

## CYBERSECURITY IN ISRAEL

THE HOTTEST PRIVATELY HELD SECURITY COMPANIES IN ISRAEL



Copyright: iStock.com\Filograph

**Erik Suppiger**  
esuppiger@jmpsecurities.com  
(415) 835-3918

**Patrick Walravens**  
pwalravens@jmpsecurities.com  
(415) 835-8943



---

**TABLE OF CONTENTS**

Executive Summary of Cybersecurity in Israel .....	3
Funding Trends .....	4
Index by Venture Capital Firm .....	7
Index by Venture Capital Firm .....	8
Aqua .....	9
Alcide .....	10
Algosec .....	11
Avanan .....	12
CheckMarx .....	13
Claroty .....	14
Coronet .....	15
CTERA Networks .....	16
Curv .....	17
CyberMDX .....	18
CyberX .....	19
CYE .....	20
Cymulate .....	21
GuardiCore .....	22
Illusive Networks .....	23
Indegy .....	24
IntSights .....	25
Ironscales .....	26
Karamba Security .....	27
Minerva Labs .....	28
Morphisec .....	29
Perimeter 81 .....	30
SafeBreach .....	31
SCADAfence .....	32
SentinelOne .....	33
Septier Communication .....	34
Siemplify .....	35
Silverfort .....	36
ThetaRay .....	37
Twistlock .....	38
Upstream .....	39
Votiro .....	40
WhiteSource Software .....	41
Zerto .....	42

---



Analyst Biographies.....43

JMP Covered Companies.....44

**EXECUTIVE SUMMARY OF CYBERSECURITY IN ISRAEL**

In our first annual Cybersecurity in Israel report, we highlight what we believe to be the most interesting and strategically positioned private cybersecurity companies in Israel.

Israel's military, the Israeli Defense Forces (IDF), requires every citizen (both men and women) to serve 12-32 months minimum (depending on exemptions) after they graduate high school and turn 18. Israel is one of only three first world countries (South Korea and Singapore being the other two) that require a lengthy period of military service. Given its placement in the world and number of wars and border conflicts, the IDF is one of the most battle-trained and ready units. The IDF is also one of the most prominent institutions in Israel, with a material impact on the country's economy, culture, and political scene. Accordingly, the IDF is central to life and innovation in Israel.

Within the IDF, the most prestigious group that drives innovation, and specifically, cybersecurity innovation, is known as Unit 8200. Unit 8200 is analogous to the NSA in the U.S., in that it is responsible for collecting signal intelligence and code decryption, but is comprised mostly of 18-21 year olds that are recruited from elite computer feeder programs. During their service, members of Unit 8200 develop deep expertise in cybersecurity, as well as a wide array of connections, where they are forced to be self-motivated. As a result, many members of Unit 8200 go on to become founders of cybersecurity startups, some of which are/were once public companies, including: Check Point Security, Imperva, Palo Alto Networks, CyberArk, and Radware. In fact, Unit 8200 is considered among many to be the foremost technical intelligence agency in the world.

Given the importance and visionary traits of the IDF, the Israeli government is quite supportive of its members when they complete their military service. The government wants to fund and support innovative cybersecurity startups, and it recently announced a new \$24M program called the National Cyber Directorate to invest in "game changing" potential technologies on a global scale. However, while that program is new, the government has been investing in Israeli-founded cyber companies for quite some time. The most prominent example is Check Point Security, where the government provides significant research grants and subsidies which allow the company to not only be one of the leading pioneers in the space, but also a profitable publicly traded software company.

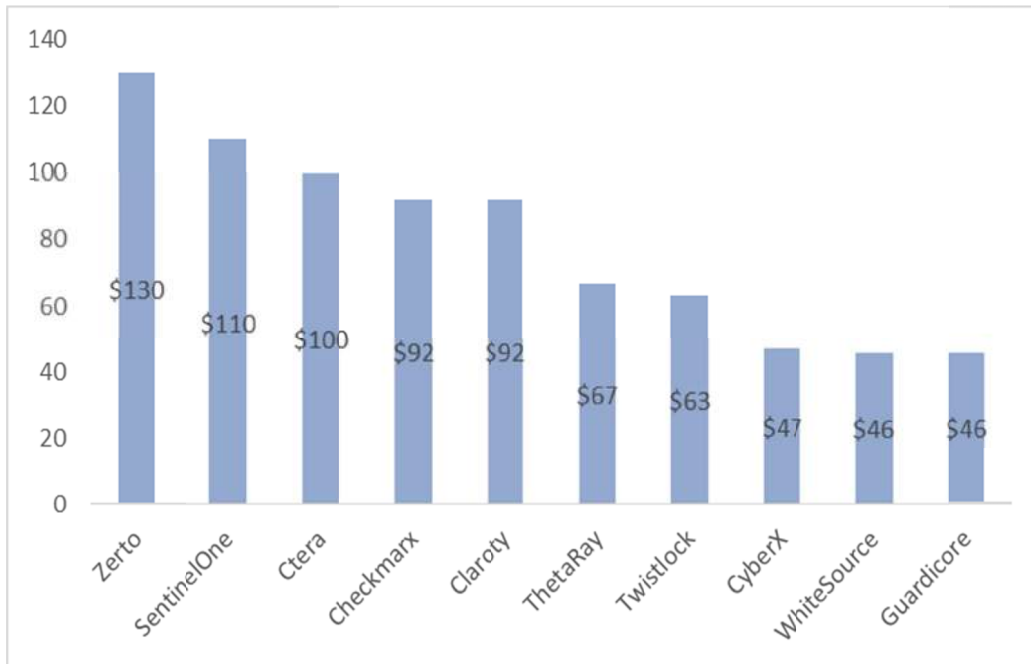
We personally spoke with executives of each company in this book, and we believe they have the capability to revolutionize various aspects of the cybersecurity landscape. The execution risk is high, but cybersecurity technologies and environments are evolving so rapidly that the need for innovation is accelerating as traditional approaches are deemed inadequate.

