely affect the marketability of our products and planned products related to VoIP. For further example, the use of the Internet and private Internet Protocol (“IP”) networks for communication is largely unregulated within the United States, but may become regulated in the future; Additionally, several foreign governments have enacted measures that could restrict or prohibit voice communications services over the Internet or private IP networks.

Our business depends on the growth of instant messaging, VoIP, mobile services, streaming video, file transfer and remote desktop and other next-generation Internet-based applications. A decline in the use of these applications due to complexity or cost of these applications relative to alternate traditional or newly developed communications channels, or development of alternative technologies, could cause a material decline in the number of users in these areas.

More aggressive domestic or international regulation of the Internet in general, and Internet telephony providers and services specifically may materially and adversely affect our business, financial condition, operating results and future prospects.

Our exposure to outside influences beyond our control, including new legislation, court rulings or actions by the United States Patent and Trademark Office, could adversely affect our licensing and enforcement activities and results of operations.

Our licensing and enforcement activities are subject to numerous risks from outside influences, including the following:

- New legislation, regulations or rules related to obtaining patents or enforcing patents could significantly increase our operating costs and decrease our revenue. For instance, the United States Supreme Court has recently modified some tests used by the USPTO in granting patents during the past 20 years which may decrease the likelihood that we will be able to obtain patents and increase the likelihood of challenge of any patents we obtain or license. In addition, the United States recently enacted sweeping changes to the United States patent system under the Leahy-Smith America Invents Act, including changes that transition the United States from a “first-to-invent” system to a “first to file” system and alter the processes for challenging issued patents;
- More patent applications are filed each year resulting in longer delays in getting patents issued by the USPTO;
- Federal courts are becoming more crowded, and as a result, patent enforcement litigation is taking longer; and
- As patent enforcement becomes more prevalent, it may become more difficult for us to voluntarily license our patents.

New legislation, regulations or court rulings related to enforcing patents could harm our business and operating results.

Intellectual property is the subject of intense scrutiny by the courts, legislatures and executive branches of governments around the world. Various patent offices, governments or intergovernmental bodies may implement new legislation, regulations or rulings that impact the patent enforcement process, or the rights of patent holders and such

changes could negatively affect licensing efforts and/or litigations. For example, limitations on the ability to bring patent enforcement claims, limitations on potential liability for patent infringement, lower evidentiary standards for invalidating patents, increases in the cost to resolve patent disputes and other similar developments could negatively affect our ability to assert our patent or other intellectual property rights.

It is impossible to determine the extent of the impact of any new laws, regulations or initiatives that may be proposed, or whether any of the proposals will become enacted as laws. Compliance with any new or existing laws or regulations could be difficult and expensive, affect the manner in which we conduct our business and negatively impact our business, prospects, financial condition and results of operations.

If we experience security breaches, we could be exposed to liability and our reputation and business could suffer.

We expect to retain certain confidential and proprietary customer information in our secure data centers and secure domain name registry, as well as personal data and other confidential and proprietary information relating to our business. It will be critical to our business strategy that our facilities and infrastructure remain secure and are perceived by the marketplace to be secure. Our secure domain name registry operations will also depend on our ability to maintain our computer and telecommunications equipment in effective working order and to reasonably protect our systems against interruption, and potentially depend on protection by other registrars in the shared registration system. The secure domain name servers that we will operate will be critical hardware to our registry services operations. Therefore, we expect to have to expend significant time and money to maintain or increase the security of our products, facilities and infrastructure. Security technologies are constantly being tested by computer professionals, academics and “hackers.” Advances in computer capabilities and the techniques for attacking security solutions, new discoveries in the field of cryptography or other events or developments could result in compromises or breaches of our security measures and could make some or all our products obsolete or unmarketable. Likewise, if any of our products are found to have significant security vulnerabilities, then we may need to dedicate engineering and other resources to eliminate the vulnerabilities and to repair or replace products already sold or licensed to our customers. Despite the security measures that we and our service providers utilize, our infrastructure and that of our service providers may be vulnerable to physical break-ins, computer viruses, attacks by hackers, phishing attacks, social engineering, or similar disruptive problems. It is possible that we may have to expend substantial financial and other resources to address such problems. As a provider of Internet security software and technology, we may be the target of dedicated efforts by hackers and other third parties to overcome or defeat our security measures. Any physical or electronic break-in or other security breach or compromise of the information stored at our secure data centers and domain name registration systems, including any compromise due to human error or employee or contractor malfeasance, may jeopardize the security of information stored on our premises or in the computer systems and networks of our customers. In such an event, we could face significant liability and current or potential customers could be reluctant to use our services. Additionally, any such data security incident, or the perception that one has occurred could also result in adverse publicity, harm to our reputation and competitive position, and adversely affect the market’s perception of the security of electronic commerce and communications over IP networks as well as the security or reliability of our services.

A security breach or other security incident could require a substantial level of financial resources to rectify and otherwise respond to and could result in claims, investigations, and inquiries by private parties or governmental entities that may divert management’s attention and require the expenditure of significant time and resources, and which may cause us to incur substantial fines, penalties, or other liability and related legal and other costs. Any actual or perceived security breach or other security incident may also harm our reputation and make it more difficult or impossible for us to successfully market to others. Any of the foregoing matters could harm our operating results and financial condition.

Privacy and data security concerns, and data collection and transfer restrictions and related domestic or foreign regulations may limit the use and adoption of our solutions and adversely affect our business.

Personal privacy, information security, and data protection are significant issues in the United States, Europe and many other jurisdictions where we have operations or offer our products. The regulatory framework governing the collection, processing, storage and use of confidential and proprietary business information and personal data is rapidly evolving. The United States, federal and various state and foreign governments have adopted or proposed requirements regarding the collection, distribution, use, security and storage of personally identifiable information and other data relating to individuals, and federal and state consumer protection laws are being applied to enforce regulations related to the online collection, use and dissemination of data.

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Further, many foreign countries and governmental bodies, including the European Union (“EU”), where we conduct business, have laws and regulations concerning the collection and use of personal data obtained from their residents or by businesses operating within their jurisdiction. These laws and regulations often are more restrictive than those in the United States. Laws and regulations in these jurisdictions apply broadly to the collection, use, storage, disclosure and security of data that identifies or may be used to identify or locate an individual, such as names, email addresses and, in some jurisdictions, IP addresses.

We also expect that there will continue to be new proposed laws, regulations and industry standards concerning privacy, data protection and information security in the United States, the EU, and other jurisdictions. For example, the European Commission adopted a General Data Protection Regulation (the “GDPR”) that became fully effective on May 25, 2018, superseding prior EU data protection legislation, imposing more stringent EU data protection requirements, and providing for greater penalties for noncompliance. We may be required to incur substantial expense in order to make significant changes to our product and business operations in connection with compliance with the GDPR, all of which may adversely affect our revenue, results of operations, and financial condition. Further, following a referendum in June 2016 in which voters in the United Kingdom approved an exit from the EU, the United Kingdom government has initiated a process to leave the EU (“Brexit”). The United Kingdom, enacted a Data Protection Act that substantially implements the GDPR, but Brexit has created uncertainty with regard to the regulation of data protection in the United Kingdom. In particular, it is unclear how data transfers to and from the United Kingdom will be regulated. Additionally, California enacted legislation in June 2018, the California Consumer Privacy Act (the “CCPA”) that will, among other things, require covered companies to provide new disclosures to California consumers, and afford such consumers new abilities to opt-out of certain sales of personal information, when it goes into effect on January 1, 2020. The CCPA was amended in September 2018, and it is possible that it will be amended again before it goes into effect. It remains unclear what, if any, modifications will be made to the CCPA or how it will be interpreted. The CCPA may require us to modify our data processing practices and policies and to incur substantial costs and expenses in an effort to comply. We cannot yet fully determine the impact these or future laws, regulations and standards may have on our business or operations. Privacy, data protection and information security laws and regulations are often subject to differing interpretations, may be inconsistent among jurisdictions, and may be alleged to be inconsistent with our current or future practices. Additionally, we may be bound by contractual requirements applicable to our collection, use, processing, and disclosure of various types of data, including personal data, and may be bound by, or voluntarily comply with, self-regulatory or other industry standards relating to these matters. These and other requirements could reduce demand for our products, increase our costs, impair our ability to grow our business, or restrict our ability to store and process data or, in some cases, impact our ability to offer our service in some locations and may subject us to liability. Any failure or perceived failure to comply with applicable laws, regulations, industry standards, and contractual obligations may adversely affect our business and may lead to claims and investigations by private parties and governmental entities, the expenditure of legal and other costs, and of substantial time and resources, as well as significant fines, penalties or liabilities. Further, in view of new or modified federal, state or foreign laws and regulations, industry standards, contractual obligations and other legal obligations, or any changes in their interpretation, we may find it necessary or desirable to fundamentally change our business activities and practices or to expend significant resources to modify our product and otherwise adapt to these changes. We may be unable to make such changes and modifications in a commercially reasonable manner or at all, and our ability to develop new products and features could be limited.

The costs of compliance with and other burdens imposed by laws, regulations and standards may limit the use and adoption of our service and reduce overall demand for it. Privacy, information security, and data protection concerns, whether valid or not valid, may inhibit market adoption of our platform, particularly in certain industries and foreign countries.

We expect that we will experience long and unpredictable sales cycles, which may impact our operating results.

The sales cycle between initial customer contact and execution of a contract or license agreement with a customer or purchaser of our products can vary widely. We expect that our sales cycles will be long and unpredictable due to several factors, including but not limited to:

- The need to educate potential customers about our patent rights and our product and service capabilities;
- Our customers’ willingness to invest potentially substantial resources and modify their network infrastructures to take advantage of our products;
- Our customers’ budgetary constraints;

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- The timing of our customers' budget cycles;
- Delays caused by customers' internal review processes; and
- Long sales cycles that may increase the risk that our financial resources are exhausted before we are able to generate significant revenue.

In addition, potential customers of our products include local, state, federal and foreign government authorities. Sales to government authorities can be extended and unpredictable. Government authorities generally have complex budgeting, purchasing, and regulatory processes that govern their capital spending, and their spending is likely to be adversely impacted by economic conditions. In addition, in many instances, sales to government authorities may require field trials and may be delayed by the time it takes for government officials to evaluate multiple competing bids, negotiate terms, and award contracts.

For these reasons the sales cycle associated with our products is subject to a number of significant risks that are beyond our control. Consequently, if our forecasted customer orders are not realized or delayed, our revenues and results of operations could be materially and adversely affected.

If we are unable to expand our revenue sources or establish, sustain, grow or replace relationships with a diversified customer base, our revenues may be limited.

We currently generate revenue from a limited number of customers that have entered into Settlement and License Agreements with us. Although our GABRIEL Collaboration Suite™ is currently generating limited revenue, it will take time for us to grow our installed user base and generate new customers. Additionally, there is no guarantee that we will be able to derive revenue from new customers, sustain or increase revenue from existing customers or replace customers from whom we currently generate revenue. As a result, our revenue may be limited or static.

We have limited technical resources and are at an early stage in commercialization of our GABRIEL Collaboration Suite™.

Part of our business includes the internal development of commercial products we seek to monetize. This aspect of our business may require significant capital, time and resources and we cannot guarantee that it will be successful or meet our expectations. We currently have only one commercial product, the GABRIEL Collaboration Suite™. As such, we have a small technical team, which may limit our ability to rapidly adapt our product to customer requirements or add new product features to maintain our competitive edge and drive adoption. Based on the scale of our technical resources, our limited historical financial data upon which to base our projected revenue or planned operating expenses related to our GABRIEL Collaboration Suite™, we may not be able to effectively:

- Generate revenues or profit from product sales;
- Drive adoption of our products;
- Attract and retain customers for our products;
- Provide appropriate levels of customer training and support for our products;
- Implement an effective marketing strategy to promote awareness of our products;
- Focus our research and development efforts in areas that generate returns on our efforts;
- Anticipate and adapt to changes in our market; or
- Protect our products from any system failures or other breaches.

In addition, a high percentage of our expenses are and will continue to be fixed. Accordingly, if we do not generate revenue as and when anticipated, our losses may be greater than expected and our operating results will suffer.

Our products are highly technical and may contain undetected errors, which could cause harm to our reputation and adversely affect our business.

Our products are highly technical and complex and, when deployed, may contain errors or defects. Despite testing, some errors in our products may only be discovered after a product has been installed and used by customers. Any errors or defects discovered in our products after commercial release could result in failure to achieve market acceptance, loss of revenue or delay in revenue recognition, loss of customers and increased service and warranty

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cost, any of which could adversely affect our business, operating results and financial condition. In addition, we could face claims for product liability, tort or breach of warranty, including claims relating to changes to our products made by our channel partners. The performance of our products could have unforeseen or unknown adverse effects on the networks over which they are delivered as well as on third-party applications and services that utilize our services, which could result in legal claims against us, harming our business. Furthermore, we expect to provide implementation, consulting and other technical services in connection with the implementation and ongoing maintenance of our products, which typically involves working with sophisticated software, computing and communications systems. We expect that our contracts with customers will contain provisions relating to warranty disclaimers and liability limitations, which may not be upheld. Defending a lawsuit, regardless of its merit, is costly and may divert management's attention and adversely affect the market's perception of us and our products. In addition, if our business liability insurance coverage proves inadequate or future coverage is unavailable on acceptable terms or at all, our business, operating results and financial condition could be adversely impacted.

Malfunctions of third-party communications infrastructure, hardware and software expose us to a variety of risks that we cannot control.

Our business will depend upon, among other things, the capacity, reliability, security and unimpeded access of the infrastructure owned by third parties that we will use to deploy our offerings. We have no control over the operation, quality or maintenance of a significant portion of that infrastructure or whether or not those third parties will upgrade or improve their equipment. We depend on these companies to maintain the operational integrity of our connections. If one or more of these companies is unable or unwilling to supply or expand its levels of service to us in the future, our operations could be severely interrupted. Also, to the extent that the number of users of networks utilizing our current or future products suddenly increases, the technology platform and secure hosting services which will be required to accommodate a higher volume of traffic may result in slower response times or service interruptions. System interruptions or increases in response time could result in a loss of potential or existing users and, if sustained or repeated, could reduce the appeal of the networks to users. In addition, users depend on real-time communications; outages caused by increased traffic could result in delays and system failures. These types of occurrences could cause users to perceive that our solution does not function properly and could therefore adversely affect our ability to attract and retain licensees, strategic partners and customers.

System failure or interruption or our failure to meet increasing demands on our systems could harm our business.

The success of our license and service offerings will depend on the uninterrupted operation of various systems, secure data centers and other computer and communication networks that we establish. To the extent, the number of users of networks utilizing our future products suddenly increases, the technology platform and hosting services which will be required to accommodate a higher volume of traffic may result in slower response times, service interruptions or delays or system failures. Our systems and operations will also be vulnerable to damage or interruption from, among other things:

- Power loss, transmission cable cuts and other telecommunications failures;
- Damage or interruption caused by fire, earthquake, and other natural disasters;
- Computer viruses or software defects; and
- Physical or electronic break-ins, sabotage, intentional acts of vandalism, terrorist attacks and other events beyond our control.

System interruptions or failures and increases or delays in response time could result in a loss of potential or existing users and, if sustained or repeated, could reduce the appeal of the networks to users. These types of occurrences could cause users to perceive that our solution does not function properly and could therefore adversely affect our ability to attract and retain licensees, strategic partners and customers.

Any significant problem with our systems or operations could result in lost revenue, customer dissatisfaction or lawsuits against us. A failure in the operation of our secure domain name registration system could result in the inability of one or more registrars to register and maintain secure domain names for a period of time. A failure in the operation or update of the master directory that we plan to maintain could result in deletion or discontinuation of assigned secure domain names for a period of time. The inability of the registrar systems we establish, including our back-office billing and collections infrastructure, and telecommunications systems to meet the demands of an increasing number of secure domain name requests could result in substantial degradation in our customer support service and our ability to process registration requests in a timely manner.

Our ability to sell our solutions will be dependent on the quality of our technical support, and our failure to deliver high-quality technical support services could have a material adverse effect on our sales and results of operations.

If we do not effectively assist our customers in deploying our products, succeed in helping our customers quickly resolve post-deployment issues and provide effective ongoing support, or if potential customers perceive that we may not be able achieve to the foregoing, our ability to sell our products would be adversely affected, and our reputation with current and potential customers could be harmed. In addition, as we expand our operations internationally, our technical support team will face additional challenges, including those associated with delivering support, training and documentation in languages other than English. Our failure to deliver and maintain high-quality technical support services to our customers could result in customers choosing to use our competitors' products and support services instead of ours in the future.

Telephone carriers have petitioned governmental agencies to enforce regulatory tariffs, which, if granted, would increase the cost of online communication, and such increase in cost may impede the growth of online communication and adversely affect our business.

Use of the Internet has over-burdened existing telecommunications infrastructures, and many high traffic areas have begun to experience interruptions in service. As a result, certain local telephone carriers have petitioned governmental agencies to enforce regulatory tariffs on IP telephony traffic that crosses over their traditional telephone networks. If the relief sought in these petitions is granted, the costs of communicating via online could increase substantially, potentially adversely affecting the growth in the use of online secure communications. Any of these developments could have an adverse effect on our business.

The departure of Kendall Larsen, our Chief Executive Officer and President, and/or other key personnel could compromise our ability to execute our strategic plan and may result in additional severance costs to us.

Our success largely depends on the skills, experience and performance of our key personnel. Due to the specialized nature of our business and limited staff, we are particularly dependent on Kendall Larsen, our Chief Executive Officer and President. We have no employment agreements with any of our key executives that prevent them from leaving us at any time. In addition, we do not maintain key person life insurance for any of our officers or key employees. The loss of Mr. Larsen, or our failure to retain other key personnel or failure to adequately plan for the succession of key personnel, would jeopardize our ability to execute our strategic plan and materially harm our business.

We will need to recruit and retain additional qualified personnel to successfully grow our business.

Our future success will depend, in part, on our ability to attract and retain qualified engineering, operations, marketing, sales and executive personnel. Inability to attract and retain such personnel could adversely affect our business. Competition for engineering, operations, marketing, sales and executive personnel is intense, particularly in the technology and Internet sectors and in the regions where we conduct our business. We may need to invest significant amounts of cash and equity to attract and retain employees and expend significant time and resources to identify, recruit, train and integrate such employees, and we may never realize returns on these investments. Additionally, we can provide no assurance that we will attract or retain such personnel.

Our international expansion will subject us to additional costs and risks, and our plans may not be successful.

We expect to expand our presence internationally through, for example, international partnerships with third parties and the possibility of establishing international subsidiaries and offices. Our international expansion may present challenges and risks, including those inherent in international operations, to us and may require significant attention from management. We may not be successful in our international partnerships, expansion efforts, and we may incur significant operating expenses.

We have incurred and will continue to incur significant increased costs as a result of operating as a public company, and our management will be required to continue to devote substantial time to various compliance initiatives.

The Sarbanes-Oxley Act of 2002, the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010, as well as other rules implemented by the SEC and the New York Stock Exchange ("NYSE"), impose various requirements on public companies, including requiring changes in corporate governance practices. These and proposed corporate governance laws and regulations under consideration may further increase our compliance costs. If compliance with

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these various legal and regulatory requirements diverts our management's attention from other business concerns, it could have a material adverse effect on our business, financial condition and operating results. The Sarbanes-Oxley Act requires, among other things, that we assess the effectiveness of our internal control over financial reporting annually and disclosure controls and procedures quarterly. If we are unable to assert in any future reporting periods that our internal control over financial reporting is effective (or if our independent registered public accounting firm is unable to express an opinion on the effectiveness of our internal controls), we could lose investor confidence in the accuracy and completeness of our financial reports, which would have an adverse effect on our share price.

Although we believe that we currently maintain effective control over our disclosures and procedures and internal control over financial reporting, we may in the future identify deficiencies regarding the design and effectiveness of our system of internal control over financial reporting. If we experience any material weaknesses in our internal control over financial reporting the future or are unable to provide unqualified management or attestation reports about our internal controls, we may be unable to meet financial and other reporting deadlines and may incur costs associated with remediation, and any of which could cause our share price to decline. Moreover, if we identify deficiencies in our internal control over financial reporting that are deemed to be material weaknesses in future periods, the market price of our ordinary shares could decline, and we could be subject to potential delisting by the NYSE and review by the NYSE, the SEC, or other regulatory authorities, which would require the expenditure by us of additional financial and management resources. As a result, our shareholders could lose confidence in our financial reporting, which would harm our business and the market price of our ordinary shares.

There are inherent uncertainties involved in estimates, judgments and assumptions used in the preparation of financial statements in accordance with U.S. GAAP. Any changes in estimates, judgments and assumptions could have a material adverse effect on our business, financial condition and operating results.

The preparation of financial statements in accordance with accounting principles generally accepted in the United States ("U.S. GAAP") involves making estimates, judgments and assumptions that affect reported amounts of assets (including intangible assets), liabilities and related reserves, revenues, expenses and income. Estimates, judgments and assumptions are inherently subject to change in the future, and any such changes could result in corresponding changes to the amounts of assets, liabilities, revenues, expenses and income. Any such changes could have a material adverse effect on our business, financial condition and operating results.

Our results of operations and financial condition could be materially affected by the enactment of legislation implementing changes in the U.S. or foreign taxation of international business activities or the adoption of other tax reform policies.

On December 22, 2017, the legislation commonly referred to as the Tax Cuts and Jobs Act (the "Act") was enacted, which contains significant changes to U.S. tax law, including, but not limited to, a reduction in the corporate tax rate and a transition to a new territorial system of taxation. The impact of the Act will likely be subject to ongoing technical guidance and accounting interpretation, which we will continue to monitor and assess. Provisional accounting impacts may change in future reporting periods until the accounting analysis is finalized, which will occur no later than one year from the date the Act was enacted. As we expand the scale of our international business activities, any changes in the U.S. or foreign taxation of such activities may increase our worldwide effective tax rate and harm our business, results of operations, and financial condition.

Risks Related to Our Common Stock:

Trading in our common stock is limited and the price of our common shares may be subject to substantial volatility.

Our common stock is listed on the NYSE American LLC (formerly the NYSE MKT LLC). Over the past years, the market price of our common stock has experienced significant fluctuations. Between January 1, 2018, and December 31, 2018, the reported last adjusted closing price on NYSE American LLC for our common stock ranged between \$2.20 and \$4.65 per share. The price of our common stock may continue to be volatile as a result of several factors, some of which are beyond our control. These factors include, but not limited to, the following:

- Developments or lack thereof in any then-outstanding litigation;
- Quarterly variations in our operating results;
- Large purchases or sales of common stock or derivative transactions related to our stock;

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- Actual or anticipated announcements of new products or services by us or competitors;
- General conditions in the markets in which we compete; and
- General social, political, economic and financial conditions, including the significant volatility in the global financial markets.

In addition, we believe there has been and may continue to be substantial trading in derivatives of our stock, including short selling activity or related similar activities, which are beyond our control and which may be beyond the full control of the SEC and Financial Institutions Regulatory Authority or “FINRA”. While the SEC and FINRA rules prohibit some forms of short selling and other activities that may result in stock price manipulation, such activity may nonetheless occur without detection or enforcement. We have held conversations with regulators concerning trading activity in our stock; however, there can be no assurance that should there be any illegal manipulation in the trading of our stock, it will be detected, prosecuted or successfully eradicated. Significant short selling or other types of market manipulation could cause our stock trading price to decline, to become more volatile, or both.

The market price of our common stock has been and may continue to be volatile, and you could lose all or part of your investment.

The trading price of our common stock has been volatile since our initial public offering and is likely to continue to be volatile. Factors that could cause fluctuations in the market price of our common stock include, but are not limited to the following:

- Price and volume fluctuations in the overall stock market from time to time;
- Volatility in the market prices and trading volumes of companies in our industry or companies that investors consider comparable;
- Changes in operating performance and stock market valuations of other companies generally, or those in our industry;
- Sales of shares of our 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 us, 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;
- Actual or anticipated developments in our business, our competitors’ businesses or the competitive landscape generally;
- Litigation involving us, our industry or both, or investigations by regulators into our operations or those of our competitors;
- Announced or completed acquisitions of businesses or technologies by us or our competitors;
- New laws or regulations or new interpretations of existing laws or regulations applicable to our business;
- Changes in accounting standards, policies, guidelines, interpretations or principles;
- Any significant change in our management; and
- General economic conditions and slow or negative growth of our markets.

Further, in recent years the stock markets have experienced extreme price and volume fluctuations that have affected and continue to affect the market prices of equity securities of many companies. These fluctuations often have been unrelated or disproportionate to the operating performance of those companies. In addition, the stock prices of many technology companies have experienced wide fluctuations that have often been unrelated to the operating

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performance of those companies. These broad market and industry fluctuations, as well as general economic, political and market conditions such as recessions, government shutdowns, interest rate changes the stability of the EU and the exit of the United Kingdom or international currency fluctuations, may cause the market price of our common stock to decline. In the past, following periods of volatility in the overall market and the market price of a particular company's securities, securities class action litigation has often been instituted against these companies.