## FUNDING TRENDS

### Funds Raised

Figure 1 shows the ten largest total amounts raised by our Israeli companies since their respective inceptions, according to crunchbase.com and company press releases.

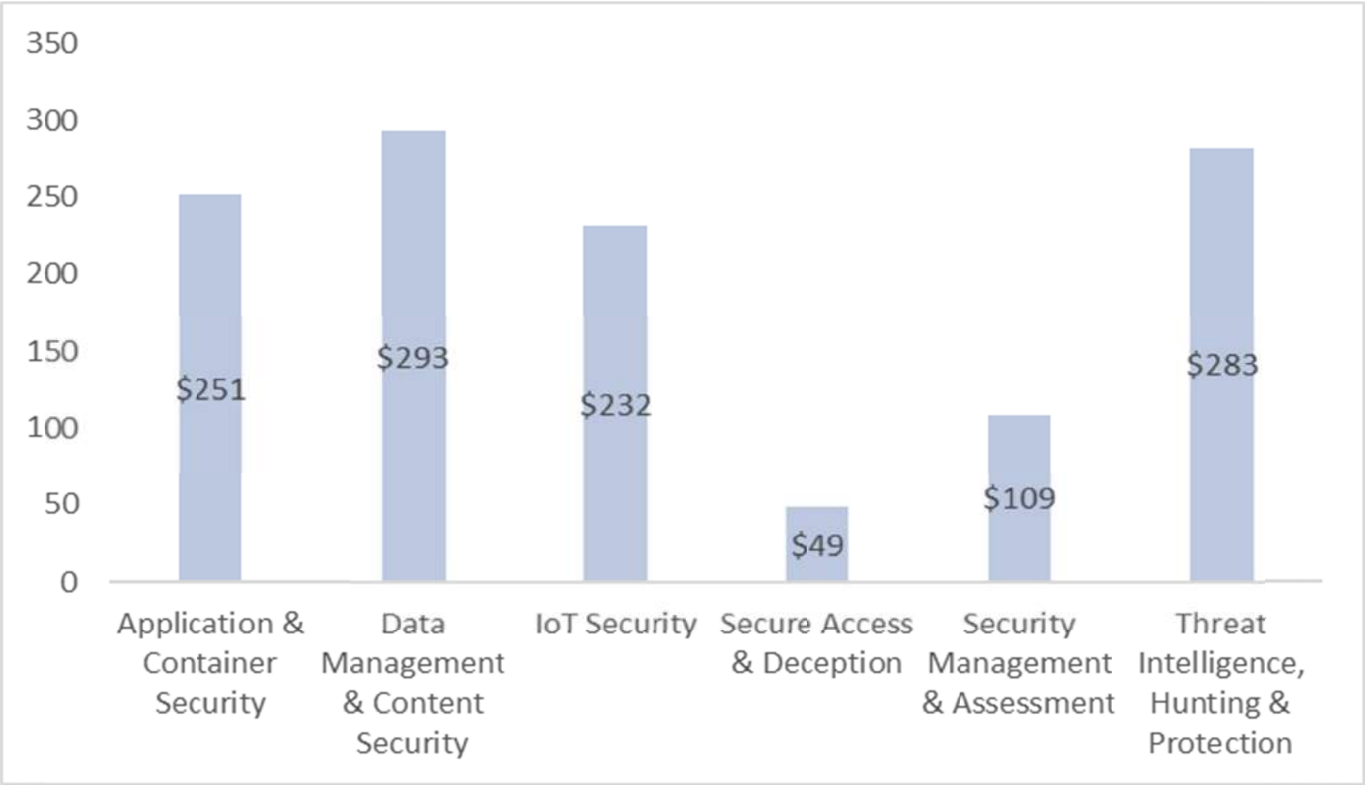
**FIGURE 1. Ten Largest Amounts Raised by Israeli Companies (\$ in Millions)**



Source: crunchbase.com, Company reports

As far as fundraising by category, companies in this report have raised \$1,218M million to date. For a more granular view, we have segmented the companies into six categories, including: 1) application and container security, 2) data management and content security, 3) threat intelligence, hunting, and protection, 4) IoT security, 5) security management and assessment, and 6) secure access and deception. Our group of Israeli companies has raised \$251M in application and container security, \$293M in data management and content security, \$283M in threat intelligence, hunting, and protection, \$232M in IoT security, \$109M in security management and assessment, and \$49M in secure access and deception to date. See Figure 2 for the breakout.

FIGURE 2. Funding by Category (\$ in millions)



Source: Company Reports

FIGURE 3. Company Distribution by Category

**Application & Container Security**

Alcide  
Aqua Security  
Checkmarx  
Twistlock  
WhiteSource Software

**Threat Intelligence/Hunting / Protection**

Coronet  
Guardicore  
IntSights  
Morphisec  
SentinelOne  
ThetaRay

**Security Mgmt & Assessment**

AlgoSec  
CYE  
Cymulate  
SafeBreach  
Simplify

**Data Mgmt & Content Security**

Avanon  
CTERA Networks  
IronScales  
Votiro  
Zerto

**IOT Security**

Claroty  
CyberMDX  
CyberX  
Indegy  
Karamba Security  
SCADAfence  
Upstream

**Secure Access & Deception**

Curv  
Illusive Networks  
Minerva Labs  
Perimeter 81  
Septier Communication  
Silverfort

Source: JMP Securities LLC and Company Reports

In our view, the increasing adoption of new data center architectures and the cloud is driving demand for solutions that are purpose-built for today's IT environments. As a result, innovative startup vendors are well positioned to take share from slower-moving incumbents with outdated architectures, in our opinion. We view these companies as some of the most innovative and promising companies in Israeli security. As the market shifts, we believe these companies will have a strong opportunity to represent the next-generation of IT infrastructure vendors.

We hope this report is helpful. Please feel free to reach out to our team with any questions.

The JMP Securities Cybersecurity and IT Infrastructure Team

## INDEX BY VENTURE CAPITAL FIRM

<b>31Ventures</b>	<b>Evolution Equity Partners</b>
SCADAfence	Morphisec
<b>83North</b>	<b>ff Venture Capital</b>
Cye	CyberX
GuardiCore	<b>Flybridge Capital Partners</b>
Siemplify	Curv
Wandera	<b>GE Ventures</b>
WhiteSource	Morphisec
Zerto	ThetaRay
<b>Accel</b>	<b>Granite Hill Capital Partners</b>
SentinelOne	SentinelOne
<b>Amplify Partners</b>	<b>Greylock Partners</b>
Minerva Labs	Zerto
<b>Aster Capital</b>	<b>Hewlett Packard Pathfinder</b>
Claroty	SafeBreach
<b>Battery Ventures</b>	<b>ICONIQ Capital</b>
GuardiCore	Twistlock
Zerto	<b>Innovation Endeavors</b>
<b>Benchmark Capital</b>	Claroty
CTERA Networks	Illusive Networks
<b>Bessemer Venture Partners</b>	<b>Insight Venture Partners</b>
Claroty	Checkmarx
CTERA Networks	<b>Intel Capital</b>
Illusive Networks	Alcide
Wandera	<b>ITOCHU Technology Ventures</b>
<b>Blumberg Capital</b>	SentinelOne
IntSights	<b>IVP</b>
<b>BMW i Ventures</b>	Zerto
Claroty	<b>JAL Ventures</b>
<b>Charles River Ventures</b>	Perimeter 81
Upstream	<b>Jerusalem Venture Partners</b>
Zerto	Coronet
<b>Cisco Investments</b>	Morphisec
CTERA Networks	SCADAfence
GuardiCore	ThetaRay
Illusive Networks	<b>Jump Capital</b>
<b>Claridge</b>	Curv
AlgoSec	Siemplify
<b>ClearSky</b>	<b>K1 Investment Management</b>
IntSights	Checkmarx
<b>Data Collective</b>	Ironscales
SentinelOne	<b>Lightspeed Venture Partners</b>
<b>Deutsche Telekom Capital Partners</b>	Aqua Security
Morphisec	<b>Magma Venture Partners</b>
SafeBreach	Avanan
<b>Draper Nexus</b>	Indegy
SafeBreach	<b>Marker</b>
<b>Elron Electronic Industries</b>	Claroty
Alcide	Illusive Networks
Ironscales	<b>Microsoft ScaleUp</b>



## INDEX BY VENTURE CAPITAL FIRM

Alcide	ThetaRay
Illusive Networks	<b>Singtel Innov8</b>
SCADAfence	CTERA Networks
Siemplify	Silverfort
<b>Mitsui &amp; Co.</b>	<b>Susquehanna Growth Equity</b>
Claroty	Cymulate
<b>New Enterprise Associates</b>	WhiteSource
Illusive Networks	<b>Team8</b>
<b>Next47 (Siemens)</b>	Claroty
Claroty	Curv
<b>NightDragon Security</b>	Illusive Networks
Claroty	<b>Temasek Holdings</b>
Illusive Networks	Claroty
<b>Norwest Venture Partners</b>	<b>Ten Eleven Ventures</b>
CyberX	Twistlock
<b>OurCrowd</b>	<b>The Blackstone Group</b>
CyberX	IntSights
Morphisec	<b>The Junction</b>
ThetaRay	Alcide
<b>Paladin Capital Group</b>	CyberX
Karamba Security	SCADAfence
<b>PayPal Holdings</b>	<b>The Westly Group</b>
SafeBreach	SentinelOne
<b>Pitango Venture Capital</b>	<b>Third Point Ventures</b>
CyberMDX	SentinelOne
Zerto	<b>Tiger Global Management</b>
<b>Plug and Play Tech Center</b>	SentinelOne
Indegy	<b>TLV Partners</b>
<b>Polaris Partners</b>	Aqua Security
Twistlock	Silverfort
<b>Presidio Ventures</b>	<b>TPG Growth</b>
Karamba Security	Avanan
<b>PwC's Accelerator</b>	GuardiCore
ThetaRay	<b>UpWest Labs</b>
<b>Red Dot Capital Partners</b>	CyberX
Claroty	SentinelOne
CTERA Networks	<b>US Venture Partners</b>
<b>Redfield Group</b>	Zerto
Votiro	<b>Venrock</b>
<b>Redpoint Ventures</b>	CTERA Networks
SentinelOne	<b>Vertex Ventures Israel</b>
<b>Sapphire Ventures</b>	Cymulate
Wandera	Indegy
<b>SBI Holdings</b>	<b>Vintage Investment Partners</b>
Indegy	CTERA Networks
<b>Schneider Electric</b>	IntSights
Claroty	<b>Viola Group</b>
<b>Siemens</b>	CTERA Networks
Claroty	<b>YL Ventures</b>
<b>Silicon Valley Bank</b>	Karamba Security
	Twistlock

## AQUA



**Founded:** 2015  
**Revenue:** <\$25M

[www.aquasec.com](http://www.aquasec.com)  
 781.362.4787

800 District Ave. #310  
 Burlington, MA 01803

**Company Summary:** Aqua leverages a unique architecture where it provides full lifecycle security for container based and serverless applications, securing all the way from building in the CI/CD pipeline to runtime production environments, with the ability to run on-prem or in the cloud at any scale. Scanning container images and serverless functions for vulnerabilities, Aqua provides continuous updates to ensure applications are secure, and then it prevents untrusted images from running, which helps the application to run as smoothly as possible. Its platform also securely delivers secrets to containers where they are only visible to the container and it has container firewalls to increase the level of container security. Its platform also allows for a robust set of platform integrations in the DevOps stack and for strong compliance and audit reporting.