We do not currently pay dividends on our common stock and thus stockholders must look to appreciation of our common stock to realize a gain on their investments.

Our dividend policy is within the discretion of our Board of Directors and will depend upon various factors, including our business, financial condition, results of operations, capital requirements, and investment opportunities. We therefore cannot make assurances that our Board of Directors will determine to pay regular or special dividends in the future. Accordingly, unless our Board of Directors determines to pay dividends, stockholders will be required to look to appreciation of our common stock to realize a gain on their investment. This appreciation may not occur.

The exercise of our outstanding stock options, RSUs and issuance of new shares would result in a dilution of our current stockholders' voting power and an increase in the number of shares eligible for future resale in the public market which may negatively impact the market price of our stock.

The exercise of our outstanding vested stock options would dilute the ownership interests of our existing stockholders. As of December 31, 2018, we had outstanding options to purchase an aggregate of 5,998,837 shares of common stock representing approximately 9% of our total shares outstanding of which 3,855,119 were vested and therefore exercisable. To the extent outstanding stock options are exercised, additional shares of common stock will be issued, existing stockholders' percentage voting interests will decline and the number of shares eligible for resale in the public market will increase. Such increase may have a negative effect on the value or market trading price of our common stock.

The market price of our common stock may decline because our operating results may not be consistent and may be difficult to predict.

Our reported net income has fluctuated in the past due to several factors. We expect that our future operating results may also fluctuate due to the same or similar factors. We had a net loss of \$28.6 million for the year ended December 31, 2016, a net loss of \$17.3 million for the year ended December 31, 2017, and a net loss of \$25 million for the year ended December 31, 2018, with an accumulated deficit of \$198 million. The following include some of the factors that may cause our operating results to fluctuate:

- The outcome of actions to enforce our intellectual property rights currently in progress or that we may undertake in the future, and the timing thereof;
- The amount and timing of receipt of license fees from potential infringers, licensees or customers;
- The rate of adoption of our patented technologies;
- The number of new license arrangements we may execute, or that may expire, within a particular period and the scope of those licenses, including the number of our patents which are licensed, the extent of prior infringement of our patent rights, royalty rates, timing of payment obligations, expiration date etc.;
- The success of a licensee in selling products that use our patented technologies; and
- The amount and timing of expenses related to our patent filings and enforcement proceedings, including litigation, related to our intellectual property rights.

These fluctuations may make our business particularly difficult to manage, adversely affect our business and operating results, make our operating results difficult for investors to predict and, further, cause our results to fall below investor's expectations and adversely affect the market price of our common stock.

Because ownership of our common stock is concentrated, investors may have limited influence on stockholder decisions.

As of September 30, 2018, our executive officers and directors beneficially owned approximately 14.7% of our outstanding common stock. In addition, a group of stockholders that, as of December 31, 2007, held 4,766,666 shares, or approximately 7% of our outstanding common stock, have entered into a voting agreement with us that requires

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them to vote all of their shares of our voting stock in favor of the director nominees approved by our Board of Directors at each director election going forward, and in a manner that is proportional to the votes cast by all other voting shares as to any other matters submitted to the stockholders for a vote. However, we cannot be certain how many shares of our common stock this group of stockholders currently owns. Because of their beneficial ownership interest, our officers and directors could significantly influence stockholder actions of which you disapprove or that are contrary to your interests. This ability to exercise significant influence could prevent or significantly delay another company from acquiring or merging with us.

Our protective provisions in our amended and restated certificate of incorporation and bylaws could make it difficult for a third party to successfully acquire us even if you would like to sell your stock to them.

We have a number of protective provisions in our amended and restated certificate of incorporation and bylaws that could delay, discourage or prevent a third party from acquiring control of us without the approval of our Board of Directors. These protective provisions include:

- ***A staggered Board of Directors.*** This means that only one or two directors (since we have a five-person Board of Directors) will be up for election at any given annual meeting. This has the effect of delaying the ability of stockholders to affect a change in control of us because it would take two annual meetings to effectively replace a majority of the Board of Directors.
- ***Blank check preferred stock.*** Our Board of Directors has the authority to establish the rights, preferences and privileges of our 10,000,000 authorized, but unissued, shares of preferred stock. Therefore, this stock may be issued at the discretion of our Board of Directors with preferences over your shares of our common stock in a manner that is materially dilutive to you. In addition, blank check preferred stock can be used to create a “poison pill” which is designed to deter a hostile bidder from buying a controlling interest in our stock without the approval of our Board of Directors. We have not adopted such a “poison pill,” but our Board of Directors has the ability to do so in the future, very rapidly and without stockholder approval.
- ***Advance notice requirements for director nominations and for new business to be brought up at stockholder meetings.*** Stockholders wishing to submit director nominations or raise matters to a vote of the stockholders must provide notice to us within very specific date windows and in very specific form in order to have the matter voted on at a stockholder meeting. This has the effect of giving our Board of Directors and management more time to react to stockholder proposals generally and could also have the effect of disregarding a stockholder proposal or deferring it to a subsequent meeting to the extent such proposal is not raised properly.
- ***No stockholder actions by written consent.*** No stockholder or group of stockholders may take actions rapidly and without prior notice to our Board of Directors and management or to the minority stockholders. Along with the advance notice requirements described above, this provision also gives our Board of Directors and management more time to react to proposed stockholder actions.
- ***Super majority requirement for stockholder amendments to the By-laws.*** Stockholder proposals to alter or amend our By-laws or to adopt new By-laws can only be approved by the affirmative vote of at least 66 2/3% of the outstanding shares of our common stock.
- ***No ability of stockholders to call a special meeting of the stockholders.*** Only the Board of Directors or management can call special meetings of the stockholders. This could mean that stockholders, even those who represent a significant percentage of our shares of common stock, may need to wait for the annual meeting before nominating directors or raising other business proposals to be voted on by the stockholders.

In addition, the provisions of Section 203 of the Delaware General Corporate Law govern us. These provisions may prohibit large stockholders, in particular those owning 15% or more of our outstanding voting stock, from merging or combining with us for a certain period of time.

These and other provisions in our amended and restated certificate of incorporation, our bylaws and under Delaware law could discourage potential takeover attempts, reduce the price that investors might be willing to pay for shares of our common stock in the future and result in the market price being lower than it would be without these provisions

Item 1B. Unresolved Staff Comments.

None.

Item 2. Properties

Our principal executive offices are located at 308 Dorla Court, Suite 206, Zephyr Cove, Nevada, 89448. We lease this property, which comprises approximately 2,090 square feet of office space, from a third party for a term that ends in October 2019. We have no other properties and believe that our office facility is suitable and appropriately supports our current business needs.

Item 3. Legal Proceedings

We have multiple intellectual property infringement lawsuits pending in the United States District Court for the Eastern District of Texas, Tyler Division (“USDC”), and United States Court of Appeals for the Federal Circuit (“USCAFC”).

VirnetX Inc. v. Cisco Systems, Inc. et al. (Case 6:10-CV-00417-LED) (“Apple I”)

On August 11, 2010, we filed a complaint against Aastra USA, Inc. (“Aastra”), Apple Inc. (“Apple”), Cisco Systems, Inc. (“Cisco”), and NEC Corporation (“NEC”) the USDC in which we alleged that these parties infringe on certain of our patents (U.S. Patent Nos. 6,502,135, 7,418,504, 7,921,211 and 7,490,151). We sought damages and injunctive relief. The cases against each defendant were separated by the judge. Aastra and NEC agreed to sign license agreements with us and we dropped all accusations of infringement against them. A jury in USDC decided that our patents were not invalid and rendered a verdict of non-infringement by Cisco on March 4, 2013. Our motion for a new Cisco trial was denied and the case against Cisco was closed.

On November 6, 2012, a jury the USDC awarded us over \$368,000 for Apple’s infringement of four of our patents, plus daily interest up to the final judgment.

Apple filed an appeal of the judgment to the USCAFC. On September 16, 2014, USCAFC affirmed the USDC jury’s finding that all four of our patents at issue are valid and confirmed the USDC jury’s finding of infringement of VPN on Demand under many of the asserted claims of our ‘135 and ‘151 patents, and the USDC’s decision to allow evidence about our license and royalty rates regarding the determination of damages. However, the USCAFC vacated the USDC jury’s damages award and some of the USDC’s claim construction with respect to parts of our ‘504 and ‘211 patents and remanded the damages award and determination of infringement with respect to FaceTime back to the USDC for further proceedings.

On September 30, 2016, pursuant to the 2014 remand from the USCAFC, a jury in the USDC awarded us \$302,400 for Apple’s infringement of four of our patents. On September 29, 2017, the USDC entered its final judgement, denied all of Apple’s post-trial motions, granted all our post-trial motions, including our motion for willful infringement and enhanced the royalty rate during the willfulness period from \$1.20 to \$1.80 per device, and awarded us costs, certain attorneys’ fees, and prejudgment interest. The total amount in the final judgement was \$439,700, including \$302,400 (jury verdict), \$41,300 (enhanced damages) and \$96,000 (costs, fees and interest).

On October 27, 2017 Apple filed its notice of appeal of this final judgement to the USCAFC. Apple filed its opening brief on March 19, 2018. We filed our response on April 4, 2018. On April 11, 2018, USCAFC designated **Cases 18-1197-CB, Case 17-1368 and Case 17-1591** as companion cases and assigned to the same merits panel. Events and developments after this order are described below under **VirnetX Inc. v. The Mangrove Partners (USCAFC Case 17-1368) (“Consolidated Appeal”)**.

VirnetX Inc. v. Apple, Inc. (Case 6:12-CV-00855-LED) (“Apple II”)

This case began on November 6, 2012, when we had filed a complaint against Apple in USDC in which we alleged that Apple infringed on certain of our patents, (U.S. Patent Nos. 6,502,135, 7,418,504, 7,921,211 and 7,490,151). We sought damages and injunctive relief. The accused products include the iPhone 5, iPod Touch 5th Generation, iPad 4th Generation, iPad mini, and the latest Macintosh computers; these products were not included in the Apple I case because they were released after the Apple I case was initiated. Post-Trial Motions hearing was held on July 18, 2018. On August 31, 2018, the USDC entered a Final Judgment and issued its Memorandum Opinion and Order regarding post-trial motions, affirming the jury’s verdict of \$502,600 and granting VirnetX’s motions for supplemental damages, a sunset royalty and the royalty rate of \$1.20 per infringing iPhone, iPad and Mac products, pre-judgment and post-judgment interest and costs. On September 20, 2018, pursuant to a Court’s order, attorneys from VirnetX and Apple conferred and agreed, without dispute, to add an amount totaling \$93,300 for Bill of Costs and Prejudgment Interest to the \$502,600 jury verdict. The total amount in the final judgement in the Apple II case is now

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\$595,900. Apple has filed a notice of appeal with the USCAFC in the Apple II case. On October 9, 2018, USCAFC accepted the notice and docketed it as **Case No. 19-1050 - VirnetX Inc. v. Apple Inc.** All subsequent events and developments in this case are described below under **VirnetX Inc. v. Apple Inc. (USCAFC Case 19-1050) (“Apple II Appeal”)**.

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On April 11, 2018, the USCAFC in an order designated the following appeals as companion cases and assigned to the same merits panel;

- **VirnetX Inc. v. The Mangrove Partners (USCAFC Case 17-1368)**

On December 16, 2016, we filed appeals with the USCAFC, appealing the invalidity findings by the Patent Trial and Appeal Board (“PTAB”) in IPR2015-01046, and on December 20, 2016 for IPR2015-1047, involving our U.S. Patent Nos. 6,502,135, and 7,490,151. These appeals also involve Apple, Inc. and one of them involves Black Swamp IP, LLC. Oral arguments in this case were argued on January 8, 2019. We are awaiting the Court’s decision in this matter.

- **VirnetX Inc. v. Cisco Systems, Inc. (USCAFC Case 18-1197-CB) (Appeal of Apple I Case)**

On October 27, 2017 Apple filed its notice of appeal of the Final Judgment entered on September 29, 2017 to the United States Court of Appeals for the Federal Circuit. Oral arguments in this case were held on January 8, 2019. On January 15, 2019 the Court’s issued a Rule 36 order affirming the District Court Judgement. Apple filed a request for panel rehearing and rehearing en-banc in this matter on February 21, 2019. On March 12, 2019, the court invited us to respond to Apple’s petition on or before March 26, 2019. We are currently preparing our response.

- **VirnetX Inc. v. Apple Inc., Cisco Systems, Inc. (USCAFC Case 17-1591)**

On February 7, 2017, we filed appeals with the USCAFC, appealing the invalidity findings by the PTAB in inter-parties’ reexamination nos. 95/001,788, 95/001,789, and 95/001,856 related to our U.S. Patent Nos. 7,921,211 and 7,418,504. Oral arguments in this case were argued on January 8, 2019. We are awaiting the Court’s decision in this matter.

VirnetX Inc. v. Apple Inc. (USCAFC Case 19-1050) (“Apple II Appeal”)

On January 24, 2019 Apple filed opening brief. We filed our response on March 1, 2019. Apple’s next response is due on April 5, 2019. The oral arguments have not yet been scheduled.

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On August 23, 2017, we filed with the USCAFC appeals of the invalidity findings by the PTAB in IPR2016-00331 and IPR2016-00332 involving our U.S. Patent No. 8,504,696. On December 10, 2018, the USCAFC issued an opinion affirming the PTAB’s invalidity findings.

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On September 22, 2017, we filed with the USCAFC, appeals of the invalidity findings by the PTAB in IPR2016-00693 and IPR2016-00957 involving our U.S. Patent Nos. 7,418,504 and 7,921,211. The briefing in these appeals has not taken place. The entity that initiated the IPRs, Black Swamp IP, LLC, indicated on October 18, 2017, that it would not participate in the appeals. On November 27, 2017, the USPTO indicated that it would intervene in the appeals. On January 19, 2018, the USCAFC stayed these appeals pending the USCAFC’s decision in Case 17-1591.

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On April 23, 2018, we filed with the USCAFC an appeal of the invalidity findings by the PTAB in IPR2016-01585 involving our U.S. Patent No. 8,904,516. On November 30, 2018, the USCAFC granted an unopposed motion to dismiss this appeal.

VirnetX Inc. (Case 18-2211)

On July 31, 2018, we filed with the USCAFC an appeal of the invalidity findings by the PTAB in IPR2017-00337 involving our U.S. Patent No. 9,038,163. On November 30, 2018, the USCAFC granted an unopposed motion to dismiss this appeal.

VirnetX Inc. (Case 19-1043)

On October 1, 2018, we filed with the USCAFC an appeal of the invalidity findings by the PTAB in inter-partes reexamination no. 95/001,746 involving our U.S. Patent No. 6,839,759. VirnetX's opening brief is due in March 2019.

One or more potential intellectual property infringement claims may also be available to us against certain other companies who have the resources to defend against any such claims. Although we believe these potential claims are likely valid, commencing a lawsuit can be expensive and time-consuming, and there is no assurance that we could prevail on such potential claims if we made them. In addition, bringing a lawsuit may lead to potential counterclaims which may distract our management and our other resources, including capital resources, from efforts to successfully commercialize our products.

Currently, we are not a party to any other pending legal proceedings and are not aware of any proceeding threatened or contemplated against us.

Item 4. Mine Safety Disclosure

Not applicable.

PART II

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

Market Information

Our common stock currently trades under the symbol “VHC” on the NYSE American LLC.

Holders of Record

As of March 14, 2019, we had 41 stockholders of record. Because many of our shares of common stock are held of record by brokers and other institutions on behalf of stockholders, we are unable to estimate the total number of beneficial stockholders represented by such record holders.

Dividends

We do not currently intend to begin paying a regular dividend in the foreseeable future. Any future determination to declare cash dividends will be made at the discretion of our board of directors and will depend on our financial condition, operating results, capital requirements, general business conditions and other factors that our board of directors may deem relevant.

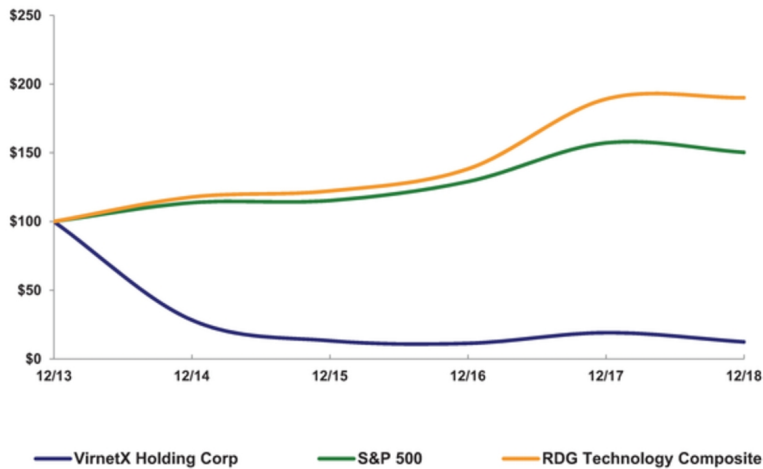
Securities Authorized for Issuance under Equity Compensation Plan

See Item 12, Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters for information regarding securities authorized for issuance.

Stock Performance Graph

This performance graph shall not be deemed “soliciting material” or to be “filed” for purposes of Section 18 of the Securities Exchange Act of 1934, as amended, or the Exchange Act, or incorporated by reference into any filing of VirnetX under the Securities Act of 1933, as amended, or the Securities Act, except as shall be expressly set forth by specific reference in such filing.

COMPARISON OF 5 YEAR CUMULATIVE TOTAL RETURN*
Among VirnetX Holding Corp, the S&P 500 Index and the RDG Technology Composite Index



*\$100 invested on 12/31/13 in stock or index, including reinvestment of dividends. Fiscal year ending December 31.

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The stock price performance reflected on this graph is not necessarily indicative of future stock price performance. See the disclosure in Part I, Item 1A, “Risk Factors.”

| | 12/13 | 12/14 | 12/15 | 12/16 | 12/17 | 12/18 |
|--------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| VirnetX Holding Corp | \$ 100.00 | \$ 28.28 | \$ 13.24 | \$ 11.33 | \$ 19.06 | \$ 12.36 |
| S&P 500 | \$ 100.00 | \$ 113.69 | \$ 115.26 | \$ 129.05 | \$ 157.22 | \$ 150.33 |
| RDG Technology Composite | \$ 100.00 | \$ 117.81 | \$ 122.23 | \$ 138.28 | \$ 189.14 | \$ 190.13 |

Recent Sales of Unregistered Securities

During the year ended December 31, 2018, we had no sales of unregistered securities and no repurchases of stock.

Item 6. Selected Financial Data (in thousands except per share data)

The consolidated statement of operations data for the years ended December 31, 2018, 2017 and 2016 and the balance sheet data at December 31, 2018 and 2017, are derived from our audited financial statements included elsewhere in this Annual Report on Form 10-K. The consolidated statement of operations data for the years ended December 31, 2015 and 2014 and the balance sheet data at December 31, 2016, 2015 and 2014 are derived from our audited financial statements not included in this annual report on Form 10-K.

The selected consolidated financial data below is not necessarily indicative of future performance and 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 thereto included in Item 8 of this Annual Report on Form 10-K.

| | For the year ended December 31, | | | | |
|---|---------------------------------|-------------|-------------|-------------|-------------|
| | 2018 | 2017 | 2016 | 2015 | 2014 |
| Consolidated Statement of Operations Data: | | | | | |
| Revenue ^(a) | \$ 63 | \$ 1,547 | \$ 1,550 | \$ 1,555 | \$ 1,249 |
| Gain on settlement ^(b) | \$ — | \$ — | \$ — | \$ — | \$ 23,000 |
| Total operating expenses | \$ (25,520) | \$ (18,868) | \$ (30,055) | \$ (30,732) | \$ (36,414) |
| Income tax expense | \$ (3) | \$ (3) | \$ (133) | \$ (8) | \$ (15) |
| Net loss | \$ (25,406) | \$ (17,278) | \$ (28,569) | \$ (29,234) | \$ (9,902) |
| Loss per share | \$ (0.40) | \$ (0.30) | \$ (0.51) | \$ (0.56) | \$ (0.19) |
| Consolidated Balance Sheet Data: | | | | | |
| Cash and cash equivalents | \$ 7,611 | \$ 3,135 | \$ 6,627 | \$ 8,726 | \$ 18,658 |
| Investments available for sale | \$ 1,803 | \$ 1,453 | \$ 9,249 | \$ 9,954 | \$ 22,571 |
| Total assets | \$ 11,751 | \$ 7,175 | \$ 18,871 | \$ 22,172 | \$ 45,090 |
| Stockholders’ equity | \$ 9,888 | \$ 1,553 | \$ 11,147 | \$ 15,095 | \$ 32,627 |

(a) Revenue for 2018 has been reduced by \$1,500 as a result of the adoption of the new revenue recognition standard as shown in Note 15 – Effects of Adopting ASU Topic 606.

(b) The gain on settlement in 2014 relates to a cash settlement of litigation with Microsoft.

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

Company Overview

We are an Internet security software and technology company with patented technology for secure communications including 5G and 4G LTE security. Our software and technology solutions, including our Secure Domain Name Registry and GABRIEL Connection Technology™, are designed to facilitate secure communications and provide the security platform required by next-generation Internet-based applications such as instant messaging, or IM, voice over Internet protocol, or VoIP, mobile services, streaming video, file transfer, remote desktop and Machine-to-Machine, or M2M communications. Our technology generates secure connections on a “zero-click” or “single-click” basis, significantly simplifying the deployment of secure real-time communication solutions by eliminating the need for end-users to enter any encryption information. Our portfolio of intellectual property is the foundation of our business model. We currently own approximately 185 total patents and pending applications, including 70 U.S.

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patents/patent applications and 115 foreign patents/validations/pending applications. Our patent portfolio is primarily focused on securing real-time communications over the Internet, as well as related services such as the establishment and maintenance of a secure domain name registry. Our patented methods also have additional applications in the key areas of device operating systems and network security for Cloud services, M2M communications in the new initiatives like “Smart City”, “Connected Car” and “Connected Home” that would connect everything from social services and citizen engagement to public safety, transportation and economic development to the internet to enable more productivity, features and efficiency in our everyday lives. The subject matter of all our U.S. and foreign patents and pending applications relates generally to securing communication over the internet, and as such covers all our technology and other products. Our issued U.S. and foreign patents expire at various times during the period from 2019 to 2024. Some of our issued patents and pending patent applications were acquired by our principal operating subsidiary; VirnetX, Inc., from Leidos, Inc., or Leidos, (f/k/a Science Applications International Corporation, or SAIC) in 2006 and we are required to make payments to Leidos, based on cash or certain other values generated from those patents. The amount of such payments depends upon the type of value generated, and certain categories are subject to maximums and other limitations.

Our product GABRIEL Secure Communication Platform™, unlike other collaboration and communication products and services on the market today, does not require access to user’s confidential data and reduces the threat of hacking and data mining. It enables individuals and organizations to maintain complete ownership and control over their personal and confidential data, secured within their own private network, while enabling authorized secure encrypted access from anywhere at any time. Our GABRIEL Collaboration Suite™ is a set of applications that run on top of our GABRIEL Secure Communication Platform™. It enables seamless and secure cross-platform communications between user’s devices that have our software installed. Our GABRIEL Collaboration Suite™ is available for download and free trial, for Android, iOS, Windows, Linux and Mac OS X platforms, at <http://www.gabrielsecure.com>. We continue to enhance our products and add new functionality to our products. We will provide updates to new and existing customers as they are released to the general public. Over 80 small and medium businesses have installed our GABRIEL Secure Communication Platform™ and GABRIEL Collaboration Suite™ products in their corporate networks. We intend to continue to expand our customer base with targeted promotions and direct sales initiatives.

We are actively recruiting best-of-breed partners in various vertical markets including, healthcare, finance, government, etc., to help us rapidly expand our enterprise customer base. A number of International Association of Certified ISAO (IACI) including, ISAO’s for Maritime & Ports, ISAO Credit Union ISAO, City of Chicago, ISAO Human Trafficking ISAO have chosen to deploy our software as private and secure e-technology to protect their communications. Several other ISAOs are completing their evaluations before deploying our products within their networks.

We have executed a number of patent and technology licenses and intend to seek further licensees for our technology, including our GABRIEL Connection Technology™ to original equipment manufacturers, or OEMs, of chips, servers, smart phones, tablets, e-Readers, laptops, net books and other devices, within the IP-telephony, mobility, fixed-mobile convergence and unified communications markets including 5G and 4G/LTE Advanced.

We have submitted a declaration with the 3rd Generation Partnership Project, or 3GPP, identifying a group of our patents and patent applications that we believe are or may become essential to certain developing specifications in the 3GPP LTE, Systems Architecture Evolution, or SAE project. We have agreed to make available a non-exclusive patent license under fair, reasonable and non-discriminatory terms and conditions, with compensation, or FRAND, to 3GPP members desiring to implement the technical specifications identified by us. We believe that we are positioned to license our essential security patents to 3GPP members as they move into deploying 5G and 4G/LTE Advanced devices and solutions.