**Key Officers:**

Amir Jerbi – CEO  
 Dror Davidoff – CFO

**Board of Directors:**

Not Listed

**Headcount:** 140

**Open Positions:** 29

U.S. based: 10  
 International: 19  
 Sales: 4  
 Other: 25

**Competition:**

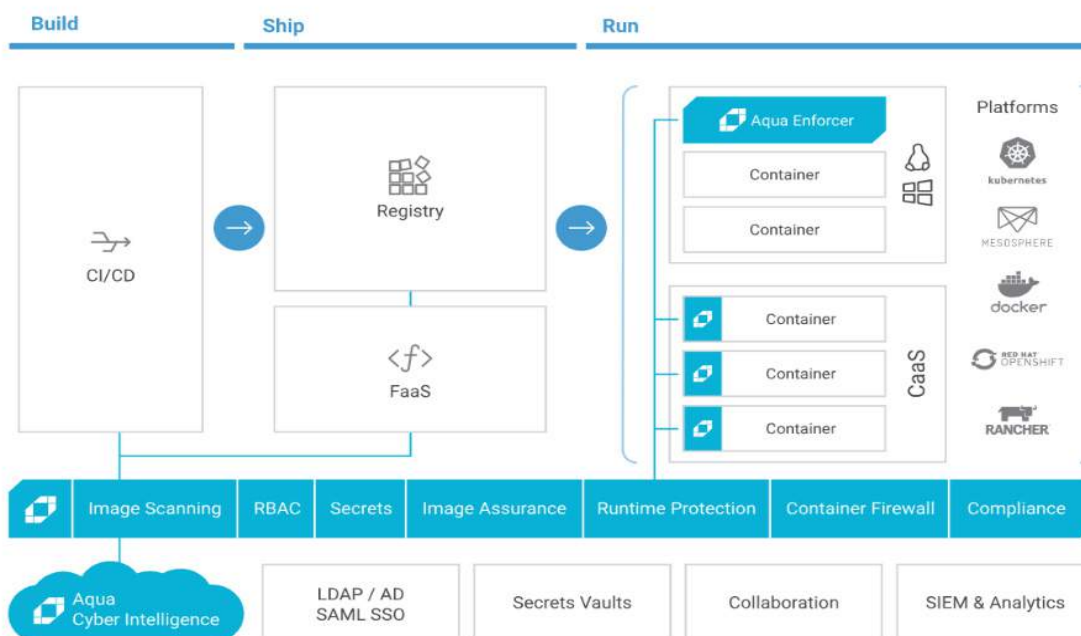
Alcide  
 Qualys  
 Twistlock

**Total Funding:** \$38M

**Key Investors:**

TLV Partners  
 M12 Microsoft Ventures  
 Lightspeed Venture Partners  
 Insight Venture Partners  
 Shlomo Kramer

*Source: Company website, all revenues are CY-18*



## ALCIDE



**Founded:** 2016  
**Revenue:** <\$25M

[www.alcide.io](http://www.alcide.io)  
N/A

5 Mikonis St.  
Tel Aviv, Israel 6777214

**Company Summary:** Alcide is a cloud-native security leader empowering DevSecOps teams to continuously secure and protect multi-cluster Kubernetes deployments. By automatically discovering, managing and enforcing security policies across deployments, Alcide's Microservices Firewall for K8s enables unified code-to-production enforcement of security policies spanning networks and workloads. This enables the smooth operation of business apps while protecting cloud deployments from malicious attacks.

### Key Officers:

Gadi Naor – CTO & Co-founder  
Ranny Nachmias – CEO & Co-founder  
Adam Wolman – VP of Sales  
Karine Regev – VP of Marketing