We have an ongoing GABRIEL Licensing Program under which we offer licenses to a portion of our patent portfolio, technology and software, including our secure domain name registry service, to domain infrastructure providers, communication service providers as well as to system integrators. Our GABRIEL Connection Technology™ License is offered to OEM customers who want to adopt the GABRIEL Connection Technology™ as their solution for establishing secure connections using secure domain names within their products. We have developed GABRIEL Connection Technology™ Software Development Kit (SDK) to assist with rapid integration of these techniques into existing software implementations with minimal code changes and include object libraries, sample code, testing and quality assurance tools and the supporting documentation necessary for a customer to implement our technology.

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Customers who want to develop their own implementation of our patented techniques for supporting secure domain names, or other techniques that are covered by our patent portfolio for establishing secure communication links, can purchase a patent license. These licenses will typically include an initial license fee, as well as an ongoing royalty.

We have signed Patent License Agreements with Avaya Inc., Aastra USA, Inc., Microsoft Corporation, Mitel Networks Corporation, NEC Corporation and NEC Corporation of America, Siemens Enterprise Communications GmbH & Co. KG, and Siemens Enterprise Communications Inc. to license certain of our patents, for a one-time payment and/or an ongoing royalty for all future sales through the expiration of the licensed patents with respect to certain current and future IP-encrypted products. We have engaged IPVALUE Management Inc. to assist us in commercializing our portfolio of patents on securing real-time communications over the Internet. Under the multi-year agreement, IPVALUE is expected to originate and assist us with negotiating transactions related to patent licensing worldwide with respect to certain third parties.

We believe that the market opportunity for our software and technology solutions is large and expanding as secure domain names are now an integral part of securing the next generation 5G and 4G/LTE Advanced wireless networks and M2M communications in areas including Smart City, Connected Car and Connected Home. We also believe that all 5G and 4G/LTE Advanced mobile devices will require unique secure domain names and become part of a secure domain name registry.

We intend to continue to license our patent portfolio, technology and software, including our secure domain name registry service, to domain infrastructure providers, communication service providers as well as to system integrators. We intend to seek further license of our technology, including our GABRIEL Connection Technology™ to enterprise customers, developers and original equipment manufacturers, or OEMs, of chips, servers, smart phones, tablets, e-Readers, laptops, net books and other devices, within the IP-telephony, mobility, fixed-mobile convergence and unified communications markets including 5G and 4G/LTE.

Our employees include the core development team behind our patent portfolio, technology and software. This team has worked together for over ten years and is the same team that invented and developed this technology while working at Leidos, Inc. (“Leidos”). Leidos is a FORTUNE 500® scientific, engineering and technology applications company that uses its deep domain knowledge to solve problems of vital importance to the nation and the world, in national security, energy and the environment, critical infrastructure and health. The team has continued its research and development work started at Leidos and expanded the set of patents we acquired in 2006 from Leidos, into a larger portfolio of approximately 185 total patents and pending applications, including 70 U.S. patents/patent applications and 115 foreign patents/validations/pending applications. This portfolio now serves as the foundation of our licensing business and planned service offerings and is expected to generate the majority of our future revenue in license fees and royalties. We intend to continue our research and development efforts to further strengthen and expand our patent portfolio.

We intend to continue using a primarily outsourced and leveraged model to maintain efficiency and manage costs as we grow our licensing business by, for example, offering incentives to early licensing targets or asserting our rights for use of our patents. We also intend to expand our design pilot in participation with leading 5G and 4G/LTE companies (domain infrastructure providers, chipset manufacturers, service providers and others) and build our secure domain name registry.

Litigation

We have multiple intellectual property infringement lawsuits pending in the United States District Court for the Eastern District of Texas, Tyler Division (“USDC”), and United States Court of Appeals for the Federal Circuit (“USCAFC”).

VirnetX Inc. v. Cisco Systems, Inc. et al. (Case 6:10-CV-00417-LED) (“Apple I”)

On August 11, 2010, we filed a complaint against Aastra USA, Inc. (“Aastra”), Apple Inc. (“Apple”), Cisco Systems, Inc. (“Cisco”), and NEC Corporation (“NEC”) the USDC in which we alleged that these parties infringe on certain of our patents (U.S. Patent Nos. 6,502,135, 7,418,504, 7,921,211 and 7,490,151). We sought damages and injunctive relief. The cases against each defendant were separated by the judge. Aastra and NEC agreed to sign license agreements with us and we dropped all accusations of infringement against them. A jury in USDC decided that our patents were not invalid and rendered a verdict of non-infringement by Cisco on March 4, 2013. Our motion for a new Cisco trial was denied and the case against Cisco was closed.

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On November 6, 2012, a jury the USDC awarded us over \$368,000 for Apple's infringement of four of our patents, plus daily interest up to the final judgment.

Apple filed an appeal of the judgment to the USCAFC. On September 16, 2014, USCAFC affirmed the USDC jury's finding that all four of our patents at issue are valid and confirmed the USDC jury's finding of infringement of VPN on Demand under many of the asserted claims of our '135 and '151 patents, and the USDC's decision to allow evidence about our license and royalty rates regarding the determination of damages. However, the USCAFC vacated the USDC jury's damages award and some of the USDC's claim construction with respect to parts of our '504 and '211 patents and remanded the damages award and determination of infringement with respect to FaceTime back to the USDC for further proceedings.

On September 30, 2016, pursuant to the 2014 remand from the USCAFC, a jury in the USDC awarded us \$302,400 for Apple's infringement of four of our patents. On September 29, 2017, the USDC entered its final judgement, denied all of Apple's post-trial motions, granted all our post-trial motions, including our motion for willful infringement and enhanced the royalty rate during the willfulness period from \$1.20 to \$1.80 per device, and awarded us costs, certain attorneys' fees, and prejudgment interest. The total amount in the final judgement was \$439,700, including \$302,400 (jury verdict), \$41,300 (enhanced damages) and \$96,000 (costs, fees and interest).

On October 27, 2017 Apple filed its notice of appeal of this final judgement to the USCAFC. Apple filed its opening brief on March 19, 2018. We filed our response on April 4, 2018. On April 11, 2018, USCAFC designated **Cases 18-1197-CB, Case 17-1368 and Case 17-1591** as companion cases and assigned to the same merits panel. Events and developments after this order are described below under **VirnetX Inc. v. The Mangrove Partners (USCAFC Case 17-1368) ("Consolidated Appeal")**.

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This case began on November 6, 2012, when we had filed a complaint against Apple in USDC in which we alleged that Apple infringed on certain of our patents, (U.S. Patent Nos. 6,502,135, 7,418,504, 7,921,211 and 7,490,151). We sought damages and injunctive relief. The accused products include the iPhone 5, iPod Touch 5th Generation, iPad 4th Generation, iPad mini, and the latest Macintosh computers; these products were not included in the Apple I case because they were released after the Apple I case was initiated. Post-Trial Motions hearing was held on July 18, 2018. On August 31, 2018, the USDC entered a Final Judgment and issued its Memorandum Opinion and Order regarding post-trial motions, affirming the jury's verdict of \$502,600 and granting VirnetX's motions for supplemental damages, a sunset royalty and the royalty rate of \$1.20 per infringing iPhone, iPad and Mac products, pre-judgment and post-judgment interest and costs. On September 20, 2018, pursuant to a Court's order, attorneys from VirnetX and Apple conferred and agreed, without dispute, to add an amount totaling \$93,300 for Bill of Costs and Prejudgment Interest to the \$502,600 jury verdict. The total amount in the final judgement in the Apple II case is now \$595,900. Apple has filed a notice of appeal with the USCAFC in the Apple II case. On October 9, 2018, USCAFC accepted the notice and docketed it as **Case No. 19-1050 - VirnetX Inc. v. Apple Inc.** All subsequent events and developments in this case are described below under **VirnetX Inc. v. Apple Inc. (USCAFC Case 19-1050) ("Apple II Appeal")**.

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- **VirnetX Inc. v. Cisco Systems, Inc. (USCAFC Case 18-1197-CB) (Appeal of Apple I Case)**

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VirnetX Inc. (Case 18-2211)

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VirnetX Inc. (Case 19-1043)

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One or more potential intellectual property infringement claims may also be available to us against certain other companies who have the resources to defend against any such claims. Although we believe these potential claims are likely valid, commencing a lawsuit can be expensive and time-consuming, and there is no assurance that we could prevail on such potential claims if we made them. In addition, bringing a lawsuit may lead to potential counterclaims which may distract our management and our other resources, including capital resources, from efforts to successfully commercialize our products.

Currently, we are not a party to any other pending legal proceedings and are not aware of any proceeding threatened or contemplated against us.

Commitments and Related Party Transactions

We lease our offices under an operating lease with a third party expiring in October 2019. We recognize rent expense on a straight-line basis over the term of the lease.

We entered into a service agreement for the use of an aircraft from K2 Investment Fund LLC (“LLC”) for business travel for employees of the Company. We incurred approximately \$1,590, \$1,240, and \$772 in rental fees and reimbursements to the LLC during the years ended December 31, 2018, 2017 and 2016, respectively. We pay for the Company’s business usage of the aircraft and have no right to purchase. Our Chief Executive Officer and Chief Administrative Officer are the managing partners of the LLC and control the equity interests of the LLC. We entered into a 12-month non-exclusive agreement with the LLC for use of the plane at a rate of \$8 per flight hour, with no minimum usage requirement. The agreement contains other terms and conditions normal in such transactions and can be cancelled by either us or the LLC with 30 days’ notice. The agreement renews on an annual basis unless terminated by either party. Neither party has exercised their termination rights.

Critical Accounting Policies

The preparation of financial statements in conformity with accounting principles generally accepted in the United States (“GAAP”) requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reported period. The critical accounting policies we employ in the preparation of our consolidated financial statements are those which involve impairment of long-lived assets, income taxes, fair value of financial instruments and stock-based compensation.

Basis of Consolidation

The consolidated financial statements include the accounts of VirnetX Holding Corporation and our wholly-owned subsidiaries. All intercompany balances and transactions have been eliminated.

Use of Estimates

We prepare our condensed consolidated financial statements in accordance with U.S. GAAP. In doing so, we have to make estimates and assumptions that affect our reported amounts of assets, liabilities, revenues, and expenses, as well as related disclosure of contingent assets and liabilities. In some cases, we could reasonably have used different accounting policies and estimates. In some cases, changes in our accounting estimates are reasonably likely to occur. Accordingly, actual results could differ materially from our estimates. To the extent that there are material differences between these estimates and actual results, our financial condition or results of operations will be affected. We base our estimates on past experience and other assumptions that we believe are reasonable under the circumstances, at the time they are made, and we evaluate these estimates on an ongoing basis. We refer to accounting estimates of this type as critical accounting policies and estimates, which we discuss further below.

Revenue Recognition

We derive our revenue from patent licensing. The timing and amount of revenue recognized from each licensee depends upon a variety of factors, including the specific terms of each agreement and the nature of the deliverables and obligations. Such agreements may be complex and include multiple elements. These agreements may include, without limitation, elements related to the settlement of past patent infringement liabilities, up-front and non-refundable license fees for the use of patents, patent licensing royalties on covered products sold by licensees, and the compensation structure and ownership of intellectual property rights associated with contractual technology development arrangements.

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We account for revenue in accordance with Accounting Standards Update (“ASU”) No.2014-09, Revenue from Contracts with Customers (“Topic 606”), which we adopted on January 1, 2018 using the modified-retrospective method (see Note 15 – Effects of Adopting ASU Topic 606).

Under Topic 606 a performance obligation is a promise in a contract to transfer a distinct good or service to the customer. A contract’s transaction price is allocated to each distinct performance obligation and recognized as revenue when, or as, the performance obligation is satisfied. Our revenue arrangements may consist of multiple-element arrangements, with revenue for each unit of accounting recognized as the product or service is delivered to the customer.

With the licensing of our patents, performance obligations are generally satisfied at a point in time as work is complete and our patent rights are transferred to our customers. We generally have no further obligation to our customers regarding our technology.

Certain contracts may require our customers to enter into a hosting arrangement with us and for these arrangements’ revenue is recognized over time, generally over the life of the servicing contract.

Prior to January 1, 2018 we recognized revenue in accordance with previous guidance which required consideration to be allocated to each element of an agreement using the relative fair value method. In other circumstances, such as those agreements involving consideration for past and expected future patent royalty obligations, after consideration of the particular facts and circumstances, the appropriate recording of revenue between periods required the use of judgment. In all cases, revenue was only recognized after all the following criteria are met: (1) written agreements had been executed; (2) delivery of technology or intellectual property rights had occurred or services had been rendered; (3) fees were fixed or determinable; and (4) collectability of fees was reasonably assured.

Under the previous guidance, upon signing a patent license agreement, including licenses entered upon settlement of litigation, we provided the licensee permission to use our patented technology in specific applications. We accounted for patent license agreements with amounts allocated to each element based on their fair values and we elected to utilize the leased-based model for revenue recognition with revenue being recognized over the expected period of benefit to the licensee.

Deferred revenue

From 2013 to 2016, we received payments totaling \$10,000 under a contract (“August 2013 Contract Settlement”). In accordance with our revenue recognition policy, we deferred and then recognized revenue over the life of the contract, but not ahead of collection. We adopted Topic 606 on January 1, 2018 using the modified retrospective approach as discussed above. As a result, revenues totaling \$2,500 under the contract were no longer deferred and were written down as an adjustment to the opening balance of retained earnings (see Note 15 – Effects of Adopting ASU Topic 606).

Royalty Expense

Royalty expense for the years ended December 31, 2018, 2017 and 2016 was \$0, \$0 and \$884, respectively, and was a result of our royalty agreement with Leidos. The agreement provides for revenue sharing and legal reimbursements related to attorney time and expenses incurred by Leidos during discovery and other aspects of litigation involving the defense of our patents which have been resolved.

Earnings Per Share

Basic earnings per share are computed by dividing earnings available to common stockholders by the weighted average number of outstanding common shares during the period. Diluted earnings per share are computed by dividing net income by the weighted average number of shares outstanding during the period increased to include the number of additional shares of common stock that would have been outstanding if the potentially dilutive securities had been issued. During the years ended 2018, 2017 and 2016 we incurred losses. Therefore, the effects of any common stock equivalent were anti-dilutive during those periods.

Concentration of Credit Risk and Other Risks and Uncertainties

Our cash and cash equivalents are primarily maintained at two major financial institutions in the United States. A portion of those balances are insured by the Federal Deposit Insurance Corporation. During the year ended

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December 31, 2018, and 2017 we had, at times, funds which were uninsured. We do not believe that we are subject to any unusual financial risk beyond the normal risk associated with commercial banking relationships with major financial institutions. We have not experienced any losses on our deposits of cash and cash equivalents.

Impairment of Long-Lived Assets

We identify and record impairment losses on long-lived assets used in operations when events and changes in circumstances indicate that the carrying amount of an asset might not be recoverable, but not less than annually. Recoverability is measured by comparison of the anticipated future net undiscounted cash flows to the related assets' carrying value. If such assets are considered to be impaired, the impairment to be recognized is measured by the amount by which the carrying amount of the assets exceeds the projected discounted future net cash flows arising from the asset.

Income Taxes

We account for income taxes using the asset and liability method. The asset and liability method requires the recognition of deferred tax assets and liabilities for expected future tax consequences of temporary differences that currently exist between the tax basis and financial reporting basis of our assets and liabilities. We calculate current and deferred tax provisions based on estimates and assumptions that could differ from actual results reflected on the income tax returns filed during the following years. Adjustments based on filed returns are recorded when identified in the subsequent years. The effect on deferred taxes for a change in tax rates is recognized in income in the period that the tax rate change is enacted. In assessing our deferred tax assets, we consider whether it is more likely than not that all or some portion of the deferred tax assets will not be realized.

A valuation allowance is provided for deferred income tax assets when, in our judgment, based upon currently available information and other factors, it is more likely than not that all or a portion of such deferred income tax assets will not be realized. The determination of the need for a valuation allowance is based on an on-going evaluation of current information including, among other things, historical operating results, estimates of future earnings in different taxing jurisdictions and the expected timing of the reversals of temporary differences. We believe the determination to record a valuation allowance to reduce a deferred income tax asset is a significant accounting estimate because it is based, among other things, on an estimate of future taxable income in the United States and certain other jurisdictions, which is susceptible to change and may or may not occur, and because the impact of adjusting a valuation allowance may be material. In determining when to release the valuation allowance established against our net deferred income tax assets, we consider all available evidence, both positive and negative. Consistent with our policy, and because of our history of operating losses, we do not currently recognize the benefit of all our deferred tax assets, including tax loss carry forwards, that may be used to offset future taxable income. We continually assess our ability to generate sufficient taxable income during future periods in which our deferred tax assets may be realized. If and when we believe it is more likely than not that we will recover our deferred tax assets, we will reverse the valuation allowance as an income tax benefit in our statements of operations.

We account for our uncertain tax positions in accordance with U.S. GAAP. The U.S. GAAP method of accounting for uncertain tax positions utilizes a two-step approach to evaluate tax positions. Step one, recognition, requires evaluation of the tax position to determine if based solely on technical merits it is more likely than not to be sustained upon examination. Step two, measurement, is addressed only if a position is more likely than not to be sustained. In step two, the tax benefit is measured as the largest amount of benefit, determined on a cumulative probability basis, which is more likely than not to be realized upon ultimate settlement with tax authorities. If a position does not meet the more likely than not threshold for recognition in step one, no benefit is recorded until the first subsequent period in which the more likely than not standard is met, the issue is resolved with the taxing authority, or the statute of limitations expires. Positions previously recognized are derecognized when we subsequently determine the position no longer is more likely than not to be sustained. Evaluation of tax positions, their technical merits, and measurements using cumulative probability are highly subjective management estimates. Actual results could differ materially from these estimates.

On December 22, 2017, the President of the United States signed into law the Tax Cuts and Jobs Act (the "Act"). The Act amended the Internal Revenue Code to reduce tax rates and modify policies, credits, and deductions for individuals and businesses. For businesses, the Act reduced the corporate federal tax rate from a maximum of 35% to a 21% rate effective on January 1, 2018. The tax rate of 21% was applied to the balances of our federal deferred tax assets and liabilities at December 31, 2018, but because we provided a full valuation allowance against our net deferred tax assets, no tax impact was recognized due to the federal tax rate change.

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The Act changes the worldwide territorial tax system. The new Section 951A impose Global Intangible Low-Taxed Income “GILTI” tax on taxpayers who own 10% or more of a controlled foreign corporation. GILTI is broadly the excess income of foreign subsidiaries over the routine return on tangible business assets. The company has no GILTI tax liability in 2018 because its foreign subsidiary has negative earnings in 2018.

Stock-based Compensation

We account for stock-based compensation using the fair value recognition method. We recognize these compensation costs on a straight-line basis over the requisite service period of the award, which is generally based on the option vesting term of 4 years. Beginning January 1, 2017, we discontinued estimating forfeitures for time-based awards upon adoption of ASU No. 2016-09 – “Compensation – Stock Compensation”.

In addition, we record stock-based compensation expense for awards granted to non-employees at fair value of the consideration received or the fair value of the equity investments issued generally as they vest over the performance period.

Fair Value

We apply fair value accounting to all financial assets and liabilities and non-financial assets and liabilities that are recognized or disclosed at fair value in the financial statements on a recurring basis. Fair value is estimated by applying the following hierarchy, which prioritizes the inputs used to measure fair value into three levels and bases the categorization within the hierarchy upon the lowest level of input that is available and significant to the fair value measurement:

Level 1 – Quoted prices in active markets for identical assets or liabilities.

Level 2 – Observable inputs other than quoted prices in active markets for identical assets and liabilities, quoted prices for identical or similar assets or liabilities in inactive markets, or other inputs that are observable or can be corroborated by observable market data for substantially the full term of the assets or liabilities.

Level 3 – Inputs that are generally unobservable and typically reflect management’s estimate of assumptions that market participants would use in pricing the asset or liability.

Our financial instruments are stated at amounts that equal, or are intended to approximate, fair value. When we approximate fair value, we utilize market data or assumptions that we believe market participants would use in pricing the financial instrument, including assumptions about risk and inputs to the valuation technique. We use quoted valuation techniques, primarily the income and market approach that maximize the use of observable inputs and minimize the use of unobservable inputs for recurring fair value measurements.

New Accounting Pronouncements

In August 2018 the Financial Accounting Standards Board (“FASB”) issued Accounting Standards Update (“ASU”) 2018-13 - Fair Value Measurement (“Topic 820”). The FASB is issuing the amendments in this ASU as part of the disclosure framework project. On March 4, 2014, the Board issued a proposed FASB Concepts Statement, Conceptual Framework for Financial Reporting—Chapter 8: Notes to Financial Statements, which the Board finalized on August 28, 2018. The disclosure framework project’s objective and primary focus are to improve the effectiveness of disclosures in the notes to financial statements by facilitating clear communication of the information required by GAAP that is most important to users of each entity’s financial statements. The amendments in this ASU are effective for all entities for fiscal years, and interim periods within those fiscal years, beginning after December 15, 2019. We are evaluating the impact this guidance will have on our financial position and statement of operations.

In June 2016, the FASB issued ASU No. 2016-13, Financial Instruments-Credit Losses (“Topic 326”). The purpose of this ASU is to require a financial asset measured at amortized cost basis to be presented at the net amount expected to be collected. Credit losses relating to available-for-sale debt securities should be recorded through an allowance for credit losses. This ASU is effective for interim and annual reporting periods beginning after December 15, 2019. We are evaluating the impact this guidance will have on our financial position and statement of operations.

In February 2016, FASB issued ASU No. 2016-02, Leases (“Topic 842”). Topic 842 requires an entity to recognize right-of-use assets and lease liabilities on its balance sheet and disclose key information about leasing arrangements.

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For public companies, Topic 842 is effective for annual reporting periods beginning after December 15, 2018, including interim periods within that reporting period, with early adoption permitted. We have evaluated this ASU and believe this guidance will not have a material impact on our financial position and statement of operations.

In May 2014, the FASB issued ASU No. 2014-09 Revenue from Contracts with Customers. As amended, Topic 606 supersedes prior revenue recognition requirements including most industry-specific revenue recognition guidance. In summary, the core principle of Topic 606 is that an entity recognizes revenue to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. On January 1, 2018 we adopted this standard which resulted in a \$2,500 decrease in the opening balance of our accumulated deficit and a \$2,500 decrease in deferred revenue in our consolidated balance sheet (see Note 15 — Effects of Adopting ASU Topic 606).

Results of Operations (all amounts in this section are expressed in thousands)

Revenue

| | <u>2018</u> | <u>2017</u> | <u>2016</u> |
|---------|-------------|-------------|-------------|
| Revenue | \$ 63 | \$ 1,547 | \$ 1,550 |

Revenue generated for the year ended December 31, 2018 was \$63 compared to December 31, 2017 of \$1,547, and December 31, 2016 revenue of approximately \$1,550. Revenue for the year ended December 31, 2018 of \$63, was largely attributable to royalty revenues as part of license agreements, with the decline when compared to 2017 attributed to the adoption of Topic 606 in 2018 as described in Note 15 – Effects of Adopting ASU Topic 606. Revenues for the year ended December 31, 2017 and 2016 were largely attributable to the 2013 Contract Settlement. Under the terms of the 2013 Contract Settlement we collected annual payments of \$2,500 over the contract period for a total of \$10,000. During 2017 and 2016 we recognized \$1,500 and \$1,500 respectively, of revenue for royalties from the 2013 Contract Settlement and \$47 and \$50 respectively, of revenue for royalties from other licensees.

In addition to the settlement discussed above, during 2018, 2017 and 2016 we recognized royalty revenue as part of license agreements entered into with customers during the patent infringement actions (see Note 13 “Litigation”). These revenues relate to payment for use of our patented technology prior to the signing of a license agreement, and royalty payments after the execution of the license agreements. No amounts were allocable to settlement fees, expense reimbursement, damages or any other amounts other than historical and future sales as no such amounts were requested or received.

Research and Development Expenses

| | <u>2018</u> | <u>2017</u> | <u>2016</u> |
|--------------------------|-------------|-------------|-------------|
| Research and Development | \$ 4,815 | 4,159 | \$ 4,155 |

Research and development costs include expenses paid to outside development consultants and compensation-related expenses for our engineering staff. Research and development costs are expensed as incurred.

Our research and development expenses for the year ended December 31, 2018 were \$4,815 compared to December 31, 2017 of \$4,159 and \$4,155 for the year ended December 31, 2016. The increase in 2018 compared to 2017 was primarily due to the increase in wages and bonuses.

Selling, General and Administrative Expenses

| | <u>2018</u> | <u>2017</u> | <u>2016</u> |
|-------------------------------------|-------------|-------------|-------------|
| Selling, General and Administrative | \$ 20,705 | \$ 14,709 | \$ 25,016 |

Selling, general and administrative expenses include compensation expense for management and administrative personnel, as well as expenses for outside legal, accounting, and consulting services.

Our selling, general and administrative expenses for the year ended December 31, 2018 was \$20,705 compared to December 31, 2017 of \$14,709 and \$25,016 for the year ended December 31, 2016. The volatility within selling, general and administrative expenses was primarily due to legal fees related to cases involving the defense of our patents. Legal fees were \$9,706, \$3,657 and \$13,002 in 2018, 2017 and 2016, respectively and represent approximately 47% of general and administrative expenses for 2018 compared to 25% for 2017 and 52% for 2016.

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Also included in selling, general and administrative expense is royalty expense of \$884 for the year ended December 31, 2016, paid to Leidos, in connection with the settlement with Microsoft, Avaya and Mitel et al.

Other Income and Expenses

| | 2018 | 2017 | 2016 |
|---------------------------|-------|-------|-------|
| Interest and Other Income | \$ 54 | \$ 46 | \$ 69 |

Interest and other income for the year ended December 31, 2018 was \$54, compared to December 31, 2017 of \$46 and \$69 for the year ended December 31, 2016.

Effective Income Tax Rate

A reconciliation of the United States federal statutory income tax rate to our effective income tax rate is as follows:

| | Year Ended December 31, 2018 | Year Ended December 31, 2017 | Year Ended December 31, 2016 |
|--------------------------------------|---------------------------------|---------------------------------|---------------------------------|
| United States federal statutory rate | 21.00% | 35.00% | 35.00% |
| State taxes, net of federal benefit | (0.01)% | (0.01)% | (0.31)% |
| Valuation allowance | (24.33)% | (35.94)% | (35.43)% |
| Accounting method change - ASC 606 | 2.07% | — | — |
| R&D Credit | 1.53% | 1.43% | 0.66% |
| Other | (0.27)% | (0.50)% | (0.39)% |
| Effective income tax rate | <u>(0.01)%</u> | <u>(0.02)%</u> | <u>(0.47)%</u> |

In 2018, 2017 and 2016, we had pre-tax losses of \$25 million, \$17 million and \$28 million, respectively, which are available for carry forward to offset future taxable income. We made determinations to provide full valuation allowances for our net deferred tax assets at the end of 2018, 2017 and 2016, including NOL carryforwards generated during the years, based on our evaluation of positive and negative evidence, including our history of operating losses and the uncertainty of generating future taxable income that would enable us to realize our deferred tax.

Liquidity and Capital Resources

For the year ended December 31, 2018, our cash and cash equivalents totaled \$7,611 and our short-term investments totaled \$1,803 compared to \$3,135 and \$1,453, respectively, for the year ended December 31, 2017.

We expect that our cash and cash equivalents and short-term investments as of December 31, 2018, and the \$2,936 in proceeds subsequent to December 31, 2018, from sales of our common shares under the ATM, as well as the possibility of future sales of common shares under the ATM and the universal shelf registration statement, described below, will be sufficient to fund our current level of selling, general and administration costs, including legal expenses and provide related working capital for the foreseeable future. Over the longer term, we expect to derive the majority of our future revenue from license fees and royalties associated with our patent portfolio, technology, software and secure domain name registry in the United States and other markets around the world.

Universal Shelf Registration and ATM Offering

On August 21, 2015, we filed a universal shelf registration statement with the SEC that enabled us to offer and sell from time to time up to \$100,000 of equity, debt or other types of securities. We also entered into an ATM equity offering sales agreement with Cowen on August 20, 2015 ("2015 ATM"), under which we could offer and sell shares of our common stock having an aggregate value of up to \$35,000. On March 8, 2018, we amended our August 20, 2015 equity offering sales agreement with Cowen whereby the maximum aggregate value of the Company's common stock we could offer and sell, from time to time, was increased from \$35,000 to \$50,000. This registration statement expired on September 2, 2018.

On July 30, 2018 we filed a \$100,000 replacement registration statement on SEC Form S-3, which replaced the S-3 registration statement discussed above. We had used approximately 40% of that S-3 registration. The replacement registration statement was declared effective by the SEC on August 16, 2018 enabling us to offer and sell from time to time up to \$100,000 of equity, debt or other types of securities. We also entered into an ATM equity offering sales

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agreement with Cowen on August 31, 2018 (“2018 ATM”), under which we could offer and sell shares of our common stock having an aggregate value of up to \$50,000. We use the proceeds of this offering for GABRIEL product development and marketing, and general corporate purposes, which may include working capital, capital expenditures, other corporate expenses and acquisitions of complementary products, technologies or businesses.

During the year ended December 31, 2018, we sold 4,062,100 shares under the 2015 ATM. The average sales price per common share was \$3.77 and the aggregate proceeds from the sales totaled \$15,295 during the period. Sales commissions, fees and other costs associated with the ATM totaled \$459.

During the year ended December 31, 2018, we sold 3,448,455 shares under the 2018 ATM. The average sales price per common share was \$3.64 and the aggregate proceeds from the sales totaled \$12,542 during the period. Sales commissions, fees and other costs associated with the ATM totaled \$326.

Contractual Commitments

| | <u>Total</u> | <u>2019</u> |
|--------|--------------|-------------|
| Leases | \$ 46 | \$ 46 |
| Total | \$ 46 | \$ 46 |

Off-Balance Sheet Arrangements

As of December 31, 2018, we had no off-balance sheet arrangements.

Item 7A. Quantitative and Qualitative Disclosures about Market Risk

We invest our excess cash primarily in highly liquid debt instruments including corporate, government and federal agency securities. By policy, we limit the amount of credit exposure to any one issuer.

Investments in fixed rate securities carry a degree of interest rate risk. Fixed rate securities may have their fair market value adversely impacted due to a rise in interest rates. Due in part to these factors, our income from investments may decrease in the future.

We considered the historical volatility of short-term interest rates and determined that it was reasonably possible that an adverse change of 100 basis points could be experienced in the near term but would have an immaterial impact in the fair value of our marketable securities as they will be maturing in six months or less.

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Item 8. Financial Statements and Supplementary Data

FINANCIAL STATEMENTS

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Board of Directors and
Stockholders of VirnetX Holding Corporation

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of VirnetX Holding Corporation (the “Company”) as of December 31, 2018 and 2017, and the related consolidated statements of income, comprehensive loss, stockholders’ equity, and cash flows for each of the years in the three-year period ended December 31, 2018, and the related notes (collectively referred to as the financial statements). In our opinion, the financial statements present fairly, in all material respects, the consolidated financial position of the Company as of December 31, 2018 and 2017, and the consolidated results of their operations and cash flows for each of the years in the three-year period ended December 31, 2018, in conformity with accounting principles generally accepted in the United States of America. We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company’s internal control over financial reporting as of December 31, 2018, based on criteria established in Internal Control—Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO), and our report dated March 18, 2019, expressed an unqualified opinion.

Basis for Opinion

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

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the 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.

/s/ Farber Hass Hurley LLP

We have served as the Company’s auditor since 2008.

Chatsworth, California
March 18, 2019

VIRNETX HOLDING CORPORATION
CONSOLIDATED BALANCE SHEETS
(in thousands, except share amounts)

| | As of December 31, 2018 | As of December 31, 2017 |
|---|----------------------------|----------------------------|
| ASSETS | | |
| Current assets: | | |
| Cash and cash equivalents | \$ 7,611 | \$ 3,135 |
| Investments available for sale | 1,803 | 1,453 |
| Accounts receivables | 6 | — |
| Prepaid expenses and other current assets | 718 | 591 |
| Total current assets | 10,138 | 5,179 |
| Prepaid expenses, non-current | 1,604 | 1,989 |
| Property and equipment, net | 9 | 7 |
| Total assets | \$ 11,751 | \$ 7,175 |
| LIABILITIES AND STOCKHOLDERS' EQUITY | | |
| Current liabilities: | | |
| Accounts payable and accrued liabilities | \$ 1,050 | \$ 414 |
| Accrued payroll and related expenses | 277 | 2,175 |
| Other liabilities, current | 140 | — |
| Income tax liability | 396 | 393 |
| Deferred revenue, current portion | — | 1,500 |
| Total current liabilities | 1,863 | 4,482 |
| Deferred revenue, non-current portion | — | 1,000 |
| Other liabilities | — | 140 |
| Total liabilities | 1,863 | 5,622 |
| Commitments and contingencies (Note 4) | — | — |
| Stockholders' equity: | | |
| Preferred stock, par value \$0.0001 per share Authorized: 10,000,000 shares at December 31, 2018 and December 31, 2017, Issued and outstanding: 0 shares at December 31, 2018 and December 31, 2017 | — | — |
| Common stock, par value \$0.0001 per share Authorized: 100,000,000 shares at December 31, 2018 and December 31, 2017, Issued and outstanding: 66,879,847 shares and 59,051,978 shares, at December 31, 2018 and December 31, 2017, respectively | 7 | 6 |
| Additional paid-in capital | 208,317 | 177,076 |
| Accumulated deficit | (198,422) | (175,516) |
| Accumulated other comprehensive loss | (14) | (13) |
| Total stockholders' equity | 9,888 | 1,553 |
| Total liabilities and stockholders' equity | \$ 11,751 | \$ 7,175 |

See accompanying notes to consolidated financial statements.

VIRNETX HOLDING CORPORATION
CONSOLIDATED STATEMENTS OF OPERATIONS

(in thousands, except share and per share amounts)

| | Year Ended December 31, 2018 | Year Ended December 31, 2017 | Year Ended December 31, 2016 |
|---|---------------------------------|---------------------------------|---------------------------------|
| Revenue | \$ 63 | \$ 1,547 | \$ 1,550 |
| Operating expense: | | | |
| Royalty expense | — | — | 884 |
| Research and development | 4,815 | 4,159 | 4,155 |
| Selling, general and administrative expenses | 20,705 | 14,709 | 25,016 |
| Total operating expense | 25,520 | 18,868 | 30,055 |
| Loss from operations | (25,457) | (17,321) | (28,505) |
| Interest and other income, net | 54 | 46 | 69 |
| Loss before taxes | (25,403) | (17,275) | (28,436) |
| Income tax expense | (3) | (3) | (133) |
| Net loss | \$ (25,406) | \$ (17,278) | \$ (28,569) |
| Basic and diluted loss per share | \$ (0.40) | \$ (0.30) | \$ (0.51) |
| Weighted average shares outstanding basic and diluted | 62,985,763 | 58,354,397 | 55,984,825 |

VIRNETX HOLDING CORPORATION
CONSOLIDATED STATEMENTS OF COMPREHENSIVE LOSS
(in thousands)

| | Year Ended December 31, 2018 | Year Ended December 31, 2017 | Year Ended December 31, 2016 |
|---|---------------------------------|---------------------------------|---------------------------------|
| Net loss | \$ (25,406) | \$ (17,278) | \$ (28,569) |
| Other comprehensive (loss), net of tax: | | | |
| Change from foreign currency translation, net of tax | — | — | 3 |
| Change in unrealized gain (loss) on investments, net of tax | (1) | (1) | 4 |
| Total other comprehensive gain (loss), net of tax | (1) | (1) | 7 |
| Comprehensive loss | \$ (25,407) | \$ (17,279) | \$ (28,562) |

See accompanying notes to consolidated financial statements.

VirnetX Holding Corporation
CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY
(in thousands, except share amounts)

| | Common Stock | | Additional Paid-in Capital | Accumulated Deficit | Accumulated Other Comprehensive Loss | Total Stockholders' Equity (Deficit) |
|---|-------------------|------------|----------------------------------|------------------------|---|---|
| | Shares | Amount | | | | |
| Balance at December 31, 2015 | 53,198,835 | \$5 | \$144,778 | \$ (129,669) | \$ (19) | \$ 15,095 |
| Stock issued for cash at \$3.00-\$5.05 per share, net | 4,760,594 | 1 | 19,195 | | | 19,196 |
| Stock-based compensation | | | 5,398 | | | 5,398 |
| Exercise of options | 50,357 | | 20 | | | 20 |
| Stock issued for vested RSUs | 135,102 | | | | | |
| Comprehensive income: | | | | | | |
| Net Loss | | | | (28,569) | | (28,569) |
| Other comprehensive income, net of tax | | | | | 7 | 7 |
| Comprehensive loss | | | | | | (28,562) |
| Balance at December 31, 2016 | 58,144,888 | \$6 | \$169,391 | \$ (158,238) | \$ (12) | \$ 11,147 |
| Stock issued for cash at \$4.00-\$5.69 per share, net | 730,444 | | 3,677 | | | 3,677 |
| Stock-based compensation | | | 3,986 | | | 3,986 |
| Exercise of options | 12,500 | | 22 | | | 22 |
| Stock issued for vested RSUs | 164,146 | | | | | |
| Comprehensive income: | | | | | | |
| Net Loss | | | | (17,278) | | (17,278) |
| Other comprehensive loss, net of tax | | | | | (1) | (1) |
| Comprehensive loss | | | | | | (17,279) |
| Balance at December 31, 2017 | 59,051,978 | \$6 | \$177,076 | \$ (175,516) | \$ (13) | \$ 1,553 |
| Cumulative effect of accounting change | | | | 2,500 | | 2,500 |
| Stock issued for cash at \$3.00 -\$4.89 per share, net | 7,510,555 | 1 | 27,051 | | | 27,052 |
| Stock-based compensation | | | 4,055 | | | 4,055 |
| Exercise of options | 117,229 | | 135 | | | 135 |
| Stock issued for vested RSUs | 200,085 | | | | | |
| Comprehensive income: | | | | | | |
| Net Loss | | | | (25,406) | | (25,406) |
| Other comprehensive loss, net of tax | | | | | (1) | (1) |
| Comprehensive loss | | | | | | (25,407) |
| Balance at December 31, 2018 | 66,879,847 | \$7 | \$208,317 | \$ (198,422) | \$ (14) | \$ 9,888 |

See accompanying notes to consolidated financial statements.

VIRNETX HOLDING CORPORATION
CONSOLIDATED STATEMENTS OF CASH FLOWS
(in thousands)

| | Year Ended December 31, 2018 | Year Ended December 31, 2017 | Year Ended December 31, 2016 |
|--|---------------------------------|---------------------------------|---------------------------------|
| Cash flows from operating activities: | | | |
| Net loss | \$ (25,406) | \$ (17,278) | \$ (28,569) |
| Adjustments to reconcile net loss to net cash from operating activities: | | | |
| Depreciation | 18 | 26 | 28 |
| Amortization of warrant issuance costs | — | — | 30 |
| Stock-based compensation | 4,055 | 3,986 | 5,398 |
| Changes in assets and liabilities: | | | |
| Prepaid expenses and other current assets | 258 | 382 | 451 |
| Accounts payable | 636 | (1,392) | (477) |
| Other liabilities | — | 140 | — |
| Accrued payroll and related expenses | (1,856) | 695 | 232 |
| Accounts receivable | (6) | — | — |
| Related-party payable | — | — | (11) |
| Income tax liability | 3 | (3) | (4) |
| Deferred revenue | — | (1,500) | 1,000 |
| Net cash used in operating activities | <u>(22,298)</u> | <u>(14,944)</u> | <u>(21,922)</u> |
| Cash flows from investing activities: | | | |
| Purchase of property and equipment | — | — | (13) |
| Purchase of investments | (3,090) | (946) | (10,527) |
| Proceeds from sale or maturity of investments | 2,720 | 8,741 | 11,240 |
| Net cash (used in) provided by investing activities | <u>(370)</u> | <u>7,795</u> | <u>700</u> |
| Cash flows from financing activities: | | | |
| Proceeds from exercise of options | 135 | 22 | 20 |
| Proceeds from sale of common stock | 27,051 | 3,677 | 19,196 |
| Payments of taxes on cashless exercise of restricted stock units | (42) | (42) | (93) |
| Net cash provided by financing activities | <u>27,144</u> | <u>3,657</u> | <u>19,123</u> |
| Net increase (decrease) in cash and cash equivalents | 4,476 | (3,492) | (2,099) |
| Cash and cash equivalents, beginning of period | 3,135 | 6,627 | 8,726 |
| Cash and cash equivalents, end of period | <u>\$ 7,611</u> | <u>\$ 3,135</u> | <u>\$ 6,627</u> |
| Cash paid for income taxes | <u>\$ 3</u> | <u>\$ 5</u> | <u>\$ 126</u> |
| Deferred revenue reclassified to retained earnings – ASC 606 adoption | <u>\$ 2,500</u> | <u>\$ —</u> | <u>\$ —</u> |

See accompanying notes to consolidated financial statements.

VirnetX Holding Corporation
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
(in thousands except share, per share and per device amounts)

Note 1 – Formation and Business of the Company

VirnetX Holding Corporation, which we refer to as “we”, “us”, “our”, “the Company” or “VirnetX”, is engaged in the business of commercializing a portfolio of patents. We seek to license our technology, including GABRIEL Connection Technology™, to various original equipment manufacturers, or OEMs, that use our technologies in the development and manufacturing of their own products within the IP-telephony, mobility, fixed-mobile convergence and unified communications markets. Prior to 2012 our revenue was limited to an insignificant amount of software royalties pursuant to the terms of a single license agreement. During 2013 and 2012 we had revenues from settlements of patent infringement disputes whereby we received consideration for past sales of licensees that utilized our technology, where there was no prior patent license agreement (see “Revenue Recognition”).

Our portfolio of intellectual property is the foundation of our business model. We currently own approximately 185 total patents and pending applications, including 70 U.S. patents/patent applications and 115 foreign patents/validations/pending applications. Our patent portfolio is primarily focused on securing real-time communications over the Internet, as well as related services such as the establishment and maintenance of a secure domain name registry. Our patented methods also have additional applications in the key areas of device operating systems and network security for Cloud services, M2M communications in areas of Smart City, Connected Car and Connected Home. The subject matter of all our U.S. and foreign patents and pending applications relates generally to securing communications over the internet and such covers all our technology and other products. Our issued U.S. and foreign patents expire at various times during the period from 2019 to 2024. Some of our issued patents and pending patent applications were acquired by our principal operating subsidiary; VirnetX, Inc., from Leidos, (f/k/a Science Applications International Corporation or SAIC) in 2006 and we are required to make payments to Leidos, based on cash or certain other values generated from those patents. The amount of such payments depends upon the type of value generated, and certain categories are subject to maximums and other limitations.

Note 2 – Summary of Significant Accounting Policies

The preparation of financial statements in conformity with accounting principles generally accepted in the United States requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reported period. The critical accounting policies we employ in the preparation of our consolidated financial statements are those which involve impairment of long-lived assets, income taxes, fair value of financial instruments and stock-based compensation.

Use of Estimates

We prepare our consolidated financial statements in accordance with accounting principles generally accepted in the U.S. (“U.S. GAAP”). In doing so, we have to make estimates and assumptions that affect our reported amounts of assets, liabilities, revenues, and expenses, as well as related disclosure of contingent assets and liabilities. In some cases, we could reasonably have used different accounting policies and estimates. In some cases, changes in the accounting estimates are reasonably likely to occur from period to period. Accordingly, actual results could differ materially from our estimates. To the extent that there are material differences between these estimates and actual results, our financial condition or results of operations will be affected. We base our estimates on past experience and other assumptions that we believe are reasonable under the circumstances, and we evaluate these estimates on an ongoing basis. We refer to accounting estimates of this type as critical accounting policies and estimates, which we discuss further below. We have reviewed our critical accounting policies and estimates with the audit committee of our board of directors.

Basis of Consolidation

The consolidated financial statements include the accounts of VirnetX Holding Corporation and our wholly-owned subsidiaries. All intercompany balances and transactions have been eliminated.

Revenue Recognition

We derive our revenue from patent licensing. The timing and amount of revenue recognized from each licensee depends upon a variety of factors, including the specific terms of each agreement and the nature of the deliverables and obligations. Such agreements may be complex and include multiple elements. These agreements may include, without limitation, elements related to the settlement of past patent infringement liabilities, up-front and non-refundable license fees for the use of patents, patent licensing royalties on covered products sold by licensees, and the compensation structure and ownership of intellectual property rights associated with contractual technology development arrangements.

We account for revenue in accordance with Accounting Standards Update (“ASU”) No. 2014-09, Revenue from Contracts with Customers (“Topic 606”), which we adopted on January 1, 2018 using the modified-retrospective method (see Note 15 – Effects of Adopting ASU Topic 606).

Under Topic 606 a performance obligation is a promise in a contract to transfer a distinct good or service to the customer. A contract’s transaction price is allocated to each distinct performance obligation and recognized as revenue when, or as, the performance obligation is satisfied. Our revenue arrangements may consist of multiple-element arrangements, with revenue for each unit of accounting recognized as the product or service is delivered to the customer. With the licensing of our patents, performance obligations are generally satisfied at a point in time as work is complete and our patent rights are transferred to our customers. We generally have no further obligation to our customers regarding our technology.

Certain contracts may require our customers to enter into a hosting arrangement with us and for these arrangements’ revenue is recognized over time, generally over the life of the servicing contract.

Prior to January 1, 2018 we recognized revenue in accordance with previous guidance which required consideration to be allocated to each element of an agreement using the relative fair value method. In other circumstances, such as those agreements involving consideration for past and expected future patent royalty obligations, after consideration of the particular facts and circumstances, the appropriate recording of revenue between periods required the use of judgment. In all cases, revenue was only recognized after all the following criteria are met: (1) written agreements had been executed; (2) delivery of technology or intellectual property rights had occurred or services had been rendered; (3) fees were fixed or determinable; and (4) collectability of fees was reasonably assured.

Under the previous guidance, upon signing a patent license agreement, including licenses entered upon settlement of litigation, we provided the licensee permission to use our patented technology in specific applications. We accounted for patent license agreements with amounts allocated to each element based on their fair values and we elected to utilize the leased-based model for revenue recognition with revenue being recognized over the expected period of benefit to the licensee.

Deferred Revenue

From 2013 to 2016, we received payments totaling \$10,000 under a contract. In accordance with our revenue recognition policy, we deferred and then recognized revenue over the life of the contract, but not ahead of collection. We adopted Topic 606 on January 1, 2018 using the modified retrospective approach as discussed above. As a result, revenues totaling \$2,500 under the contract were no longer deferred and were written down, and the opening balance of retained earnings was written up (see Note 15 – Effects of Adopting ASU Topic 606).

Activity under the August 2013 Contract Settlement was as follows:

| | <u>2018</u> | <u>2017</u> | <u>2016</u> |
|-------------------------------------|-------------|-----------------|-----------------|
| Deferred Revenue, beginning of year | \$ 2,500 | \$ 4,000 | \$ 3,000 |
| ASC 606 Adjustment | (2,500) | — | — |
| Payment received | — | — | 2,500 |
| Less: Amount amortized as revenue | — | 1,500 | 1,500 |
| Deferred Revenue, end of year | <u>\$ —</u> | <u>\$ 2,500</u> | <u>\$ 4,000</u> |

Royalty Expense

Royalty expense for the years ended December 31, 2018, 2017 and 2016 was \$0, \$0 and \$884, respectively and was a result of our royalty agreement with Leidos. The agreement provides for revenue sharing and legal reimbursements related to attorney time and expenses incurred by Leidos during discovery and other aspects of litigation matters that have been resolved.

Cash and Cash Equivalents

We consider all highly liquid investments purchased with original maturities of three months or less at the date of purchase to be cash equivalents. Our cash and cash equivalents are not subject to significant interest rate risk due to the short maturities of these investments.

Prepaid Expenses and Other Current Assets

Prepaid Expense and Other Current Assets on the consolidated balance sheet include the current portion of prepaid rent for a facility lease for corporate promotional and marketing purposes. In March 2014, the Company prepaid \$4,000 which is being amortized over the 10-year term of the lease. The unamortized non-current portion of the prepayment is included in Prepaid Expenses-Non-current on the consolidated balance sheet.

Investments

Investments are classified as available-for-sale and are recorded at fair market value. Unrealized gains and losses are reported as other comprehensive income. Realized gains and losses are recorded in income in the period they are realized using specific identification of each security's cost basis. We invest our excess cash primarily in highly liquid debt instruments including corporate, government and federal agency securities, with contractual maturities less than two years. By policy, we limit the amount of credit exposure to any one issuer.

Property and Equipment

Property and equipment are stated at historical cost, less accumulated depreciation and amortization. Depreciation and amortization are computed using the accelerated and straight-line methods over the estimated useful lives of the assets, which range from five to seven years. Repair and maintenance costs are charged to expense as incurred.

Concentration of Credit Risk and Other Risks and Uncertainties

Our cash and cash equivalents are primarily maintained at two major financial institutions in the United States. Deposits held with these financial institutions may exceed the amount of insurance provided on such deposits. A portion of those balances are insured by the Federal Deposit Insurance Corporation, or FDIC. During the year ended December 31, 2018 and 2017, we had, at times, funds that were uninsured. We do not believe that we are subject to any unusual financial risk beyond the normal risk associated with commercial banking relationships. We have not experienced any losses on our deposits of cash and cash equivalents.

Fair Value

The carrying amounts of our financial instruments, including cash equivalents, accounts payable, and accrued liabilities, approximate fair value because of their generally short maturities.

Intangible Assets

We record intangible assets at cost, less accumulated amortization. Amortization of intangible assets is provided over their estimated useful lives, which can range from 3 to 15 years, on either a straight-line basis or as revenue is generated by the assets.