### Competition:

Qualys  
Twistlock  
Palo Alto Networks  
Aqua

### Board of Directors:

Not listed

**Total Funding:** \$12.3M

### Key Investors:

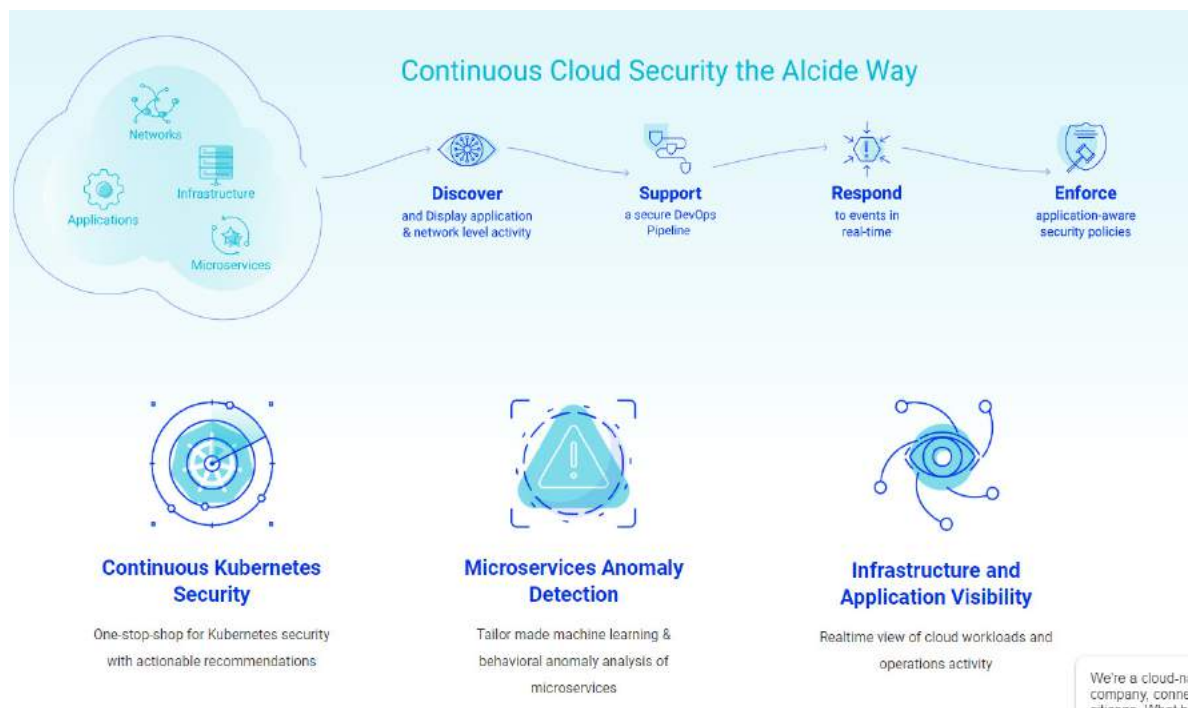
Intel Capital  
Elron  
CE Ventures

**Headcount:** 24

### Open Positions: 6

U.S. based: 2  
International: 4  
Sales: 2  
Other: 4

Source: Company website, all revenues are CY-18



## ALGOSEC



**Founded:** 2003  
**Revenue:** \$50-\$100M

www.algosec.com  
 888.358.3696

65 Challenger Rd., Suite 310  
 Ridgefield Park, NJ 07660

**Company Summary:** Founded in Israel, AlgoSec is at the forefront of next-gen firewall management, where its unique platform allows enterprises to discover, map, and migrate business application connectivity to proactively analyze security risk from the business perspective. Additionally, it can automate network security policy changes with zero touch provisioning and link cyber-attacks to certain business processes, allowing companies to significantly mitigate risks. With a host of products that have a differentiated offering, AlgoSec has been able to accumulate over 1,800 customers and 20 of the Fortune 50.

**Key Officers:**

Yuval Baron – Chairman, CEO and CCSO  
 Avishai Wool – CTO and Co-founder  
 Ofer Segev – COO and CFO  
 Jeffrey Starr – CMO

**Board of Directors:**

Not Listed

**Headcount:** 400

**Open Positions:** 31

U.S. based: 10  
 International: 21  
 Sales: 12  
 Other: 19

**Competition:**

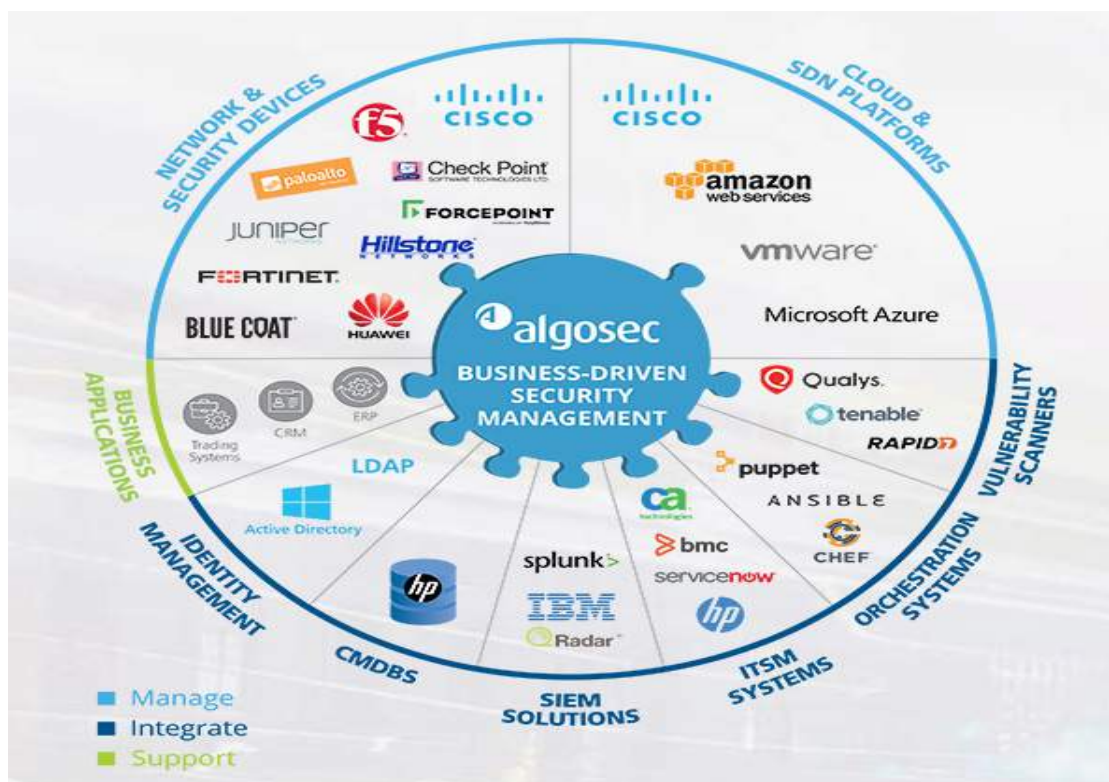
Tufin  
 Skybox  
 FireMon  
 Palo Alto Networks  
 Fortinet  
 Cisco  
 CheckPoint

**Total Funding:** \$36M

**Key Investors:**

Claridge Israel

Source: Company website, all revenues are CY-18



### AVANAN



**Founded:** 2014  
**Revenue:** <\$25M

[www.avanan.com](http://www.avanan.com)  
855.528.2626

259 W. 30th St.  
New York, NY 10001

**Company Summary:** Born in the cloud, Avanan secures all cloud emails, messages, and file sharing tools from phishing, malware and data loss in a single click. The company finds best of breed security tools and then 'cloudifies' them with its proprietary APIs to standardize users and policy information. The company then bundles them so customers can deploy their choice of security tools or a pre-bundled offering and consolidate the payment into a single per-user, per-month subscription, creating a single-click full-security stack. It also integrates with the cloud to secure SaaS applications without proxies or agents to allow for instant and secure usage of SaaS apps.