Impairment of Long-Lived Assets

We identify and record impairment losses on long-lived assets used in operations when events and changes in circumstances indicate that the carrying amount of an asset might not be recoverable, but not less than annually. Recoverability is measured by comparison of the anticipated future net undiscounted cash flows to the related assets' carrying value. If such assets are considered to be impaired, the impairment to be recognized is measured by the amount by which the carrying amount of the assets exceeds the projected discounted future net cash flows arising from the asset.

Research and Development

Research and development costs include expenses paid to outside development consultants and compensation related expenses for our engineering staff. Research and development costs are expensed as incurred.

Income Taxes

We account for income taxes using the asset and liability method. The asset and liability method requires the recognition of deferred tax assets and liabilities for expected future tax consequences of temporary differences that currently exist between the tax basis and financial reporting basis of our assets and liabilities. We calculate current and deferred tax provisions based on estimates and assumptions that could differ from actual results reflected on the income tax returns filed during the following years. Adjustments based on filed returns are recorded when identified in the subsequent years. The effect on deferred taxes for a change in tax rates is recognized in income in the period that the tax rate change is enacted. In assessing our deferred tax assets, we consider whether it is more likely than not that all or some portion of the deferred tax assets will not be realized.

A valuation allowance is provided for deferred income tax assets when, in our judgment, based upon currently available information and other factors, it is more likely than not that all or a portion of such deferred income tax assets will not be realized. The determination of the need for a valuation allowance is based on an on-going evaluation of current information including, among other things, historical operating results, estimates of future earnings in different taxing jurisdictions and the expected timing of the reversals of temporary differences. We believe the determination to record a valuation allowance to reduce a deferred income tax asset is a significant accounting estimate because it is based, among other things, on an estimate of future taxable income in the United States and certain other jurisdictions, which is susceptible to change and may or may not occur, and because the impact of adjusting a valuation allowance may be material. In determining when to release the valuation allowance established against our net deferred income tax assets, we consider all available evidence, both positive and negative. Consistent with our policy, and because of our history of operating losses, we do not currently recognize the benefit of all of our deferred tax assets, including tax loss carry forwards, that may be used to offset future taxable income. We continually assess our ability to generate sufficient taxable income during future periods in which our deferred tax assets may be realized. If and when we believe it is more likely than not that we will recover our deferred tax assets, we will reverse the valuation allowance as an income tax benefit in our statements of operations.

We account for our uncertain tax positions in accordance with U.S. GAAP. The U.S. GAAP method of accounting for uncertain tax positions utilizes a two-step approach to evaluate tax positions. Step one, recognition, requires evaluation of the tax position to determine if based solely on technical merits it is more likely than not to be sustained upon examination. Step two, measurement, is addressed only if a position is more likely than not to be sustained. In step two, the tax benefit is measured as the largest amount of benefit, determined on a cumulative probability basis, which is more likely than not to be realized upon ultimate settlement with tax authorities. If a position does not meet the more likely than not threshold for recognition in step one, no benefit is recorded until the first subsequent period in which the more likely than not standard is met, the issue is resolved with the taxing authority, or the statute of limitations expires. Positions previously recognized are derecognized when we subsequently determine the position no longer is more likely than not to be sustained. Evaluation of tax positions, their technical merits, and measurements using cumulative probability are highly subjective management estimates. Actual results could differ materially from these estimates.

On December 22, 2017, the President of the United States signed into law the Tax Cuts and Jobs Act (the "Act"). The Act amended the Internal Revenue Code to reduce tax rates and modify policies, credits, and deductions for individuals and businesses. For businesses, the Act reduced the corporate federal tax rate from a maximum of 35% to a 21% rate effective on January 1, 2018. The tax rate of 21% was applied to the balances of our federal deferred tax assets and liabilities at December 31, 2018, but because we provided a full valuation allowance against our net deferred tax assets, no tax impact was recognized due to the federal tax rate change.

The Act changes the worldwide territorial tax system. The new Section 951A impose Global Intangible Low-Taxed Income "GILTI" tax on taxpayers who own 10% or more of a controlled foreign corporation. GILTI is broadly the excess income of foreign subsidiaries over the routine return on tangible business assets. The company has no GILTI tax liability in 2018 because its foreign subsidiary has negative earnings in 2018.

Stock-Based Compensation

We account for stock-based compensation using the fair value recognition method in accordance with U.S. GAAP. We recognize these compensation costs on a straight-line basis over the requisite service period of the award, which is generally the vesting term of 4 years. We do not estimate the forfeiture rate and recognize forfeitures, if any, when they occur. See Note 6 - Stock-Based Compensation below for additional information concerning our share-based compensation awards.

In addition, as required we record stock-based compensation expense for awards granted to non-employees at fair value of the consideration received or the fair value of the equity instruments issued as they vest over the performance period.

Earnings per Share

Basic earnings per share are computed by dividing earnings available to common stockholders by the weighted average number of outstanding common shares during the period. Diluted earnings per share is computed by dividing net income by the weighted average number of shares outstanding during the period increased to include the number of additional shares of common stock that would have been outstanding if the potentially dilutive securities had been issued. During 2018, 2017 and 2016 we incurred losses; therefore, the effect of any common stock equivalent would be anti-dilutive during these periods.

Reclassifications

Certain prior year amounts in the accompanying consolidated financial statements have been reclassified to conform to the current year's presentation.

New Accounting Pronouncements

In August 2018 the Financial Accounting Standards Board ("FASB") issued Accounting Standards Update ("ASU") 2018-13 - Fair Value Measurement (Topic 820). The FASB is issuing the amendments in this ASU as part of the disclosure framework project. On March 4, 2014, the Board issued a proposed FASB Concepts Statement, Conceptual Framework for Financial Reporting—Chapter 8: Notes to Financial Statements, which the Board finalized on August 28, 2018. The disclosure framework project's objective and primary focus are to improve the effectiveness of disclosures in the notes to financial statements by facilitating clear communication of the information required by GAAP that is most important to users of each entity's financial statements. The amendments in this ASU are effective for all entities for fiscal years, and interim periods within those fiscal years, beginning after December 15, 2019. We are evaluating the impact this guidance will have on our financial position and statement of operations.

In June 2016, the FASB issued ASU No. 2016-13, Financial Instruments—Credit Losses ("Topic 326"). The purpose of this ASU is to require a financial asset measured at amortized cost basis to be presented at the net amount expected to be collected. Credit losses relating to available-for-sale debt securities should be recorded through an allowance for credit losses. This ASU is effective for interim and annual reporting periods beginning after December 15, 2019. We are evaluating the impact this guidance will have on our financial position and statement of operations.

In February 2016, FASB issued ASU No. 2016-02, Leases ("Topic 842"). Topic 842 requires an entity to recognize right-of-use assets and lease liabilities on its balance sheet and disclose key information about leasing arrangements. For public companies, Topic 842 is effective for annual reporting periods beginning after December 15, 2018, including interim periods within that reporting period, with early adoption permitted. We have evaluated this ASU and believe this guidance will not have a material impact on our financial position and statement of operations.

In May 2014, the FASB issued ASU No. 2014-09 Revenue from Contracts with Customers. As amended, Topic 606 supersedes prior revenue recognition requirements including most industry-specific revenue recognition guidance. In summary, the core principle of Topic 606 is that an entity recognizes revenue to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. On January 1, 2018 we adopted this standard which resulted in a \$2,500 decrease in the opening balance of our accumulated deficit and a \$2,500 decrease in deferred revenue in our consolidated balance sheet (see Note 15 — Effects of Adopting ASU Topic 606).

Note 3 – Property and Equipment

Our major classes of property and equipment were as follows:

| | December 31 | |
|-----------------------------------|-------------|-------|
| | 2018 | 2017 |
| Office furniture | \$ 79 | \$ 79 |
| Computer equipment | 67 | 172 |
| Total | 146 | 251 |
| Less accumulated depreciation | (137) | (244) |
| Total property and equipment, net | \$ 9 | \$ 7 |

Depreciation expense for the years ended December 31, 2018, 2017 and 2016 was \$18, \$26 and \$28, respectively.

Note 4 – Commitments, Contingencies and Related Party Transactions

We lease our offices under an operating lease with a third party expiring in October 2019. We recognize rent expense on a straight-line basis over the term of the lease. Rent expense was \$56, for each of the years ended December 31, 2018, 2017 and 2016. Future minimum rents due under the lease total \$46 in 2019, when the lease expires.

We entered into a service agreement for the use of an aircraft from K2 Investment Fund LLC (“LLC”) for business travel for employees of the Company. We incurred approximately \$1,590, \$1,240, and \$772 in rental fees and reimbursements to the LLC during the years ended December 31, 2018, 2017 and 2016, respectively. We pay for the Company’s usage of the aircraft and have no rights to purchase. Our Chief Executive Officer and Chief Administrative Officer are the managing partners of the LLC and control the equity interests of the LLC. We entered into a 12-month non-exclusive agreement with the LLC for use of the plane at a rate of \$8 per flight hour, with no minimum usage requirement. The agreement contains other terms and conditions normal in such transactions and can be cancelled by either us or the LLC with 30 days’ notice. The agreement renews on an annual basis unless terminated by either party. Neither party has exercised their termination rights.

Note 5 – Stock Plan

We have a stock incentive plan for employees and others called the VirnetX Holding Corporation 2013 Equity Incentive Plan (the “2013 Plan”), which has been approved by our stockholders. To the extent that any award should expire, become un-exercisable or is otherwise forfeited, the shares subject to such award will again become available for issuance under the 2013 Plan. The 2013 Plan provides for the granting of stock options and restricted stock units purchase rights (“RSUs”) to our employees and consultants. Stock options granted under the 2013 Plan may be incentive stock options or nonqualified stock options. Incentive stock options (“ISOs”) may only be granted to our employees (including officers and directors). Nonqualified stock options (“NSOs”) and stock purchase rights may be granted to our employees and consultants.

The 2013 Plan will expire in 2023. Options may be granted under the 2013 Plan with an exercise price determined by our Board of Directors, or a duly appointed committee thereof, provided, however, that the exercise price of an option granted to any employee shall be not less than 100% of the fair market value at the date of grant in the case of ISOs or 85% of the fair market value at the date of grant in the case of an NSO. The exercise price of an ISO or NSO granted to one of our Named Executive Officers shall not be less than 100% fair market value of the shares at the date of grant and the exercise price of an ISO granted to a 10% shareholder shall not be less than 110% of the fair market value of the shares on the date of grant. Stock options granted under the 2013 Plan typically vest over four years and have a 10-year term. All RSUs are considered to be granted at the fair value of our stock on the date of grant because they have no exercise price. RSUs typically vest over four years. At December 31, 2018, there were 1,703,899 shares available for grant under the 2013 Plan.

Note 6 – Stock-Based Compensation

The following tables summarize information about stock options and RSUs outstanding at December 31, 2018:

| Options Outstanding | | | | Options Vested and Exercisable | | | |
|--------------------------|--------------------|---|---------------------------------|--------------------------------|---|---------------------------------|--|
| Range of Exercise Prices | Number Outstanding | Weighted Average Remaining Contractual Life (Years) | Weighted Average Exercise Price | Number Exercisable | Weighted Average Remaining Contractual Life (Years) | Weighted Average Exercise Price | |
| \$ 0.24- 1.58 | 653,816 | 0.26 | \$ 1.16 | 653,816 | 0.26 | \$ 1.16 | |
| \$ 1.74- 6.95 | 4,091,396 | 7.86 | 4.04 | 1,947,678 | 6.90 | 4.24 | |
| \$ 14.52- 35.25 | 1,253,625 | 3.71 | 23.16 | 1,253,625 | 3.71 | 23.16 | |
| | <u>5,998,837</u> | <u>6.16</u> | <u>\$ 7.72</u> | <u>3,855,119</u> | <u>4.74</u> | <u>\$ 9.87</u> | |

The following tables summarize activity under the Plan for the indicated periods:

| | Options | | | |
|--|------------------|---------------------------------|---|---------------------------|
| | Number of Shares | Weighted Average Exercise Price | Weighted Average Remaining Contractual Life (Years) | Aggregate Intrinsic Value |
| Outstanding at December 31, 2015 | 4,999,928 | \$ 8.76 | — | \$ — |
| Options granted | 429,000 | 4.77 | — | — |
| Options exercised | (50,357) | 0.40 | — | — |
| Outstanding at December 31, 2016 | 5,378,571 | \$ 8.52 | — | \$ — |
| Options granted | 1,613,500 | 4.06 | — | — |
| Options exercised | (12,500) | 1.74 | — | — |
| Options cancelled | (1,841,505) | 4.71 | — | — |
| Outstanding at December 31, 2017 | 5,138,066 | \$ 8.41 | — | \$ — |
| Options granted | 1,095,000 | 3.52 | — | — |
| Options exercised | (117,229) | 1.15 | — | — |
| Options cancelled | (117,000) | 5.34 | — | — |
| Outstanding at December 31, 2018 | 5,998,837 | \$ 7.72 | 6.16 | \$ 810 |
| Options exercisable at December 31, 2018 | 3,855,119 | \$ 9.87 | 4.74 | \$ 809 |

| | RSUs | | |
|----------------------------------|----------------|--|---------------------------|
| | Number of RSUs | Weighted Average Grant Date Fair Value | Aggregate Intrinsic Value |
| Outstanding at December 31, 2015 | 359,956 | \$ 13.22 | \$ — |
| RSUs granted | 219,331 | 4.75 | — |
| RSUs vested | (155,852) | 15.27 | — |
| Outstanding at December 31, 2016 | 423,435 | \$ 8.08 | \$ — |
| RSUs granted | 220,664 | 3.83 | — |
| RSUs vested | (174,438) | 10.47 | — |
| Outstanding at December 31, 2017 | 469,661 | \$ 5.19 | \$ — |
| RSUs granted | 246,663 | 3.26 | — |
| RSUs vested | (211,330) | 6.19 | — |
| Outstanding at December 31, 2018 | 504,994 | \$ 3.83 | \$ — |

Intrinsic value is calculated as the difference between the per-share market price of our common stock on the last trading day of 2018, which was \$2.40, and the exercise price of the options. For options exercised, the intrinsic value

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is the difference between market price and the exercise price on the date of exercise. We received cash proceeds of \$135, \$22 and \$20 from stock options exercised in 2018, 2017 and 2016, respectively. The total intrinsic value of options exercised was \$241, \$25 and \$91 during the years ended December 31, 2018, 2017 and 2016, respectively.

Stock-based compensation expense is included in general and administrative expense for each period as follows:

| Stock-Based Compensation by Type of Award | Year Ended | Year Ended | Year Ended |
|---|-------------------|-------------------|-------------------|
| | December 31, 2018 | December 31, 2017 | December 31, 2016 |
| Stock options | \$ 2,926 | \$ 2,446 | \$ 3,436 |
| RSUs | 1,129 | 1,540 | 1,962 |
| Total stock-based compensation expense | <u>\$ 4,055</u> | <u>\$ 3,986</u> | <u>\$ 5,398</u> |

As of December 31, 2018, there was \$5,960 of unrecognized stock-based compensation expense related to unvested employee stock options and \$1,442 of unrecognized stock-based compensation expense related to unvested RSUs. These costs are expected to be recognized over a weighted-average period of 2.67 and 2.38 years, respectively.

The fair value of each option grant was estimated on the date of grant using the Black-Scholes option pricing model using the following weighted average assumptions:

| | Year Ended | Year Ended | Year Ended |
|---------------------------------|-------------------|-------------------|-------------------|
| | December 31, 2018 | December 31, 2017 | December 31, 2016 |
| Expected stock price volatility | 85.26% | 84.91% | 79.6% |
| Risk-free interest rate | 2.73% | 1.94% | 1.85% |
| Expected life term | 6.02 years | 6.08 years | 6.03 years |
| Expected dividends | 0% | 0% | 0% |

Based on the Black-Scholes option pricing model, the weighted average estimated fair value of employee stock options granted was \$2.58, \$2.93 and \$3.25 per share during the years ended December 31, 2018, 2017 and 2016, respectively.

The expected life was determined using the simplified method outlined in ASC 718, "Compensation - Stock Compensation". Expected volatility of the stock options was based upon historical data and other relevant factors. We have not provided an estimate for forfeitures because we have had nominal forfeited options and RSUs and believed that all outstanding options and RSUs at December 31, 2018, would vest.

Note 7 – Earnings Per Share

Basic earnings per share are based on the weighted average number of shares outstanding for a period. Diluted earnings per share are based upon the weighted average number of shares and potentially dilutive common shares outstanding. Potential common shares outstanding principally include stock options, under our stock plan and warrants. During 2018, 2017 and 2016 we incurred losses; therefore, the effect of any common stock equivalent would be anti-dilutive during those periods.

The table below sets forth the basic and diluted loss per share calculations:

| | Year Ended December 31, | | |
|---|-------------------------|---------------|------------------|
| | 2018 | 2017 | 2016 |
| Net loss | \$ (25,406) | (17,278) | \$ (28,569) |
| Basic and diluted weighted average number of shares outstanding | 62,986 | 58,354 | 55,985 |
| Basic and diluted loss per share | <u>\$ (0.40)</u> | <u>(0.30)</u> | <u>\$ (0.51)</u> |

Note 8 – Common Stock

Each share of common stock has the right to one vote. The holders of common stock are entitled to receive dividends whenever funds are legally available and when declared by our Board of Directors, subject to the prior rights of holders of all classes of stock outstanding having priority rights as to dividends. Our restated articles of incorporation authorize us to issue up to 100,000,000 shares of \$.0001 par value common stock.

In August 2015, we filed a universal shelf registration statement with the SEC enabling us to offer and sell from time to time up to \$100 million of equity, debt or other types of securities. We also entered into an at-the-market ("ATM")

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equity offering sales agreement with Cowen & Company, LLC in August 2015, under which we may offer and sell shares of our common stock having an aggregate value of up to \$35 million. On March 8, 2018, we amended our August 20, 2015 equity offering sales agreement with Cowen whereby the maximum aggregate value of the Company's common stock we could offer and sell, from time to time, was increased from \$35,000 to \$50,000. This registration statement expired on September 2, 2018.

On July 30, 2018 we filed a \$100,000 replacement universal shelf registration statement on SEC Form S-3. This replacement registration statement was declared effective by the SEC on August 16, 2018. We also entered a new ATM with Cowen on August 31, 2018, under which we could offer and sell shares of our common stock having an aggregate value of up to \$50,000.

We intend to use the ATM proceeds for GABRIEL product development and marketing, and general corporate purposes, which may include working capital, capital expenditures, other corporate expenses and acquisitions of complementary products, technologies or businesses. As of December 31, 2018, common stock with an aggregate value of up to \$37,458 remained available for offer and sale under the ATM agreement.

We sold 7,510,555, 730,444 and 4,760,594 shares of common stock under the ATM program during the years ended December 31, 2018, 2017 and 2016 respectively. The average sales price per common share sold during the year ended December 31, 2018 was \$3.71 and the aggregate proceeds from the sales totaled \$27,837 during the period. Sales commissions, fees and other costs associated with the ATM transactions totaled \$785 for 2018. The average sales price per common share sold during the year ended December 31, 2017 was \$5.19 and the aggregate proceeds from the sales totaled \$3,790 during the period. Sales commissions, fees and other costs associated with the ATM transactions totaled \$113 for 2017. The average sales price per common share sold during the year ended December 31, 2016 was \$4.16 and the aggregate proceeds from the sales totaled \$19,791 during the period. Sales commissions, fees and other costs associated with the ATM totaled \$594 for 2016 (see Note 16 Subsequent Events).

Note 9 – Equity Warrants

In 2015 we issued warrants for the purchase of 25,000 shares of common stock at an exercise price of \$7 per share, which expire in April 2020. Information about warrants outstanding as of December 31, 2018 is as follows:

| Original Number of Warrants Issued | Exercise Price per Common Share | Exercisable at December 31, 2017 | Became Exercisable | Exercised | Terminated / Cancelled / Expired | Exercisable at December 31, 2018 | Expiration Date |
|------------------------------------|---------------------------------|----------------------------------|--------------------|-----------|----------------------------------|----------------------------------|-----------------|
| 25,000 | \$7.00 | 25,000 | — | — | — | 25,000 | April 2020 |

Note 10 – Employee Benefit Plan

We sponsor a defined contribution 401k plan covering substantially all our employees. Our matching contribution to the plan was approximately \$95, \$84 and \$90 in 2018, 2017 and 2016, respectively.

Note 11 – Income Taxes

The income tax provision is comprised of the following:

| | Year Ended December 31, 2018 | Year Ended December 31, 2017 | Year Ended December 31, 2016 |
|----------------------------|------------------------------|------------------------------|------------------------------|
| Current: | | | |
| Federal | \$ — | \$ — | \$ — |
| State | (3) | (3) | (133) |
| Foreign | — | — | — |
| | (3) | (3) | (133) |
| Deferred: | | | |
| Federal | — | — | — |
| State | — | — | — |
| Total income tax provision | \$ (3) | \$ (3) | \$ (133) |

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A reconciliation of the United States federal statutory income tax rate to our effective income tax rate is as follows:

| | Year Ended December 31, 2018 | Year Ended December 31, 2017 | Year Ended December 31, 2016 |
|--------------------------------------|---------------------------------|---------------------------------|---------------------------------|
| United States federal statutory rate | 21.00% | 35.00% | 35.00% |
| State taxes, net of federal benefit | (0.01)% | (0.01)% | (0.31)% |
| Valuation allowance | (24.33)% | (35.94)% | (35.43)% |
| Accounting method change - ASC 606 | 2.07% | — | — |
| R&D Credit | 1.53% | 1.43% | 0.66% |
| Other | (0.27)% | (0.50)% | (0.39)% |
| Effective income tax rate | <u>(0.01)%</u> | <u>(0.02)%</u> | <u>(0.47)%</u> |

In 2018, 2017 and 2016, we had pre-tax losses of \$25 million, \$17 million and \$28 million, respectively, which are available for carry forward to offset future taxable income. We made determinations to provide full valuation allowances for our net deferred tax assets at the end of 2018, 2017 and 2016, including NOL carryforwards generated during the years, based on our evaluation of positive and negative evidence, including our history of operating losses and the uncertainty of generating future taxable income that would enable us to realize our deferred tax assets.

Deferred tax assets (liabilities) consist of the following:

| | Year Ended December 31, 2018 | Year Ended December 31, 2017 |
|--|---------------------------------|---------------------------------|
| Deferred tax assets: | | |
| Reserves and accruals | \$ 45 | \$ 963 |
| Research and development credits and other credits | 1,635 | 1,300 |
| Net operating loss carry forward | 25,733 | 22,448 |
| Stock based compensation | 8,857 | 9,260 |
| Other | 26 | 54 |
| Total deferred tax assets | <u>36,296</u> | <u>34,025</u> |
| Valuation allowance | <u>(36,296)</u> | <u>(34,025)</u> |
| Deferred tax assets after valuation allowance | — | — |
| Deferred tax liability: | | |
| Depreciation and amortization | — | — |
| Total deferred tax liability | <u>—</u> | <u>—</u> |
| Net deferred tax assets | <u>\$ —</u> | <u>\$ —</u> |

On December 22, 2017, the President of the United States signed into law the Tax Cuts and Jobs Act (the "Act"). The Act amended the Internal Revenue Code to reduce tax rates and modify policies, credits, and deductions for individuals and businesses. For businesses, the Act reduced the corporate federal tax rate from a maximum of 35% to a 21% rate effective on January 1, 2018. The tax rate of 21% was applied to the balances of our federal deferred tax assets and liabilities at December 31, 2018, but because we provided a full valuation allowance against our net deferred tax assets, no tax impact is recognized due to the federal tax rate change.

The Act changes the worldwide territorial tax system. The new Section 951A impose Global Intangible Low-Taxed Income "GILTI" tax on taxpayers who own 10% or more of a controlled foreign corporation. GILTI is broadly the excess income of foreign subsidiaries over the routine return on tangible business assets. The company has no GILTI tax liability in 2018 because its foreign subsidiary has negative earnings in 2018.

In assessing the realization of deferred tax assets, management considers whether it is more likely than not that some portion or all deferred assets will not be realized. The ultimate realization of the deferred tax assets is dependent upon the generation of future taxable income during the periods in which those temporary differences become deductible.

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Based on the available objective evidence, management believes it is more likely than not that the net deferred tax assets at December 31, 2018 will not be fully realizable. Accordingly, management has maintained a full valuation allowance against its net deferred tax assets at December 31, 2018. The net change in the total valuation allowance for the 12 months ended December 31, 2018 was an increase of \$2,271. At December 31, 2018, we had federal and state net operating loss carry-forwards of approximately \$112,709 and \$107,948, respectively, expiring beginning in 2027 for federal and in 2028, for state. At December 31, 2018, we had federal research and development credit carry-forwards of approximately \$1,635, expiring beginning in 2031.