#### Key Officers:

Gil Friedrich – CEO  
Don Byrne – EVP, Worldwide Sales  
Avi Zelovich – CTO  
Michael Castricone – CFO  
Roy Rotem – VP, Product Management  
Michael Landewe – VP, Business Development

#### Competition:

Mimecast  
Proofpoint  
Zix

**Total Funding:** \$41.4M

#### Board of Directors:

Yuda Doron – Managing Partner, Greenfield Partners  
Modi Rosen – Managing Partner, Magma Venture Partners  
Tal Slobodkin – Managing Partner, StageOne Ventures

#### Key Investors:

Greenfield Partners  
Magma Venture Partners  
StageOne Ventures

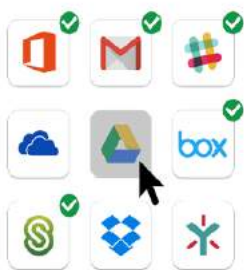
**Headcount:** 70

#### Open Positions: 6

U.S. based: 2  
International: 4  
Sales: 1  
Other: 5

*Source: Company website, all revenues are CY-18*

#### 1. Select your SaaS



Avanan connects to any cloud application in one click via API connection. Secure all of your cloud applications from business suites like Office 365 to Citrix Sharefile, and everything in between.

#### 2. Choose Security Layers



Advanced anti-phishing, anti-malware, DLP, and UEBA tools from the leading security vendors, pre-configured on the cloud. Add layers of security a-la-carte or from our pre-packaged bundles to your SaaS in a single click.

#### 3. Deploy Instantly



All of your security is now standardized across your organization and managed from a single dashboard. You can finally stop worrying about threats on the cloud.



## CHECKMARX



**Founded:** 2006  
**Revenue:** \$50M-\$100M

www.checkmarx.com  
 917.470.9501

Amot Atrium Tower, 2 Jabotinsky St.  
 Ramat Gan, Israel 5250501

**Company Summary:** Checkmarx delivers a security platform for DevOps and Continuous Integration environments by redefining security's role in the SDLC while operating at the speed of DevOps. The fast feedback loop makes security testing of new or edited code fragments quick with speedy remediation by developers. This significantly reduces costs and eliminates the problem of having to deal with potential security vulnerabilities close to release. Ultimately, by enabling developers to test their own code for security issues, they can get instant results and remediate issues on the spot.

**Key Officers:**

Emmanuel Benzaquen – CEO  
 Maty Siman – Founder & CTO  
 Alex Roichman – Chief Software Architect  
 Shmuel Arvatz – CFO  
 Moshe Lerner – SVP, Product Strategy & Corporate Development  
 Rafi Bhonker – SVP, Global Sales  
 Assaf Dar – Chief Product Development Officer  
 Yael Ben Tovim – VP, Human Resources  
 Nir Livni – VP, Products

**Board of Directors:**

John True – GP, Cultivation Capital  
 David (Dede) Goldschmidt – Former MP & CEO, Mofet Technology Fund  
 Emmanuel Benzaquen – CEO, Checkmarx  
 Maty Siman – Founder & CTO, Checkmarx

**Competition:**

HP (Fortify)  
 CyberArk  
 Veracode  
 Synaptics

**Total Funding:** \$92M - Acquired by Insight Venture Partners on June 15, 2015

**Key Investors:**

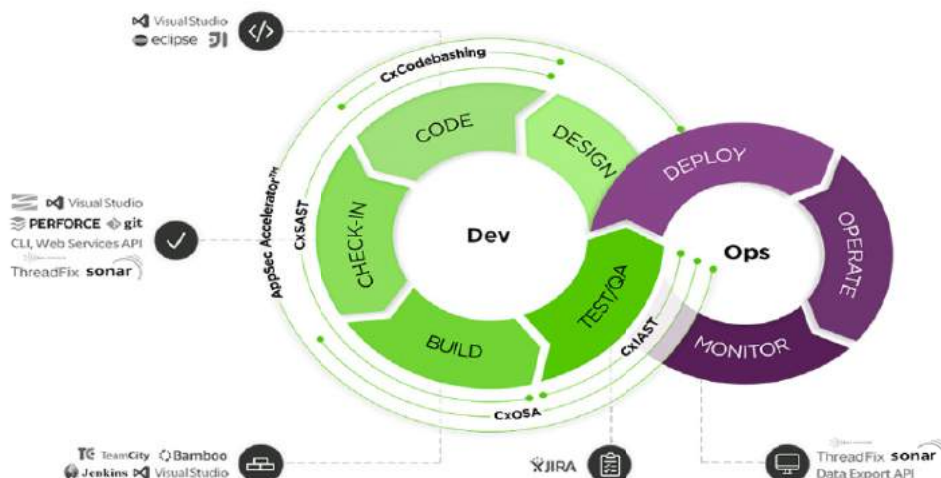
Insight Venture Partners  
 Ofer Hi-Tech  
 Salesforce Ventures  
 XT Investments  
 Naiot Venture

**Headcount:** ~500

**Open Positions: 40**

U.S. based: 5  
 International: 35  
 Sales: 8  
 Other: 32

Source: Company website, all revenues are CY-18



### CLAROTY



**Founded:** 2014  
**Revenue:** <\$25M

[www.claroty.com](http://www.claroty.com)  
201.345.4256

488 Madison, 11th Floor  
New York, NY 10022

**Company Summary:** The Claroty Platform is an integrated set of cyber security products that provides extreme visibility, unmatched cyber threat detection, secure remote access and risk assessments for industrial control networks. With a focus on operational technology (OT), the company has a unique ability to protect devices from vulnerabilities, then control the network segmentation and manage remote access by enforcing granular policies and recording sessions. With its continuous monitoring, it can detect malicious and high-risk activity, and then respond with context-rich alerts for rapid triage.

#### Key Officers:

Amir Zilberstein – Co-founder & CEO  
Benny Porat, PhD – Co-founder & CPO  
Galina Antova – Co-founder & Chief BDO  
Yaron Shalom – CFO  
Yuval Tzeiri – COO

#### Board of Directors:

Amir Zilberstein – Co-founder & CEO, Claroty  
Dave DeWalt – Chairman, Ex-CEO, FireEye  
Nadav Zafrir – CEO, Team8  
Benny Porat, PhD – Co-founder & CPO, Claroty  
David Cowan – Partner, Bessemer  
Guy Sella – CEO, SolarEdge  
Yeoh Keat Chuan – MD, Temasek  
Meir Ukeles – GP, ICV

**Headcount:** 200

#### Open Positions: 15

U.S. based: 3  
International: 12  
Sales: 5  
Other: 10

#### Competition:

CyberX  
Indegy

**Total Funding:** \$92M

#### Key Investors:

Rockwell Automation  
Next47  
Aster Capital  
Temasek  
Bessemer Venture Partners  
Team8  
Innovation Endeavors  
Clearvision Ventures  
Reddot  
Mitsui & Co.  
ICV  
Every Ventures  
BMW iVentures

*Source: Company website, all revenues are CY-18*



#### Protect

Proactively discover and eliminate vulnerabilities, misconfigurations and insecure connections.



#### Control

Implement NW segmentation and manage remote access by enforcing granular access policies and recording sessions.



#### Detect

Continuously monitor and detect malicious activity and high-risk changes throughout the attack "kill-chain".



#### Respond

Receive context rich alerts for rapid triage and investigation, and automate response using existing NW infrastructure.

## CORONET



**Founded:** 2013  
**Revenue:** <\$25M

www.coro.net  
 N/A

Yehuda and Noah Moses 13  
 Tel-Aviv-Yafo 6744252

**Company Summary:** Built for cloud environments, Coronet provides endpoint security that can be simply deployed and will begin to immediately monitor a customer's business for a data breach. Its platform also automatically mitigates risks, threats, and abnormal activities using its award-winning AI engine to protect an enterprise with a few clicks. It also blocks and remediates against leakage of sensitive information with its DLP engine. Coronet also has an endpoint monitoring offering for mobile devices.

**Key Officers:**

Guy Moskowitz – Founder & CEO  
 Len Crosson – Chief Revenue Officer  
 Doron Milchtaich – Founder & CTO  
 Dror Liwer – Founder & CISO  
 Prof. Carmel Domshlak – Founder & Chief Scientist

**Competition:**

Symantec  
 CrowdStrike  
 Lookout  
 McAfee  
 SentinelOne

**Board of Directors:**

Not Listed

**Total Funding:** Unknown

**Headcount:** 20

**Key Investors:**

JVP  
 MizMaa Ventures  
 Sound

**Open Positions: 5**

U.S. based: 0  
 International: 5  
 Sales: 0  
 Other: 5

Source: Company website, all revenues are CY-18



### CTERA NETWORKS



**Founded:** 2008  
**Revenue:** <\$25M

[www.ctera.com](http://www.ctera.com)  
917.768.7193

25 Eyal St.  
Petach Tikvah Israel 49511-25

**Company Summary:** CTERA provides the only cyber-hardened platform to integrate endpoint, office, and cloud file services while supporting cloud choice and automation. Serving over 50,000 businesses worldwide, CTERA was born in the cloud, with its platform designed for new file services to easily sync, share, and backup. The platform can be deployed in both private and public cloud instances, powering hybrid cloud environments. As a cloud native architecture, CTERA has many RESTful APIs, and offers multi-tenant data security and service management to provide best-in-breed security. In 2018, CTERA doubled enterprise solution subscription revenue Y/Y.

#### Key Officers:

Liran Eshel – CEO & Co-founder  
Oded Nagel – Chief Strategy Officer  
Aron Brand – CTO  
Limor Bakal – EVP, Business and Marketing Ops

#### Board of Directors:

Liran Eshel – CEO & Co-founder, CTERA Networks  
Zohar Kaufman – Co-founder, CTERA Networks  
Arad Naveh – Partner, Benchmark Capital  
Yaniv Stern, Managing Partner, Red Dot Capital Partners  
Ray Rothrock – Partner, Venrock  
Adam Fisher – Partner, Bessemer Venture Partners

**Headcount:** 250

#### Open Positions: 8

U.S. Based: 2  
International: 6  
Sales: 3  
Other: 5

#### Competition:

Box  
Dropbox  
Microsoft

**Total Funding:** \$100M

#### Key Investors:

Benchmark  
Bessemer Venture Partners  
Cisco  
Venrock  
Vintage Investment Partners  
Innov8  
Viola Ventures

*Source: Company website, all revenues are CY-18*



## CURV



**Founded:** 2017  
**Revenue:** <\$25M

[www.curv.co](http://www.curv.co)

Tel Aviv, Israel

**Company Summary:** Curv develops multi-party encryption technology that provides solid protection, instant availability and total autonomy for blockchain processing. Powered by its Revolutionary Cryptography, Curv eliminates the private key flaw in blockchains, which is the single point of failure in the system. It does so by offering a secure, distributed approach to sign transactions and manage digital assets. It is intended to be easy for both employees and developers to use.