Internal Revenue Code Section 382 places a limitation (the "Section 382 Limitation") on the amount of taxable income that can be offset by net operating loss carry forwards after a change in control (generally greater than 50% change in ownership) of a loss corporation. California, the state in which our headquarters was once located, has similar rules. Our capitalization described herein may have resulted in such a change. Generally, after a control change, a loss corporation cannot deduct net operating loss carry forwards generated in years prior to the deemed change of control under IRC Section 382 in excess of the Section 382 Limitation. Management has done a high level analysis on the utilization of its NOL carryforwards against taxable income in future periods and determined on a more likely than not basis it will be able to use all of its NOLs before they expire.

We are required to recognize the financial statement effects of a tax position when it is more likely than not, based on the technical merits, that the position will be sustained upon examination. As a result, we have provided contingent reserve under ASC 740-10 of \$316 at December 31, 2018, 2017 and 2016. Our tax returns are subject to review by various tax authorities. The returns subject to review are those from 2005 forward.

Our policy is to recognize interest and penalties, if any, accrued on any unrecognized tax benefits, as a component of income tax expense. We had no interest or penalties accrued for the year ended December 31, 2018.

A reconciliation of beginning and ending amounts of unrecognized tax benefits follows:

| | Year Ended December 31, 2018 | Year Ended December 31, 2017 | Year Ended December 31, 2016 |
|--|---------------------------------|---------------------------------|---------------------------------|
| Balance at the beginning of the year | \$ 316 | \$ 316 | \$ 316 |
| Additions based on tax positions related to the current year | — | — | — |
| Additions for tax positions of prior years | — | — | — |
| Settlements | — | — | — |
| Lapse of applicable statute of limitations | — | — | — |
| Balance at the end of the year | <u>\$ 316</u> | <u>\$ 316</u> | <u>\$ 316</u> |

Note 12 – Fair Value Measurement

We apply fair value accounting for all financial assets and liabilities and non-financial assets and liabilities that are recognized or disclosed at fair value in the financial statements on a recurring basis. Fair value is estimated by applying the following hierarchy, which prioritizes the inputs used to measure fair value into three levels and bases the categorization within the hierarchy upon the lowest level of input that is available and significant to the fair value measurement:

Level 1 – Quoted prices in active markets for identical assets or liabilities.

Level 2 – Observable inputs other than quoted prices in active markets for identical assets and liabilities, quoted prices for identical or similar assets or liabilities in inactive markets, or other inputs that are observable or can be corroborated by observable market data for substantially the full term of the assets or liabilities.

Level 3 – Inputs that are generally unobservable and typically reflect management's estimate of assumptions that market participants would use in pricing the asset or liability.

The carrying amounts for cash and cash equivalents, investments in certificates of deposit, accounts payable and accrued expenses approximate their fair values due to the short period of time until maturity.

Mutual funds: Valued at the quoted net asset value (NAV) of shares held.

U.S. agency securities: Fair value measured at the closing price reported on the active market on which the individual securities are traded.

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The following table shows our cash and available-for-sale securities adjusted cost, gross unrealized gains, gross unrealized losses and fair value by significant investment category recorded as cash and cash equivalents of investments available for sale as of December 31, 2018 and 2017 (in thousands):

| December 31, 2018 | | | | | | |
|------------------------|------------------|---------------------|----------------------|-----------------|---------------------------------|--------------------------------------|
| | Adjusted Cost | Unrealized Gains | Unrealized Losses | Fair Value | Cash and Cash Equivalents | Investments Available for Sale |
| Cash | \$ 5,048 | \$ — | \$ — | \$ 5,048 | \$ 5,048 | \$ — |
| Level 1: | | | | | | |
| Mutual funds | 1,107 | — | — | 1,107 | 1,107 | — |
| U.S. agency securities | 3,259 | — | — | 3,259 | 1,456 | 1,803 |
| | 4,366 | — | — | 4,366 | 2,563 | 1,803 |
| Total | <u>\$ 9,414</u> | <u>\$ —</u> | <u>\$ —</u> | <u>\$ 9,414</u> | <u>\$ 7,611</u> | <u>\$ 1,803</u> |
| December 31, 2017 | | | | | | |
| | Adjusted Cost | Unrealized Gains | Unrealized Losses | Fair Value | Cash and Cash Equivalents | Investments Available for Sale |
| Cash | \$ 1,972 | \$ — | \$ — | \$ 1,972 | \$ 1,972 | \$ — |
| Level 1: | | | | | | |
| Mutual funds | 616 | \$ — | — | 616 | 616 | — |
| U.S. agency securities | 2,001 | \$ — | (1) | 2,000 | 547 | 1,453 |
| | 2,617 | \$ — | (1) | 2,616 | 1,163 | 1,453 |
| Total | <u>\$ 4,589</u> | <u>\$ —</u> | <u>\$ (1)</u> | <u>\$ 4,588</u> | <u>\$ 3,135</u> | <u>\$ 1,453</u> |

The maturities of our marketable securities generally range from within one to two years. Actual maturities could differ from contractual maturities due to call or prepayment provisions.

Note 13 – Litigation

We have multiple intellectual property infringement lawsuits pending in the United States District Court for the Eastern District of Texas, Tyler Division (“USDC”), and United States Court of Appeals for the Federal Circuit (“USCAFC”).

VirnetX Inc. v. Cisco Systems, Inc. et al. (Case 6:10-CV-00417-LED) (“Apple I”)

On August 11, 2010, we filed a complaint against Aastra USA, Inc. (“Aastra”), Apple Inc. (“Apple”), Cisco Systems, Inc. (“Cisco”), and NEC Corporation (“NEC”) the USDC in which we alleged that these parties infringe on certain of our patents (U.S. Patent Nos. 6,502,135, 7,418,504, 7,921,211 and 7,490,151). We sought damages and injunctive relief. The cases against each defendant were separated by the judge. Aastra and NEC agreed to sign license agreements with us and we dropped all accusations of infringement against them. A jury in USDC decided that our patents were not invalid and rendered a verdict of non-infringement by Cisco on March 4, 2013. Our motion for a new Cisco trial was denied and the case against Cisco was closed.

On November 6, 2012, a jury the USDC awarded us over \$368,000 for Apple’s infringement of four of our patents, plus daily interest up to the final judgment.

Apple filed an appeal of the judgment to the USCAFC. On September 16, 2014, USCAFC affirmed the USDC jury’s finding that all four of our patents at issue are valid and confirmed the USDC jury’s finding of infringement of VPN on Demand under many of the asserted claims of our ‘135 and ‘151 patents, and the USDC’s decision to allow evidence about our license and royalty rates regarding the determination of damages. However, the USCAFC vacated the USDC jury’s damages award and some of the USDC’s claim construction with respect to parts of our ‘504 and ‘211 patents and remanded the damages award and determination of infringement with respect to FaceTime back to the USDC for further proceedings.

On September 30, 2016, pursuant to the 2014 remand from the USCAFC, a jury in the USDC awarded us \$302,400 for Apple’s infringement of four of our patents. On September 29, 2017, the USDC entered its final

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judgement, denied all of Apple's post-trial motions, granted all our post-trial motions, including our motion for willful infringement and enhanced the royalty rate during the willfulness period from \$1.20 to \$1.80 per device, and awarded us costs, certain attorneys' fees, and prejudgment interest. The total amount in the final judgement was \$439,700, including \$302,400 (jury verdict), \$41,300 (enhanced damages) and \$96,000 (costs, fees and interest).

On October 27, 2017 Apple filed its notice of appeal of this final judgement to the USCAFC. Apple filed its opening brief on March 19, 2018. We filed our response on April 4, 2018. On April 11, 2018, USCAFC designated **Cases 18-1197-CB, Case 17-1368 and Case 17-1591** as companion cases and assigned to the same merits panel. Events and developments after this order are described below under **VirnetX Inc. v. The Mangrove Partners (USCAFC Case 17-1368) ("Consolidated Appeal")**.

VirnetX Inc. v. Apple, Inc. (Case 6:12-CV-00855-LED) ("Apple II")

This case began on November 6, 2012, when we had filed a complaint against Apple in USDC in which we alleged that Apple infringed on certain of our patents, (U.S. Patent Nos. 6,502,135, 7,418,504, 7,921,211 and 7,490,151). We sought damages and injunctive relief. The accused products include the iPhone 5, iPod Touch 5th Generation, iPad 4th Generation, iPad mini, and the latest Macintosh computers; these products were not included in the Apple I case because they were released after the Apple I case was initiated. Post-Trial Motions hearing was held on July 18, 2018. On August 31, 2018, the USDC entered a Final Judgment and issued its Memorandum Opinion and Order regarding post-trial motions, affirming the jury's verdict of \$502,600 and granting VirnetX's motions for supplemental damages, a sunset royalty and the royalty rate of \$1.20 per infringing iPhone, iPad and Mac products, pre-judgment and post-judgment interest and costs. On September 20, 2018, pursuant to a Court's order, attorneys from VirnetX and Apple conferred and agreed, without dispute, to add an amount totaling \$93,300 for Bill of Costs and Prejudgment Interest to the \$502,600 jury verdict. The total amount in the final judgement in the Apple II case is now \$595,900. Apple has filed a notice of appeal with the USCAFC in the Apple II case. On October 9, 2018, USCAFC accepted the notice and docketed it as **Case No. 19-1050 - VirnetX Inc. v. Apple Inc.** All subsequent events and developments in this case are described below under **VirnetX Inc. v. Apple Inc. (USCAFC Case 19-1050) ("Apple II Appeal")**.

VirnetX Inc. v. The Mangrove Partners (USCAFC Case 17-1368) ("Consolidated Appeal")

On April 11, 2018, the USCAFC in an order designated the following appeals as companion cases and assigned to the same merits panel;

- **VirnetX Inc. v. The Mangrove Partners (USCAFC Case 17-1368)**

On December 16, 2016, we filed appeals with the USCAFC, appealing the invalidity findings by the Patent Trial and Appeal Board ("PTAB") in IPR2015-01046, and on December 20, 2016 for IPR2015-1047, involving our U.S. Patent Nos. 6,502,135, and 7,490,151. These appeals also involve Apple, Inc. and one of them involves Black Swamp IP, LLC. Oral arguments in this case were argued on January 8, 2019. We are awaiting the Court's decision in this matter.

- **VirnetX Inc. v. Cisco Systems, Inc. (USCAFC Case 18-1197-CB) (Appeal of Apple I Case)**

On October 27, 2017 Apple filed its notice of appeal of the Final Judgment entered on September 29, 2017 to the United States Court of Appeals for the Federal Circuit. Oral arguments in this case were held on January 8, 2019. On January 15, 2019 the Court's issued a Rule 36 order affirming the District Court Judgement. Apple filed a request for panel rehearing and rehearing en-banc in this matter on February 21, 2019. On March 12, 2019, the court invited us to respond to Apple's petition on or before March 26, 2019. We are currently preparing our response.

- **VirnetX Inc. v. Apple Inc., Cisco Systems, Inc. (USCAFC Case 17-1591)**

On February 7, 2017, we filed appeals with the USCAFC, appealing the invalidity findings by the PTAB in inter-parties' reexamination nos. 95/001,788, 95/001,789, and 95/001,856 related to our U.S. Patent Nos. 7,921,211 and 7,418,504. Oral arguments in this case were argued on January 8, 2019. We are awaiting the Court's decision in this matter.

VirnetX Inc. v. Apple Inc. (USCAFC Case 19-1050) ("Apple II Appeal")

On January 24, 2019 Apple filed opening brief. We filed our response on March 1, 2019. Apple's next response is due on April 5, 2019. The oral arguments have not yet been scheduled.

VirnetX Inc. v. Apple Inc. (Case 17-2490)

On August 23, 2017, we filed with the USCAFC appeals of the invalidity findings by the PTAB in IPR2016-00331 and IPR2016-00332 involving our U.S. Patent No. 8,504,696. On December 10, 2018, the USCAFC issued an opinion affirming the PTAB’s invalidity findings.

VirnetX Inc. (Case 17-2593)

On September 22, 2017, we filed with the USCAFC, appeals of the invalidity findings by the PTAB in IPR2016-00693 and IPR2016-00957 involving our U.S. Patent Nos. 7,418,504 and 7,921,211. The briefing in these appeals has not taken place. The entity that initiated the IPRs, Black Swamp IP, LLC, indicated on October 18, 2017, that it would not participate in the appeals. On November 27, 2017, the USPTO indicated that it would intervene in the appeals. On January 19, 2018, the USCAFC stayed these appeals pending the USCAFC’s decision in Case 17-1591.

VirnetX Inc. (Case 18-1751)

On March 30, 2018, we filed with the USCAFC an appeal of the invalidity findings by the PTAB in inter-partes reexamination no. 95/001,851 involving our U.S. Patent No. 7,418,504. The briefing in this appeal has been concluded; the oral argument has not yet been scheduled.

VirnetX Inc. (Case 18-1872)

On April 23, 2018, we filed with the USCAFC an appeal of the invalidity findings by the PTAB in IPR2016-01585 involving our U.S. Patent No. 8,904,516. On November 30, 2018, the USCAFC granted an unopposed motion to dismiss this appeal.

VirnetX Inc. (Case 18-2211)

On July 31, 2018, we filed with the USCAFC an appeal of the invalidity findings by the PTAB in IPR2017-00337 involving our U.S. Patent No. 9,038,163. On November 30, 2018, the USCAFC granted an unopposed motion to dismiss this appeal.

VirnetX Inc. (Case 19-1043)

On October 1, 2018, we filed with the USCAFC an appeal of the invalidity findings by the PTAB in inter-partes reexamination no. 95/001,746 involving our U.S. Patent No. 6,839,759. VirnetX’s opening brief is due in March 2019.

One or more potential intellectual property infringement claims may also be available to us against certain other companies who have the resources to defend against any such claims. Although we believe these potential claims are likely valid, commencing a lawsuit can be expensive and time-consuming, and there is no assurance that we could prevail on such potential claims if we made them. In addition, bringing a lawsuit may lead to potential counterclaims which may distract our management and our other resources, including capital resources, from efforts to successfully commercialize our products.

Currently, we are not a party to any other pending legal proceedings and are not aware of any proceeding threatened or contemplated against us.

Note 14 – Quarterly Financial Information (unaudited)

| | <u>First</u> | <u>Second</u> | <u>Third</u> | <u>Fourth</u> |
|---|---------------------------------|---------------|--------------|---------------|
| | (in thousands except per share) | | | |
| 2018 | | | | |
| Revenue | \$ 6 | \$ 16 | \$ 7 | \$ 34 |
| Loss from operations | \$ (7,608) | \$ (6,462) | \$ (4,948) | \$ (6,439) |
| Net loss | \$ (7,605) | \$ (6,450) | \$ (4,934) | \$ (6,417) |
| Basic and diluted (loss) per common share | \$ (0.13) | \$ (0.10) | \$ (0.08) | \$ (0.09) |

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| | First | Second | Third | Fourth |
|---|---------------------------------|------------|------------|------------|
| | (in thousands except per share) | | | |
| 2017 | | | | |
| Revenue | \$ 375 | \$ 396 | \$ 375 | \$ 401 |
| Loss from operations | \$ (3,906) | \$ (3,811) | \$ (3,562) | \$ (6,042) |
| Net loss | \$ (3,894) | \$ (3,798) | \$ (3,552) | \$ (6,034) |
| Basic and diluted (loss) per common share | \$ (0.07) | \$ (0.07) | \$ (0.06) | \$ (0.10) |

Note 15 – Effects of Adopting ASU Topic 606 – (in thousands except share and per share amounts)

As described in Note 2 – Summary of Significant Accounting Policies, we account for revenue in accordance with Accounting Standards Update (“ASU”) No.2014-09, Revenue from Contracts with Customers, which we adopted on January 1, 2018 using the modified-retrospective method. The effect of the changes made to the Company’s January 1, 2018 balance sheet as a result of the adoption of Topic 606 were as follows:

| BALANCE SHEET HIGHLIGHTS | Reported As of December 31, 2017 | Effects of Adopting Topic 606 | As of January 1, 2018 |
|---------------------------------------|-------------------------------------|----------------------------------|--------------------------|
| Current liabilities: | | | |
| Deferred revenue, current portion | \$ 1,500 | \$ (1,500) | \$ — |
| Total current liabilities | \$ 4,482 | \$ (1,500) | \$ 2,982 |
| Deferred revenue, non-current portion | \$ 1,000 | \$ (1,000) | \$ — |
| Total Liabilities | \$ 5,622 | \$ (2,500) | \$ 3,122 |
| Accumulated deficit | \$ (175,516) | \$ 2,500 | \$ (173,016) |
| Total Stockholder’s Equity | \$ 1,553 | \$ 2,500 | \$ 4,053 |

The impacts of adoption of Topic 606 on the consolidated balance sheet and statement of operations were as follows:

| BALANCE SHEET HIGHLIGHTS | Year Ended December 31, 2018 | | |
|-----------------------------------|------------------------------|----------------------------------|-----------------|
| | Pre-Topic 606 | Effects of Adopting Topic 606 | (as reported) |
| Current liabilities: | | | |
| Deferred revenue, current portion | \$ 1,000 | \$ (1,000) | \$ — |
| Total current liabilities | \$ 2,863 | \$ (1,000) | \$ 1,863 |
| Total liabilities | \$ 2,863 | \$ (1,000) | \$ 1,863 |
| Accumulated deficit | (199,422) | 1,000 | (198,422) |
| Total stockholders’ equity | \$ 8,888 | \$ 1,000 | \$ 9,888 |

| INCOME STATEMENT HIGHLIGHTS | Year Ended December 31, 2018 | | |
|---|------------------------------|----------------------------------|--------------------|
| | Pre-Topic 606 | Effects of Adopting Topic 606 | (as reported) |
| Revenue | \$ 1,563 | \$ (1,500) | \$ 63 |
| Loss from operations | (23,957) | (1,500) | (25,457) |
| Loss before taxes | (23,903) | (1,500) | (25,403) |
| Net loss | \$ (23,906) | \$ (1,500) | \$ (25,406) |
| Basic and diluted loss per share | \$ (0.38) | \$ (0.02) | \$ (0.40) |
| Weighted average shares outstanding basic and diluted | 62,985,763 | 62,985,763 | 62,985,763 |

The adoption of Topic 606 had no impact on net cash used in operating activities.

Note 16 – Subsequent Events

Between January 1, 2019 and February 20, 2019, we sold 560,338 shares of common stock under the 2018 ATM offering. The average sales price per common shares sold was \$5.24 and the aggregate proceeds from the sales totaled \$2,936. Sales commissions, fees and other costs associated with these ATM transactions totaled \$88.

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Board of Directors and
Stockholders of VirnetX Holding Corporation

Opinion on Internal Control over Financial Reporting

We have audited VirnetX Holding Corporation’s (the Company’s) internal control over financial reporting as of December 31, 2018, based on criteria established in *Internal Control—Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2018, based on criteria established in *Internal Control—Integrated Framework (2013)* issued by COSO.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets and the related consolidated statements of income, comprehensive loss, stockholders’ equity, and cash flows of the Company, and our report dated March 18, 2019, expressed an unqualified opinion.

Basis for Opinion

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

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

Definition and Limitations of Internal Control over Financial Reporting

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

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

/s/ Farber Hass Hurley LLP

Chatsworth, California
March 18, 2019

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

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 the design and operation of our disclosure controls and procedures, as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended, December 31, 2018.

The purpose of this evaluation was to determine whether as of December 31, 2018 our disclosure controls and procedures were effective to provide reasonable assurance that the information we are required to disclose in our filings with the SEC, (i) is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms and (ii) accumulated and communicated to our management, including our Chief Executive Officer and Chief Financial Officer, as appropriate to allow timely decisions regarding required disclosure.

Based on their evaluation, our Chief Executive Officer and Chief Financial Officer have concluded that as of December 31, 2018, our disclosure controls and procedures were effective.

Changes in Internal Control Over Financial Reporting

There were no changes in our internal controls over financial reporting (as such term is defined in rules 13a-15(f) under the Securities Exchange Act of 1934, as amended) during the fiscal year ended December 31, 2018 that have materially affected, or are reasonably likely to materially affect, our internal controls over financial reporting.

Management's Report on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting for the Company. Internal control over financial reporting is a process to provide reasonable assurance regarding the reliability of our financial reporting for external purposes in accordance with accounting principles generally accepted in the United States of America. Internal control over financial reporting includes maintaining records that in reasonable detail accurately and fairly reflect our transactions; providing reasonable assurance that transactions are recorded as necessary for preparation of our financial statements; providing reasonable assurance that receipts and expenditures of Company assets are made in accordance with management authorization; and providing reasonable assurance that unauthorized acquisition, use or disposition of Company assets that could have a material effect on our financial statements would be prevented or detected on a timely basis. Because of its inherent limitations, internal control over financial reporting is not intended to provide absolute assurance that a misstatement of our financial statements would be prevented or detected.

Management conducted an evaluation of the effectiveness of our internal control over financial reporting based on the framework in *Internal Control – Integrated Framework* (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on this evaluation, management concluded that the Company's internal control over financial reporting was effective as of December 31, 2018. There were no changes in our internal control over financial reporting during the period ended December 31, 2018 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting. Farber Hass Hurley LLP has audited our internal control over financial reporting as of December 31, 2018; their report is included elsewhere herein.

Item 9B. Other Information

Termination of PITA Agreements

On March 16, 2018, we sent a letter to PITA acknowledging the termination of the Amended and Restated Revenue Sharing Agreement and the Amended and Restated Gabriel License Agreement with PITA. Although we consider the PITA Agreements terminated as of March 16, 2018, our letter also constituted our (i) notice of termination of the Amended and Restated Revenue Sharing Agreement pursuant to Section 5.2(b) thereof and (ii) notice of termination of the Amended and Restated Gabriel License Agreement pursuant to Section 5.2(b) thereof to PITA.

New Form of Indemnification Agreement

On March 14, 2019, our Board of Directors approved and adopted a new form of indemnification agreement (the “Indemnification Agreement”) which we expect to enter into with each of our current directors and officers (collectively, the “Indemnitees”). The Indemnification Agreement replaces the existing form of indemnification agreement in place with the Company’s directors and officers, which was adopted by the Board in 2007 (the “Prior Indemnification Agreement”).

The Indemnification Agreement continues to provide for, among other things, the indemnification by the Company of the Indemnitees to the maximum extent permitted by Delaware law and the advancement of reasonable expenses incurred by Indemnitees in connection with certain legal proceedings, and shall be in addition to any other rights the Indemnitees may have under applicable law, the Company’s charter documents or bylaws, or otherwise. The Indemnification Agreement also continues to set forth procedures for determining entitlement to indemnification, the requirements relating to notice and defense of claims for which indemnification is sought, the procedures for enforcement of indemnification rights, and the limitations on and exclusions from indemnification.

The foregoing description of the Indemnification Agreement does not purport to be complete and is subject to and qualified in its entirety by reference to the complete form of Indemnification Agreement, a copy of which is filed as Exhibit 10.1 to this Annual Report on Form 10-K and incorporated herein by reference.

PART III

Item 10. Directors, Executive Officers and Corporate Governance

The information required by this item will be contained in our definitive proxy statement to be filed with the SEC in connection with our 2018 Annual Meeting of Stockholders (the “Proxy Statement”), which is expected to be filed not later than 120 days after the end of our fiscal year ended December 31, 2018 and is incorporated in this report by reference.

Item 11. Executive Compensation

The information required by this item will be set forth in the Proxy Statement and is incorporated herein by reference.

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

The information required by this item will be set forth in the Proxy Statement and is incorporated herein by reference.

Securities Authorized for Issuance Under the Equity Compensation Plans

We have a stock incentive plan for employees and others called the “VirnetX Holding Corporation 2013 Stock Plan”, or the Plan, which has been approved by our stockholders. The Plan provides for the granting of up to 16,624,469 shares of our common stock, including stock options and stock purchase rights, and will expire in 2023. As of December 31, 2018, there were 1,703,899 shares available to be granted under the Plan. We had 5,998,837 and 5,138,066 options outstanding at December 31, 2018, and December 31, 2017, respectively, with an average exercise price of \$7.72 and \$8.41, respectively. We had 504,993 and 469,661 restricted stock units outstanding at December 31, 2018 and December 31, 2017, respectively, with a weighted average grant price of \$3.83 and \$5.19 respectively.

| Plan Category | Number of Securities to be Issued Upon Exercise of Outstanding Options, Warrants and Rights | Weighted-Average Exercise Price of Outstanding Options, Warrants and Rights | Number of Securities Remaining Available for Future Issuance Under Equity Compensation Plans |
|--|--|--|---|
| Equity compensation plans approved by security holders | 6,528,830 | \$ 7.42 | 1,703,899 |
| Equity compensation plans not approved by security holders | — | — | — |
| Total | 6,528,830 | \$ 7.42 | 1,703,899 |

On February 16, 2018, February 26, 2018, May 31, 2018 and September 26, 2018, the Compensation Committee granted 640,000, 30,000, 302,500 and 85,000 options respectively to the employees of VirnetX Inc. On February 26, 2018 and May 31, 2018 the Compensation Committee granted 20,000 and 201,664 RSUs respectively to the employees of VirnetX, Inc. On May 24, 2018, the Compensation Committee granted 37,500 options and 24,999 RSUs to members of the Board of Directors of VirnetX, Inc.

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

The information required by this item will be set forth in the Proxy Statement and is incorporated herein by reference.

Item 14. Principal Accountant Fees and Services

The information required by this item will be set forth in the Proxy Statement and is incorporated herein by reference.



PART IV

Item 15. Exhibits and Financial Statement Schedules

- (a) The following documents are filed as part of this Annual Report on Form
- (1) *Financial Statements*: See the Index to Consolidated Financial Statements under Item 8 of this Annual Report on Form 10-K.
 - (2) *Financial Statement Schedule*: Financial statement schedules are omitted because they are not applicable, or the required information is shown in the financial statements or notes thereto. All other schedules are omitted because of the absence of conditions under which they are required or because the required information is given in the financial statements or the notes thereto.
 - (3) *Exhibits*: The documents listed in the Exhibit Index of this Annual Report on Form 10-K are incorporated by reference or are filed with this Annual Report on Form 10-K, in each case as indicated therein (numbered in accordance with Item 601 of Regulation S-K).

EXHIBIT INDEX

| Exhibit Number | Description | Incorporated by reference herein | | | |
|-----------------------|--|----------------------------------|-------------|-------------|------------|
| | | Form | Exhibit No. | Filing Date | File No. |
| 3.1 | Certificate of Incorporation of the Company. | 8-K | 3.1 | 11/01/2007 | 000-26895 |
| 3.2 | By-Laws of the Company. | 8-K | 3.2 | 11/01/2007 | 000-26895 |
| 4.1 | Form of Warrant Agency Agreement by and between the Company and Corporate Stock Transfer, Inc. as Warrant Agent. | S-1/A | 4.1 | 01/16/2009 | 333-153645 |
| 4.2 | Form of Series I Warrant. | 8-K | 4.1 | 09/03/2009 | 001-33852 |
| 4.3 | Specimen Common Stock Certificate. | S-3 | 4.1 | 07/30/2018 | 333-226413 |
| 4.4 | Form of Senior Indenture | S-3 | 4.2 | 07/30/2018 | 333-226413 |
| 4.5 | Form of Subordinated Indenture | S-3 | 4.4 | 07/30/2018 | 333-226413 |
| 10.1 | Form of Indemnification Agreement by and between the Company and each of Kendall Larsen, Robert D. Short III, Gary Feiner, Michael F. Angelo, Thomas M. O'Brien and Richard Nance. | | | | |
| 10.2* | 2007 Stock Plan, as amended on April 13, 2012. | 10-Q | 10.2 | 05/10/2012 | 001-33852 |
| 10.3* | Amended Form of Stock Option Agreement – 2007 Stock Plan. | 10-Q | 4.5 | 05/10/2011 | 001-33852 |
| 10.4* | Form of Restricted Stock Unit Award Agreement – 2007 Stock Plan. | 10-Q | 10.3 | 05/10/2012 | 001-33852 |
| 10.5* | 2013 Equity Incentive Plan. | DEF 14A | Appendix A | 04/12/2013 | 001-33852 |
| 10.6* | Form of Stock Option Agreement – 2013 Equity Incentive Plan. | 10-K | 10.6 | 03/02/2015 | 001-33852 |
| 10.7* | Form of Restricted Stock Unit Agreement – 2013 Equity Incentive Plan. | 10-K | 10.7 | 03/02/2015 | 001-33852 |
| 10.8 | Voting Agreement among the Company and certain of its stockholders, dated as of December 12, 2007. | 10-K | 10.11 | 03/31/2008 | 001-33852 |
| 10.9 | Securities Purchase Agreement, dated as of September 2, 2009, by and between the Company and the Purchasers (as defined therein). | 8-K | 10.1 | 09/03/2009 | 001-33852 |
| 10.10 | Form of Registration Rights Agreement by and between the Company and the Purchasers (as defined therein). | 8-K | 10.2 | 09/03/2009 | 001-33852 |

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| Exhibit Number | Description | Incorporated by reference herein | | | |
|---------------------------|--|---|--------------------|--------------------|-----------------|
| | | Form | Exhibit No. | Filing Date | File No. |
| 10.11 | Form of Underwriting Agreement between VirnetX Holding Corporation and Gilford Securities Incorporated. | S-1/A | 1.1 | 01/16/2009 | 333-153645 |
| 10.12 | Patent License and Assignment Agreement by and between the Company and Leidos, Inc. (formerly Science Applications International Corporation) dated as of August 12, 2005. | 8-K | 10.4 | 07/12/2007 | 000-26895 |
| 10.13 | Amendment No. 1 to Patent License and Assignment Agreement by and between the Company and Leidos, Inc. dated as of November 2, 2006. | 8-K | 10.6 | 07/12/2007 | 000-26895 |
| 10.14 | Amendment No. 2 to Patent License and Assignment Agreement by and between VirnetX, Inc. and Leidos, Inc. dated as of March 12, 2008. | 8-K | 10.1 | 03/18/2008 | 001-33852 |
| 10.15 | Security Agreement by and between the Company and Leidos, Inc. dated as of August 12, 2005. | 8-K | 10.5 | 07/12/2007 | 000-26895 |
| 10.16 | Assignment Agreement between the Company and Leidos, Inc. dated as of December 21, 2006. | 8-K | 10.7 | 07/12/2007 | 000-26895 |
| 10.17 | Professional Services Agreement by and between the Company and Leidos, Inc. dated as of August 12, 2005. | 8-K | 10.8 | 07/12/2007 | 000-26895 |
| 10.18** | Engagement Letter dated June 8, 2009, by and between McKool Smith, a professional corporation, and VirnetX, Inc. | 10-Q | 10.1 | 08/10/2009 | 001-33852 |
| 10.19** | Engagement Letter dated April 15, 2010, by and between McKool Smith, a professional corporation, and VirnetX, Inc. | 10-Q | 10.1 | 05/07/2010 | 001-33852 |
| 10.20** | Settlement and License Agreement, by and between Microsoft Corporation and VirnetX, Inc., dated May 14, 2010. | 10-Q/A | 10.1 | 01/31/2011 | 001-33852 |
| 10.21*** | Amended Settlement and License Agreement, by and between Microsoft Corporation and VirnetX, Inc., dated December 17, 2014. | 10-K | 10.23 | 03/02/2015 | 001-33852 |
| 10.22* | Employment Offer Letter from VirnetX, Inc. to Richard H. Nance. | 10-Q | 10.4 | 05/10/2012 | 001-33852 |
| 10.23 | Patent Licensing Representative Agreement, by and between IPValue Management, Inc. and VirnetX, Inc., dated May 8, 2015. | 10-Q | 10.1 | 05/11/2015 | 001-33852 |
| 10.24** | Amended and Restated Revenue Sharing Agreement by and between VirnetX Holding Corporation and Public Intelligence Technology Associates, dated October 18, 2017. | 10-Q | 10.1 | 11/09/2017 | 001-33852 |

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| Exhibit Number | Description | Incorporated by reference herein | | | |
|-------------------------|--|----------------------------------|-------------|-------------|-----------|
| | | Form | Exhibit No. | Filing Date | File No. |
| 10.25** | Amended and Restated Gabriel License Agreement by and between VirnetX Holding Corporation and Public Intelligence Technology Associates, dated October 18, 2017. | 10-Q | 10.2 | 11/09/2017 | 001-33852 |
| 10.26 | Sales Agreement, dated August 31, 2018, by and between VirnetX Holding Corporation and Cowen and Company, LLC. | 8-K | 10.1 | 08/31/2018 | 001-33852 |
| 21.1 | Subsidiaries of VirnetX Holding Corporation. | | | | |
| 23.1 | Consent of Farber Hass Hurley LLP, Independent Registered Public Accounting Firm. | | | | |
| 24.1 | Power of Attorney (contained on signature page hereto) | | | | |
| 31.1 | Chief Executive Officer Certification pursuant to Rule 13a-14(a) of the Securities Exchange Act. | | | | |
| 31.2 | Chief Financial Officer Certification pursuant to Rule 13a-14(a) of the Securities Exchange Act. | | | | |
| 32.1† | Chief Executive Officer Certification pursuant to 18 U.S.C. Section 1350 as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 | | | | |
| 32.2† | Chief Financial Officer Certification pursuant to 18 U.S.C. Section 1350 as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002. | | | | |
| 101.INS | XBRL Instance Document | | | | |
| 101.SCH | XBRL Taxonomy Extension Schema Document | | | | |
| 101.CAL | XBRL Taxonomy Extension Calculation Linkbase Document | | | | |
| 101.DEF | XBRL Taxonomy Extension Definition Linkbase Document | | | | |
| 101.LAB | XBRL Taxonomy Extension Label Linkbase Document | | | | |
| 101.PRE | XBRL Taxonomy Extension Presentation Linkbase Document | | | | |

* Indicates management contract or compensatory plan.

** Confidential treatment has been granted by the Securities and Exchange Commission as to certain portions of this Exhibit.

*** Portions of this Exhibit have been omitted pending a determination by the Securities and Exchange Commission as to whether these portions should be granted confidential treatment.

† The certifications attached as Exhibit 32.1 and 32.2 that accompany this Annual Report on Form 10-K are not deemed filed with the Securities and Exchange Commission and are not to be incorporated by reference into any filing of VirnetX Holding Corporation under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended, whether before or after the date of this Annual Report on Form 10-K, irrespective of any general incorporation language contained in such filing.

SIGNATURES

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

VirnetX Holding Corporation

By: /s/ Kendall Larsen

Name: Kendall Larsen

Title: Chief Executive Officer and President

Dated: March 18, 2019

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints Kendall Larsen his or her attorney-in-fact, with full power of substitution, for him or her in any and all capacities, to sign any amendments to this Report on Form 10-K, and to file the same, with exhibits thereto and other documents in connection therewith with the Securities and Exchange Commission, hereby ratifying and confirming all that said attorney-in-fact, or his or her substitute or substitutes may do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Exchange Act of 1934, this Annual Report on Form 10-K has been signed below by the following persons on behalf of the registrant and in the capacities indicated.

| <u>Name</u> | <u>Capacity</u> | <u>Date</u> |
|---|--|----------------|
| <u>/s/ Kendall Larsen</u> Kendall Larsen | Director, Chief Executive Officer and President <i>(Principal Executive Officer)</i> | March 18, 2019 |
| <u>/s/ Richard H. Nance</u> Richard H. Nance | Chief Financial Officer <i>(Principal Financial Officer and Principal Accounting Officer)</i> | March 18, 2019 |
| <u>/s/ Robert D. Short III</u> Robert D. Short III | Director | March 18, 2019 |
| <u>/s/ Gary Feiner</u> Gary Feiner | Director | March 18, 2019 |
| <u>/s/ Michael F. Angelo</u> Michael F. Angelo | Director | March 18, 2019 |
| <u>/s/ Thomas M. O'Brien</u> Thomas M. O'Brien | Director | March 18, 2019 |

VIRNETX HOLDING CORPORATION
INDEMNIFICATION AGREEMENT

This Indemnification Agreement (this “*Agreement*”) is dated as of [*insert date*], and is between VirnetX Holding Corporation, a Delaware corporation (the “*Company*”), and [*insert name of indemnitee*] (“*Indemnitee*”).

RECITALS

- A. Indemnitee’s service to the Company substantially benefits the Company.
- B. Individuals are reluctant to serve as directors or officers of corporations or in certain other capacities unless they are provided with adequate protection through insurance or indemnification against the risks of claims and actions against them arising out of such service.
- C. Indemnitee does not regard the protection currently provided by applicable law, the Company’s governing documents and any insurance as adequate under the present circumstances, and Indemnitee may not be willing to serve as a director or officer without additional protection.
- D. In order to induce Indemnitee to continue to provide services to the Company, it is reasonable, prudent and necessary for the Company to contractually obligate itself to indemnify, and to advance expenses on behalf of, Indemnitee as permitted by applicable law.
- E. This Agreement is a supplement to and in furtherance of the indemnification provided in the Company’s certificate of incorporation and bylaws, and any resolutions adopted pursuant thereto, and this Agreement shall not be deemed a substitute therefor, nor shall this Agreement be deemed to limit, diminish or abrogate any rights of Indemnitee thereunder.

The parties therefore agree as follows:

1. Definitions.

(a) A “*Change in Control*” shall be deemed to occur upon the earliest to occur after the date of this Agreement of any of the following events:

(i) Acquisition of Stock by Third Party. Any Person (as defined below) becomes the Beneficial Owner (as defined below), directly or indirectly, of securities of the Company representing fifteen percent (15%) or more of the combined voting power of the Company’s then outstanding securities;

(ii) Change in Board Composition. During any period of two consecutive years (not including any period prior to the execution of this Agreement), individuals who at the beginning of such period constitute the Company’s board of directors, and any new directors (other than a director designated by a person who has entered into an agreement with the Company to effect a transaction described in Sections 1(a)(i), 1(a)(iii) or 1(a)(iv)) whose election by the board of directors or nomination for election by the Company’s stockholders was approved by a vote of at least two-thirds of the directors then still in office who either were directors at the beginning of the period or whose election or nomination for election was previously so approved, cease for any reason to constitute at least a majority of the members of the Company’s board of directors;

(iii) *Corporate Transactions.* The effective date of a merger or consolidation of the Company with any other entity, other than a merger or consolidation which would result in the voting securities of the Company outstanding immediately prior to such merger or consolidation continuing to represent (either by remaining outstanding or by being converted into voting securities of the surviving entity) more than 50% of the combined voting power of the voting securities of the surviving entity outstanding immediately after such merger or consolidation and with the power to elect at least a majority of the board of directors or other governing body of such surviving entity;

(iv) *Liquidation.* The approval by the stockholders of the Company of a complete liquidation of the Company or an agreement for the sale or disposition by the Company of all or substantially all of the Company's assets; and

(v) *Other Events.* Any other event of a nature that would be required to be reported in response to Item 6(e) of Schedule 14A of Regulation 14A (or in response to any similar item on any similar schedule or form) promulgated under the Securities Exchange Act of 1934, as amended, whether or not the Company is then subject to such reporting requirement.

For purposes of this Section 1(a), the following terms shall have the following meanings:

(1) "Person" shall have the meaning as set forth in Sections 13(d) and 14(d) of the Securities Exchange Act of 1934, as amended; provided, however, that "Person" shall exclude (i) the Company, (ii) any trustee or other fiduciary holding securities under an employee benefit plan of the Company, and (iii) any corporation owned, directly or indirectly, by the stockholders of the Company in substantially the same proportions as their ownership of stock of the Company.

(2) "Beneficial Owner" shall have the meaning given to such term in Rule 13d-3 under the Securities Exchange Act of 1934, as amended; provided, however, that "Beneficial Owner" shall exclude any Person otherwise becoming a Beneficial Owner by reason of (i) the stockholders of the Company approving a merger of the Company with another entity or (ii) the Company's board of directors approving a sale of securities by the Company to such Person.

(b) "Corporate Status" describes the status of a person who is or was a director, trustee, general partner, managing member, officer, employee, agent or fiduciary of the Company or any other Enterprise.

(c) "DGCL" means the General Corporation Law of the State of Delaware.

(d) "Disinterested Director" means a director of the Company who is not and was not a party to the Proceeding in respect of which indemnification is sought by Indemnitee.

(e) "Enterprise" means the Company and any other corporation, partnership, limited liability company, joint venture, trust, employee benefit plan or other enterprise of which Indemnitee is or was serving at the request of the Company as a director, trustee, general partner, managing member, officer, employee, agent or fiduciary.

(f) “Expenses” include all reasonable and actually incurred attorneys’ fees, retainers, court costs, transcript costs, fees and costs of experts, witness fees, travel expenses, duplicating costs, printing and binding costs, telephone charges, postage, delivery service fees, and all other disbursements or expenses of the types customarily incurred in connection with prosecuting, defending, preparing to prosecute or defend, investigating, being or preparing to be a witness in, or otherwise participating in, a Proceeding. Expenses also include (i) Expenses incurred in connection with any appeal resulting from any Proceeding, including without limitation the premium, security for, and other costs relating to any cost bond, supersedeas bond or other appeal bond or their equivalent, and (ii) for purposes of Section 12(c), Expenses incurred by Indemnitee in connection with the interpretation, enforcement or defense of Indemnitee’s rights under this Agreement or under any directors’ and officers’ liability insurance policies maintained by the Company. Expenses, however, shall not include amounts paid in settlement by Indemnitee or the amount of judgments or fines against Indemnitee.

(g) “Independent Counsel” means a law firm, or a partner or member of a law firm, that is experienced in matters of corporation law and neither presently is, nor in the past five years has been, retained to represent (i) the Company or Indemnitee in any matter material to either such party (other than as Independent Counsel with respect to matters concerning Indemnitee under this Agreement, or other indemnitees under similar indemnification agreements), or (ii) any other party to the Proceeding giving rise to a claim for indemnification hereunder. Notwithstanding the foregoing, the term “**Independent Counsel**” shall not include any person who, under the applicable standards of professional conduct then prevailing, would have a conflict of interest in representing either the Company or Indemnitee in an action to determine Indemnitee’s rights under this Agreement.

(h) “Proceeding” means any threatened, pending or completed action, suit, arbitration, mediation, alternate dispute resolution mechanism, investigation, inquiry, administrative hearing or proceeding, whether brought in the right of the Company or otherwise and whether of a civil, criminal, administrative or investigative nature, including any appeal therefrom and including without limitation any such Proceeding pending as of the date of this Agreement, in which Indemnitee was, is or will be involved as a party, a potential party, a non-party witness or otherwise by reason of (i) the fact that Indemnitee is or was a director or officer of the Company, (ii) any action taken by Indemnitee or any action or inaction on Indemnitee’s part while acting as a director or officer of the Company, or (iii) the fact that he or she is or was serving at the request of the Company as a director, trustee, general partner, managing member, officer, employee, agent or fiduciary of the Company or any other Enterprise, in each case whether or not serving in such capacity at the time any liability or Expense is incurred for which indemnification or advancement of expenses can be provided under this Agreement.

(i) Reference to “**other enterprises**” shall include employee benefit plans; references to “**fines**” shall include any excise taxes assessed on a person with respect to any employee benefit plan; references to “**servicing at the request of the Company**” shall include any service as a director, officer, employee or agent of the Company which imposes duties on, or involves services by, such director, officer, employee or agent with respect to an employee benefit plan, its participants or beneficiaries; and a person who acted in good faith and in a manner he or she reasonably believed to be in the best interests of the participants and beneficiaries of an employee benefit plan shall be deemed to have acted in a manner “**not opposed to the best interests of the Company**” as referred to in this Agreement.

2. Indemnity in Third-Party Proceedings. The Company shall indemnify Indemnitee in accordance with the provisions of this Section 2 if Indemnitee is, or is threatened to be made, a party to or a participant in any Proceeding, other than a Proceeding by or in the right of the Company to procure a judgment in its favor. Pursuant to this Section 2, Indemnitee shall be indemnified to the fullest extent permitted by applicable law against all Expenses, judgments, fines and amounts paid in settlement actually and reasonably incurred by Indemnitee or on his or her behalf in connection with such Proceeding or any claim, issue or matter therein, if Indemnitee acted in good faith and in a manner he or she reasonably believed to be in or not opposed to the best interests of the Company and, with respect to any criminal action or proceeding, had no reasonable cause to believe that his or her conduct was unlawful.

3. Indemnity in Proceedings by or in the Right of the Company. The Company shall indemnify Indemnitee in accordance with the provisions of this Section 3 if Indemnitee is, or is threatened to be made, a party to or a participant in any Proceeding by or in the right of the Company to procure a judgment in its favor. Pursuant to this Section 3, Indemnitee shall be indemnified to the fullest extent permitted by applicable law against all Expenses actually and reasonably incurred by Indemnitee or on Indemnitee's behalf in connection with such Proceeding or any claim, issue or matter therein, if Indemnitee acted in good faith and in a manner he or she reasonably believed to be in or not opposed to the best interests of the Company. No indemnification for Expenses shall be made under this Section 3 in respect of any claim, issue or matter as to which Indemnitee shall have been adjudged by a court of competent jurisdiction to be liable to the Company, unless and only to the extent that the Delaware Court of Chancery or any court in which the Proceeding was brought shall determine upon application that, despite the adjudication of liability but in view of all the circumstances of the case, Indemnitee is fairly and reasonably entitled to indemnification for such expenses as the Delaware Court of Chancery or such other court shall deem proper.

4. Indemnification for Expenses of a Party Who is Wholly or Partly Successful. To the extent that Indemnitee is a party to or a participant in and is successful (on the merits or otherwise) in defense of any Proceeding or any claim, issue or matter therein, the Company shall indemnify Indemnitee against all Expenses actually and reasonably incurred by Indemnitee or on Indemnitee's behalf in connection therewith. For purposes of this section, the termination of any claim, issue or matter in such a Proceeding by dismissal, with or without prejudice, shall be deemed to be a successful result as to such claim, issue or matter.

5. Indemnification for Expenses of a Witness. To the extent that Indemnitee is, by reason of his or her Corporate Status, a witness in any Proceeding to which Indemnitee is not a party, Indemnitee shall be indemnified to the extent permitted by applicable law against all Expenses actually and reasonably incurred by Indemnitee or on Indemnitee's behalf in connection therewith.

6. Additional Indemnification.

(a) Notwithstanding any limitation in Sections 2, 3 or 4, the Company shall indemnify Indemnitee to the fullest extent permitted by applicable law if Indemnitee is, or is threatened to be made, a party to or a participant in any Proceeding (including a Proceeding by or in the right of the Company to procure a judgment in its favor) against all Expenses, judgments, fines and amounts paid in settlement actually and reasonably incurred by Indemnitee or on his or her behalf in connection with the Proceeding or any claim, issue or matter therein.

(b) For purposes of Section 6(a), the meaning of the phrase "*to the fullest extent permitted by applicable law*" shall include, but not be limited to:

(i) the fullest extent permitted by the provision of the DGCL that authorizes or contemplates additional indemnification by agreement, or the corresponding provision of any amendment to or replacement of the DGCL; and

(ii) the fullest extent authorized or permitted by any amendments to or replacements of the DGCL adopted after the date of this Agreement that increase the extent to which a corporation may indemnify its officers and directors.

7. Exclusions. Notwithstanding any provision in this Agreement, the Company shall not be obligated under this Agreement to make any indemnity in connection with any Proceeding (or any part of any Proceeding):

(a) for which payment has actually been made to or on behalf of Indemnitee under any statute, insurance policy, indemnity provision, vote or otherwise, except with respect to any excess beyond the amount paid;

(b) for an accounting or disgorgement of profits pursuant to Section 16(b) of the Securities Exchange Act of 1934, as amended, or similar provisions of federal, state or local statutory law or common law, if Indemnitee is held liable therefor (including pursuant to any settlement arrangements);

(c) for any reimbursement of the Company by Indemnitee of any bonus or other incentive-based or equity-based compensation or of any profits realized by Indemnitee from the sale of securities of the Company, as required in each case under the Securities Exchange Act of 1934, as amended (including any such reimbursements that arise from an accounting restatement of the Company pursuant to Section 304 of the Sarbanes-Oxley Act of 2002 (the "*Sarbanes-Oxley Act*"), or the payment to the Company of profits arising from the purchase and sale by Indemnitee of securities in violation of Section 306 of the Sarbanes-Oxley Act), if Indemnitee is held liable therefor (including pursuant to any settlement arrangements);

(d) initiated by Indemnitee, including any Proceeding (or any part of any Proceeding) initiated by Indemnitee against the Company or its directors, officers, employees, agents or other indemnitees, unless (i) the Company's board of directors authorized the Proceeding (or the relevant part of the Proceeding) prior to its initiation, (ii) the Company provides the indemnification, in its sole discretion, pursuant to the powers vested in the Company under applicable law, (iii) otherwise authorized in Section 12(c) or (iv) otherwise required by applicable law; or

(e) if prohibited by applicable law.

8. Advances of Expenses. The Company shall advance the Expenses incurred by Indemnitee in connection with any Proceeding prior to its final disposition, and such advancement shall be made as soon as reasonably practicable, but in any event no later than 90 days, after the receipt by the Company of a written statement or statements requesting such advances from time to time (which shall include invoices received by Indemnitee in connection with such Expenses but, in the case of invoices in connection with legal services, any references to legal work performed or to expenditure made that would cause Indemnitee to waive any privilege accorded by applicable law shall not be included with the invoice). Advances shall be unsecured and interest free and made without regard to Indemnitee's ability to repay such advances. Indemnitee hereby undertakes to repay any advance to the extent that it is ultimately determined that Indemnitee is not entitled to be indemnified by the Company, and no other form of undertaking shall be required other than the execution of this Agreement. This Section 8 shall not apply to the extent advancement is prohibited by law and shall not apply to any Proceeding (or any part of any Proceeding) for which indemnity is not permitted under this Agreement, but shall apply to any Proceeding (or any part of any Proceeding) referenced in Section 7(b) or 7(c) prior to a determination that Indemnitee is not entitled to be indemnified by the Company.

9. Procedures for Notification and Defense of Claim.

(a) Indemnitee shall notify the Company in writing of any matter with respect to which Indemnitee intends to seek indemnification or advancement of Expenses as soon as reasonably practicable following the receipt by Indemnitee of notice thereof. The written notification to the Company shall include, in reasonable detail, a description of the nature of the Proceeding and the facts underlying the Proceeding. The failure by Indemnitee to notify the Company will not relieve the Company from any liability which it may have to Indemnitee hereunder or otherwise than under this Agreement, and any delay in so notifying the Company shall not constitute a waiver by Indemnitee of any rights, except to the extent that such failure or delay materially prejudices the Company.

(b) If, at the time of the receipt of a notice of a Proceeding pursuant to the terms hereof, the Company has directors' and officers' liability insurance in effect that may be applicable to the Proceedings,, the Company shall give prompt notice of the commencement of the Proceeding to the insurers in accordance with the procedures set forth in the applicable policies. The Company shall thereafter take all commercially-reasonable action to cause such insurers to pay, on behalf of Indemnitee, all amounts payable as a result of such Proceeding in accordance with the terms of such policies.

(c) In the event the Company may be obligated to make any indemnity in connection with a Proceeding, the Company shall be entitled to assume the defense of such Proceeding with counsel approved by Indemnitee, which approval shall not be unreasonably withheld, conditioned or delayed, upon the delivery to Indemnitee of written notice of its election to do so. After delivery of such notice, approval of such counsel by Indemnitee and the retention of such counsel by the Company, the Company will not be liable to Indemnitee for any fees or expenses of counsel subsequently incurred by Indemnitee with respect to the same Proceeding. Notwithstanding the Company's assumption of the defense of any such Proceeding, the Company shall be obligated to pay the fees and expenses of Indemnitee's separate counsel to the extent (i) the employment of separate counsel by Indemnitee is authorized by the Company, (ii) counsel for the Company or Indemnitee shall have reasonably concluded that there is a conflict of interest between the Company and Indemnitee in the conduct of any such defense such that Indemnitee needs to be separately represented, (iii) the fees and expenses are non-duplicative and reasonably incurred in connection with Indemnitee's role in the Proceeding despite the Company's assumption of the defense, (iv) the Company is not financially or legally able to perform its defense obligations or (v) the Company shall not have retained, or shall not continue to retain, such counsel to defend such Proceeding. The Company shall have the right to conduct such defense as it sees fit in its sole discretion. Regardless of any provision in this Agreement, Indemnitee shall have the right to employ counsel in any Proceeding at Indemnitee's personal expense. The Company shall not be entitled, without the consent of Indemnitee, to assume the defense of any claim brought by or in the right of the Company.

(d) Indemnitee shall give the Company such information and cooperation in connection with the Proceeding as may be reasonably appropriate.

(e) The Company shall not be liable to indemnify Indemnitee for any settlement of any Proceeding (or any part thereof) without the Company's prior written consent, which shall not be unreasonably withheld, conditioned or delayed.

(f) The Company shall have the right to settle any Proceeding (or any part thereof) without the consent of Indemnitee.

10. Procedures upon Application for Indemnification.

(a) To obtain indemnification, Indemnitee shall submit to the Company a written request, including therein or therewith such documentation and information as is reasonably available to Indemnitee and as is reasonably necessary to determine whether and to what extent Indemnitee is entitled to indemnification following the final disposition of the Proceeding. The Company shall, as soon as reasonably practicable after receipt of such a request for indemnification, advise the board of directors that Indemnitee has requested indemnification. Any delay in providing the request will not relieve the Company from its obligations under this Agreement, except to the extent such failure is prejudicial.

(b) Upon written request by Indemnitee for indemnification pursuant to Section 10(a), a determination, if required by applicable law, with respect to Indemnitee's entitlement thereto shall be made in the specific case (i) if a Change in Control shall have occurred, by Independent Counsel in a written opinion to the Company's board of directors, a copy of which shall be delivered to Indemnitee or (ii) if a Change in Control shall not have occurred, if required by applicable law, (A) by a majority vote of the Disinterested Directors, even though less than a quorum of the Company's board of directors, (B) by a committee of Disinterested Directors designated by a majority vote of the Disinterested Directors, even though less than a quorum of the Company's board of directors, (C) if there are no such Disinterested Directors or, if such Disinterested Directors so direct, by Independent Counsel in a written opinion to the Company's board of directors, a copy of which shall be delivered to Indemnitee or (D) if so directed by the Company's board of directors, by the stockholders of the Company. If it is determined that Indemnitee is entitled to indemnification, payment to Indemnitee shall be made within ten days after such determination. Indemnitee shall cooperate with the person, persons or entity making the determination with respect to Indemnitee's entitlement to indemnification, including providing to such person, persons or entity upon reasonable advance request any documentation or information that is not privileged or otherwise protected from disclosure and that is reasonably available to Indemnitee and reasonably necessary to such determination. Any costs or expenses (including attorneys' fees and disbursements) actually and reasonably incurred by Indemnitee in so cooperating with the person, persons or entity making such determination shall be borne by the Company, to the extent permitted by applicable law.

(c) In the event the determination of entitlement to indemnification is to be made by Independent Counsel pursuant to Section 10(b), the Independent Counsel shall be selected as provided in this Section 10(c). If a Change in Control shall not have occurred, the Independent Counsel shall be selected by the Company's board of directors, and the Company shall give written notice to Indemnitee advising him or her of the identity of the Independent Counsel so selected. If a Change in Control shall have occurred, the Independent Counsel shall be selected by Indemnitee (unless Indemnitee shall request that such selection be made by the Company's board of directors, in which event the preceding sentence shall apply), and Indemnitee shall give written notice to the Company advising it of the identity of the Independent Counsel so selected. In either event, Indemnitee or the Company, as the case may be, may, within ten days after such written notice of selection shall have been given, deliver to the Company or to Indemnitee, as the case may be, a written objection to such selection; *provided, however*, that such objection may be asserted only on the ground that the Independent Counsel so selected does not meet the requirements of "Independent Counsel" as defined in Section 1 of this Agreement, and the objection shall set forth with particularity the factual basis of such assertion. Absent a proper and timely objection, the person so selected shall act as Independent Counsel. If such written objection is so made and substantiated, the Independent Counsel so selected may not serve as Independent Counsel unless and until such objection is withdrawn or a court has determined that such objection is without merit. If, within 20 days after the later of (i) submission by Indemnitee of a written request for indemnification pursuant to Section 10(a) hereof and (ii) the final disposition of the Proceeding, the parties have not agreed upon an Independent Counsel, either the Company or Indemnitee may petition a court of competent jurisdiction for resolution of any objection which shall have been made by the Company or Indemnitee to the other's selection of Independent Counsel and for the appointment as Independent Counsel of a person selected by the court or by such other person as the court shall designate, and the person with respect to whom all objections are so resolved or the person so appointed shall act as Independent Counsel under Section 10(b) hereof. Upon the due commencement of any judicial proceeding pursuant to Section 12(a) of this Agreement, the Independent Counsel shall be discharged and relieved of any further responsibility in such capacity (subject to the applicable standards of professional conduct then prevailing).

(d) The Company agrees to pay the reasonable fees and expenses of any Independent Counsel and to fully indemnify such counsel against any and all Expenses, claims, liabilities and damages arising out of or relating to this Agreement or its engagement pursuant hereto

11. Presumptions and Effect of Certain Proceedings.

(a) In making a determination with respect to entitlement to indemnification hereunder, the person, persons or entity making such determination shall, to the fullest extent not prohibited by law, presume that Indemnitee is entitled to indemnification under this Agreement if Indemnitee has submitted a request for indemnification in accordance with Section 10(a) of this Agreement, and the Company shall, to the fullest extent not prohibited by law, have the burden of proof to overcome that presumption.

(b) The termination of any Proceeding or of any claim, issue or matter therein, by judgment, order, settlement or conviction, or upon a plea of *nolo contendere* or its equivalent, shall not (except as otherwise expressly provided in this Agreement) of itself adversely affect the right of Indemnitee to indemnification or create a presumption that Indemnitee did not act in good faith and in a manner which he or she reasonably believed to be in or not opposed to the best interests of the Company or, with respect to any criminal Proceeding, that Indemnitee had reasonable cause to believe that his or her conduct was unlawful.

(c) For purposes of any determination of good faith, Indemnitee shall be deemed to have acted in good faith to the extent Indemnitee relied in good faith on (i) the records or books of account of the Enterprise, including financial statements, (ii) information supplied to Indemnitee by the officers of the Enterprise in the course of their duties, (iii) the advice of legal counsel for the Enterprise or its board of directors or counsel selected by any committee of the board of directors or (iv) information or records given or reports made to the Enterprise by an independent certified public accountant, an appraiser, investment banker or other expert selected with reasonable care by the Enterprise or its board of directors or any committee of the board of directors. The provisions of this Section 11(c) shall not be deemed to be exclusive or to limit in any way the other circumstances in which Indemnitee may be deemed to have met the applicable standard of conduct set forth in this Agreement.

(d) Neither the knowledge, actions nor failure to act of any other director, officer, agent or employee of the Enterprise shall be imputed to Indemnitee for purposes of determining the right to indemnification under this Agreement.

12. Remedies of Indemnitee.

(a) Subject to Section 12(d), in the event that (i) a determination is made pursuant to Section 10 of this Agreement that Indemnitee is not entitled to indemnification under this Agreement, (ii) advancement of Expenses is not timely made pursuant to Section 8 or 12(c) of this Agreement, (iii) no determination of entitlement to indemnification shall have been made pursuant to Section 10 of this Agreement within 90 days after the later of the receipt by the Company of the request for indemnification or the final disposition of the Proceeding, (iv) payment of indemnification pursuant to this Agreement is not made (A) within ten days after a determination has been made that Indemnitee is entitled to indemnification or (B) with respect to indemnification pursuant to Sections 4, 5 and 12(c) of this Agreement, within 30 days after receipt by the Company of a written request therefor, or (v) the Company or any other person or entity takes or threatens to take any action to declare this Agreement void or unenforceable, or institutes any litigation or other action or proceeding to deny, or to recover from, Indemnitee the benefits provided or intended to be provided to Indemnitee hereunder, Indemnitee shall be entitled to an adjudication by a court of competent jurisdiction of his or her entitlement to such indemnification or advancement of Expenses. Indemnitee shall commence such proceeding seeking an adjudication within 180 days following the date on which Indemnitee first has the right to commence such proceeding pursuant to this Section 12(a); *provided, however*, that the foregoing clause shall not apply in respect of a proceeding brought by Indemnitee to enforce his or her rights under Section 4 of this Agreement. The Company shall not oppose Indemnitee's right to seek any such adjudication in accordance with this Agreement.

(b) Neither (i) the failure of the Company, its board of directors, any committee or subgroup of the board of directors, Independent Counsel or stockholders to have made a determination that indemnification of Indemnitee is proper in the circumstances because Indemnitee has met the applicable standard of conduct, nor (ii) an actual determination by the Company, its board of directors, any committee or subgroup of the board of directors, Independent Counsel or stockholders that Indemnitee has not met the applicable standard of conduct, shall create a presumption that Indemnitee has or has not met the applicable standard of conduct. In the event that a determination shall have been made pursuant to Section 10 of this Agreement that Indemnitee is not entitled to indemnification, any judicial proceeding commenced pursuant to this Section 12 shall be conducted in all respects as a *de novo* trial, on the merits, and Indemnitee shall not be prejudiced by reason of that adverse determination. In any judicial proceeding commenced pursuant to this Section 12, the Company shall, to the fullest extent not prohibited by law, have the burden of proving Indemnitee is not entitled to indemnification or advancement of Expenses, as the case may be.

(c) To the extent not prohibited by law, the Company shall indemnify Indemnitee against all Expenses that are incurred by Indemnitee in connection with any action for indemnification or advancement of Expenses from the Company under this Agreement or under any directors' and officers' liability insurance policies maintained by the Company to the extent Indemnitee is successful in such action, and, if requested by Indemnitee, shall (as soon as reasonably practicable, but in any event no later than 60 days, after receipt by the Company of a written request therefor) advance such Expenses to Indemnitee, subject to the provisions of Section 8.

(d) Notwithstanding anything in this Agreement to the contrary, no determination as to entitlement to indemnification shall be required to be made prior to the final disposition of the Proceeding.

13. Contribution. To the fullest extent permissible under applicable law, if the indemnification provided for in this Agreement is unavailable to Indemnitee, the Company, in lieu of indemnifying Indemnitee, shall contribute to the amounts incurred by Indemnitee, whether for Expenses, judgments, fines or amounts paid or to be paid in settlement, in connection with any claim relating to an indemnifiable event under this Agreement, in such proportion as is deemed fair and reasonable in light of all of the circumstances of such Proceeding in order to reflect (i) the relative benefits received by the Company and Indemnitee as a result of the events and transactions giving rise to such Proceeding; and (ii) the relative fault of Indemnitee and the Company (and its other directors, officers, employees and agents) in connection with such events and transactions.

14. Non-exclusivity. The rights of indemnification and to receive advancement of Expenses as provided by this Agreement shall not be deemed exclusive of any other rights to which Indemnitee may at any time be entitled under applicable law, the Company's certificate of incorporation or bylaws, any agreement, a vote of stockholders or a resolution of directors, or otherwise. To the extent that a change in Delaware law, whether by statute or judicial decision, permits greater indemnification or advancement of Expenses than would be afforded currently under the Company's certificate of incorporation and bylaws and this Agreement, it is the intent of the parties hereto that Indemnitee shall enjoy by this Agreement the greater benefits so afforded by such change, subject to the restrictions expressly set forth herein or therein. Except as expressly set forth herein, no right or remedy herein conferred is intended to be exclusive of any other right or remedy, and every other right and remedy shall be cumulative and in addition to every other right and remedy given hereunder or now or hereafter existing at law or in equity or otherwise. Except as expressly set forth herein, the assertion or employment of any right or remedy hereunder, or otherwise, shall not prevent the concurrent assertion or employment of any other right or remedy.

15. No Duplication of Payments. The Company shall not be liable under this Agreement to make any payment of amounts otherwise indemnifiable hereunder (or for which advancement is provided hereunder) if and to the extent that Indemnitee has otherwise actually received payment for such amounts under any insurance policy, contract, agreement or otherwise.

16. Insurance. To the extent that the Company maintains an insurance policy or policies providing liability insurance for directors, trustees, general partners, managing members, officers, employees, agents or fiduciaries of the Company or any other Enterprise, Indemnitee shall be covered by such policy or policies to the same extent as the most favorably-insured persons under such policy or policies in a comparable position.

17. Subrogation. In the event of any payment under this Agreement, the Company shall be subrogated to the extent of such payment to all of the rights of recovery of Indemnitee, who shall execute all papers required and take all action necessary to secure such rights, including execution of such documents as are necessary to enable the Company to bring suit to enforce such rights.

18. Services to the Company. Indemnitee agrees to serve as a director or officer of the Company or, at the request of the Company, as a director, trustee, general partner, managing member, officer, employee, agent or fiduciary of another Enterprise, for so long as Indemnitee is duly elected or appointed or until Indemnitee tenders his or her resignation or is removed from such position. Indemnitee may at any time and for any reason resign from such position (subject to any other contractual obligation or any obligation imposed by operation of law), in which event the Company shall have no obligation under this Agreement to continue Indemnitee in such position. This Agreement shall not be deemed an employment contract between the Company (or any of its subsidiaries or any Enterprise) and Indemnitee. Indemnitee specifically acknowledges that any employment with the Company (or any of its subsidiaries or any Enterprise) is at will, and Indemnitee may be discharged at any time for any reason, with or without cause, with or without notice, except as may be otherwise expressly provided in any executed, written employment contract between Indemnitee and the Company (or any of its subsidiaries or any Enterprise), any existing formal severance policies adopted by the Company's board of directors or, with respect to service as a director or officer of the Company, the Company's certificate of incorporation or bylaws or the DGCL. No such document shall be subject to any oral modification thereof.

19. Duration. This Agreement shall continue until and terminate upon the later of (a) ten years after the date that Indemnitee shall have ceased to serve as a director or officer of the Company or as a director, trustee, general partner, managing member, officer, employee, agent or fiduciary of any other Enterprise, as applicable; or (b) one year after the final termination of any Proceeding, including any appeal, then pending in respect of which Indemnitee is granted rights of indemnification or advancement of Expenses hereunder and of any proceeding commenced by Indemnitee pursuant to Section 12 of this Agreement relating thereto.

20. Successors. This Agreement shall be binding upon the Company and its successors and assigns, including any direct or indirect successor by purchase, merger, consolidation or otherwise to all or substantially all of the business or assets of the Company, and shall inure to the benefit of Indemnitee and Indemnitee's heirs, executors and administrators. The Company shall require and cause any successor (whether direct or indirect by purchase, merger, consolidation or otherwise) to all or substantially all of the business or assets of the Company, by written agreement, expressly to assume and agree to perform this Agreement in the same manner and to the same extent that the Company would be required to perform if no such succession had taken place.

21. Severability. Nothing in this Agreement is intended to require or shall be construed as requiring the Company to do or fail to do any act in violation of applicable law. The Company's inability, pursuant to court order or other applicable law, to perform its obligations under this Agreement shall not constitute a breach of this Agreement. If any provision or provisions of this Agreement shall be held to be invalid, illegal or unenforceable for any reason whatsoever: (i) the validity, legality and enforceability of the remaining provisions of this Agreement (including without limitation, each portion of any section of this Agreement containing any such provision held to be invalid, illegal or unenforceable, that is not itself invalid, illegal or unenforceable) shall not in any way be affected or impaired thereby and shall remain enforceable to the fullest extent permitted by law; (ii) such provision or provisions shall be deemed reformed to the extent necessary to conform to applicable law and to give the maximum effect to the intent of the parties hereto; and (iii) to the fullest extent possible, the provisions of this Agreement (including, without limitation, each portion of any section of this Agreement containing any such provision held to be invalid, illegal or unenforceable, that is not itself invalid, illegal or unenforceable) shall be construed so as to give effect to the intent manifested thereby.

22. Enforcement. The Company expressly confirms and agrees that it has entered into this Agreement and assumed the obligations imposed on it hereby in order to induce Indemnitee to serve as a director or officer of the Company, and the Company acknowledges that Indemnitee is relying upon this Agreement in serving as a director or officer of the Company.

23. Entire Agreement. This Agreement constitutes the entire agreement between the parties hereto with respect to the subject matter hereof and supersedes all prior agreements and understandings, oral, written and implied, between the parties hereto with respect to the subject matter hereof; *provided, however*, that this Agreement is a supplement to and in furtherance of the Company's certificate of incorporation and bylaws and applicable law.

24. Modification and Waiver. No supplement, modification or amendment to this Agreement shall be binding unless executed in writing by the parties hereto. No amendment, alteration or repeal of this Agreement shall adversely affect any right of Indemnitee under this Agreement in respect of any action taken or omitted by such Indemnitee in his or her Corporate Status prior to such amendment, alteration or repeal. No waiver of any of the provisions of this Agreement shall constitute or be deemed a waiver of any other provision of this Agreement nor shall any waiver constitute a continuing waiver.

25. Notices. All notices and other communications required or permitted hereunder shall be in writing and shall be mailed by registered or certified mail, postage prepaid, sent by facsimile or electronic mail or otherwise delivered by hand, messenger or courier service addressed:

(a) if to Indemnitee, to Indemnitee's address, facsimile number or electronic mail address as shown on the signature page of this Agreement or in the Company's records, as may be updated in accordance with the provisions hereof; or

(b) if to the Company, to the attention of the Chief Executive Officer or Chief Financial Officer of the Company at 308 Dorla Ct., Zephyr Cove, NV 89448, or at such other current address as the Company shall have furnished to Indemnitee, with a copy (which shall not constitute notice) to Bradley Finkelstein, Wilson Sonsini Goodrich & Rosati, P.C., 650 Page Mill Road, Palo Alto, California 94304. Each such notice or other communication shall for all purposes of this Agreement be treated as effective or having been given (i) if delivered by hand, messenger or courier service, when delivered (or if sent *via* a nationally-recognized overnight courier service, freight prepaid, specifying next-business-day delivery, one business day after deposit with the courier), (ii) if sent *via* mail, at the earlier of its receipt or five days after the same has been deposited in a regularly-maintained receptacle for the deposit of the United States mail, addressed and mailed as aforesaid, (iii) if sent *via* facsimile, upon confirmation of facsimile transfer or (v) if sent *via* electronic mail, upon confirmation of delivery when directed to the relevant electronic mail address, if sent during normal business hours of the recipient, or if not sent during normal business hours of the recipient, then on the recipient's next business day.

26. Applicable Law and Consent to Jurisdiction. This Agreement and the legal relations among the parties shall be governed by, and construed and enforced in accordance with, the laws of the State of Delaware, without regard to its conflict of laws rules. The Company and Indemnitee hereby irrevocably and unconditionally (i) agree that any action or proceeding arising out of or in connection with this Agreement shall be brought only in the Delaware Court of Chancery, and not in any other state or federal court in the United States of America or any court in any other country, (ii) consent to submit to the exclusive jurisdiction of the Delaware Court of Chancery for purposes of any action or proceeding arising out of or in connection with this Agreement, (iii) appoint, to the extent such party is not otherwise subject to service of process in the State of Delaware, The Corporation Trust Company, Wilmington, Delaware, as its agent in the State of Delaware as such party's agent for acceptance of legal process in connection with any such action or proceeding against such party with the same legal force and validity as if served upon such party personally within the State of Delaware, (iv) waive any objection to the laying of venue of any such action or proceeding in the Delaware Court of Chancery, and (v) waive, and agree not to plead or to make, any claim that any such action or proceeding brought in the Delaware Court of Chancery has been brought in an improper or inconvenient forum.

27. Counterparts. This Agreement may be executed in one or more counterparts, each of which shall for all purposes be deemed to be an original but all of which together shall constitute one and the same Agreement. This Agreement may also be executed and delivered by facsimile signature and in counterparts, each of which shall for all purposes be deemed to be an original but all of which together shall constitute one and the same Agreement. Only one such counterpart signed by the party against whom enforceability is sought needs to be produced to evidence the existence of this Agreement.

28. Captions. The headings of the paragraphs of this Agreement are inserted for convenience only and shall not be deemed to constitute part of this Agreement or to affect the construction thereof.

(signature page follows)

The parties are signing this Indemnification Agreement as of the date stated in the introductory sentence.

VIRNETX HOLDING CORPORATION

(Signature)

(Print name)

(Title)

[INSERT INDEMNITEE NAME]

(Signature)

(Print name)

(Street address)

(City, State and ZIP)

Subsidiaries of Registrant

| Name of Entity | Jurisdiction of Incorporation or Organization |
|---|---|
| Network Research Corporation Japan Ltd. (known as Network Research Corporation Japan Kabushiki Kaisha in Japan) | Japan |
| VirnetX Inc. | Delaware |

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the Registration Statements on Form S-3 (No. 333-226413) and Form S-8 (Nos. 333-149883, 333-196064, and 333-218467) of our reports dated March 18, 2019, relating to the consolidated financial statements of VirnetX Holding Corporation (the "Company"), and the effectiveness of the Company's internal control over financial reporting, appearing in this Annual Report on Form 10-K of the Company for the year ended December 31, 2018.

/s/ Farber Hass Hurley LLP

Chatsworth, California

March 18, 2019

CERTIFICATIONS

I, Kendall Larsen, certify that:

1. I have reviewed this Annual Report on Form 10-K of VirnetX Holding Corporation for the fiscal year ended December 31, 2018;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

/s/ Kendall Larsen
Kendall Larsen
President and Chief Executive Officer
(Principal Executive Officer)

Date: March 18, 2019

CERTIFICATIONS

I, Richard H. Nance, certify that:

1. I have reviewed this Annual Report on Form 10-K of VirnetX Holding Corporation for the fiscal year ended December 31, 2018;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

/s/ Richard H. Nance
Richard H. Nance
Chief Financial Officer
(Principal Accounting and Financial Officer)

Date: March 18, 2019

**CERTIFICATION PURSUANT TO
18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

In connection with the Annual Report of VirnetX Holding Corporation (the "Company") on Form 10-K for the fiscal year ended December 31, 2018 as filed with the Securities and Exchange Commission on March 18, 2019 (the "Report"), I, Kendall Larsen, President and Chief Executive Officer of the Company, certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that, to my knowledge:

- (1) The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
- (2) The information contained in the Report fairly presents, in all material respects, the financial condition and result of operations of the Company.

/s/ Kendall Larsen
Kendall Larsen
President and Chief Executive Officer
(Principal Executive Officer)

Date: March 18, 2019

**CERTIFICATION PURSUANT TO
18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

In connection with the Annual Report of VirnetX Holding Corporation (the "Company") on Form 10-K for the fiscal year ended December 31, 2018 as filed with the Securities and Exchange Commission on March 18, 2019 (the "Report"), I, Richard Nance, Chief Financial Officer of the Company, certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that, to my knowledge:

- (1) The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
- (2) The information contained in the Report fairly presents, in all material respects, the financial condition and result of operations of the Company.

/s/ Richard H. Nance
Richard H. Nance
Chief Financial Officer
(Principal Accounting and Financial Officer)

Date: March 18, 2019