**Key Officers:**

Itay Malinge – Co-founder & CEO  
 Dan Yadlin – Co-founder & CTO  
 Dr. Ben Riva – Chief Scientist

**Competition:**

CyberX  
 Venafi  
 Indegy  
 Claroty

**Board of Directors:**

Nadav Zafrir – Co-founder & CEO, Team8  
 Lluís Pedragosa – Partner & CFO, Team8  
 Itay Malinge – Co-founder & CEO, Curv  
 Dan Yadlin – Co-founder & CTO, Curv

**Total Funding:** NA

**Key Investors:**

Team8  
 Digital Currency Group  
 Jump Capital  
 Flybridge Capital Partners  
 Monex Group

**Headcount:** 16

**Open Positions:** 3

U.S. based: 0  
 International: 3  
 Sales: 0  
 Other: 3

*Source: Company website, all revenues are CY-18*



**TRANSACTION WITH CONFIDENCE**

Know all transfers are legitimate and authorized, and assure your digital assets are safe from cyberattacks, insider collusion, bugs and human errors.



**EXECUTE WITH SPEED**

Transact online, at the speed of business, and accelerate the adoption of new assets to capitalize on digital market opportunities as they emerge.



**REMAIN IN COMPLETE CONTROL**

Maintain total autonomy over your digital assets with one platform to manage all your assets.



### CYBERMDX



**Founded:** 2017  
**Revenue:** <\$25M

[www.cybermdx.com](http://www.cybermdx.com)  
646.794.4160

44 West 28th St., Floor 8  
New York, NY 10001

**Company Summary:** CyberMDX was established to tackle the growing security challenges that hospitals and clinical networks face as they protect their networked medical devices and critical IoT assets. It helps healthcare organizations map IT ecosystems, shore up vulnerabilities, detect and expel cyber intruders and shrink the attack service. CyberMDX leverages deep industry expertise and unparalleled cyber training and proprietary AI technology to lead the company and fuel its innovation.

#### Key Officers:

Amir Magner – CEO  
Motti Sorani – CTO  
Ido Geffen – VP, Product and Customer Success  
Prof. Gil David – Chief Scientist of Artificial Intelligence  
Amir Vashkover – Head of Professional Services & Compliance  
Elad Luz – Head of Research  
Kirill Morozov – Head of DevOps

#### Competition:

NA

**Total Funding:** \$10M

#### Key Investors:

Pitango Venture Capital  
Qure Ventures  
Firstminute Capital

#### Board of Directors:

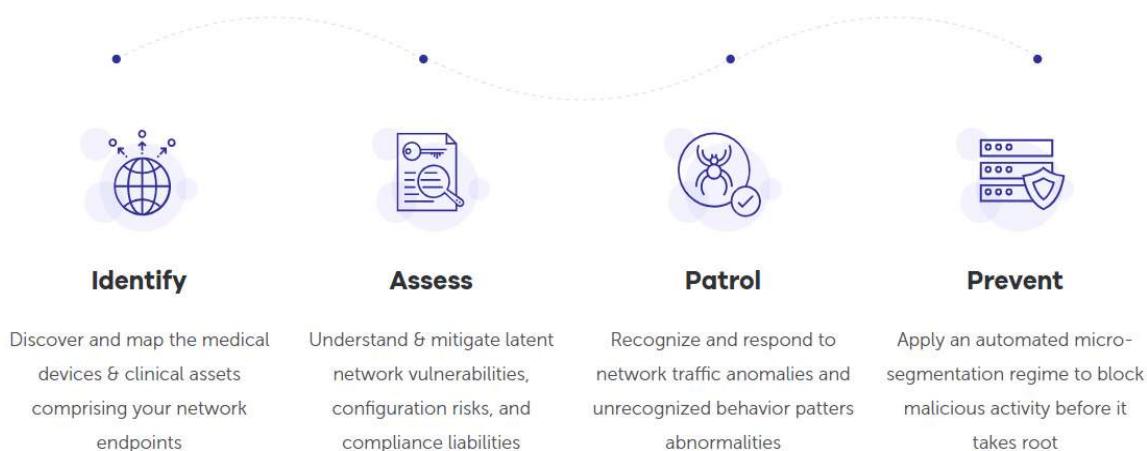
Yuval Bar-Gil – Co-founder & CEO, AeroScout  
Moti Shniberg – Co-founder and Chairman, Face.com  
Rami Kalish – Managing General Partner, Pitango  
Dr. Yossi Bahagon – Co-founder, Clalit Health Services Digital Health Division

**Headcount:** 22

#### Open Positions: 7

U.S. based: 3  
International: 4  
Sales: 1  
Other: 6

*Source: Company website, all revenues are CY-18*



## CYBERX



**Founded:** 2013  
**Revenue:** <\$25M

www.cyberx-labs.com  
 657.229.2370

203 Crescent St. Suite 107  
 Waltham, MA 02453

**Company Summary:** CyberX provides an industrial cybersecurity platform (ICP) that delivers continuous monitoring and vulnerability management with zero impact on operational networks. It displays a complete network map of all assets, reaching into all areas of production to give a clear picture of the devices in a network and how they communicate. It also integrates with security operations center (SOC) workflows and the existing security stack to provide unified security governance across both IT and OT.

**Key Officers:**

Omer Schneider – Co-founder & CEO  
 Nir Giller – Co-founder, GM & CTO  
 Liat Soffer – CFO  
 Amit Porat – Chief Architect

**Competition:**

NA

**Total Funding:** \$47M

**Key Investors:**

Norwest Venture Partners  
 Flint Capital  
 Gilot Capital Partners

**Board of Directors:**

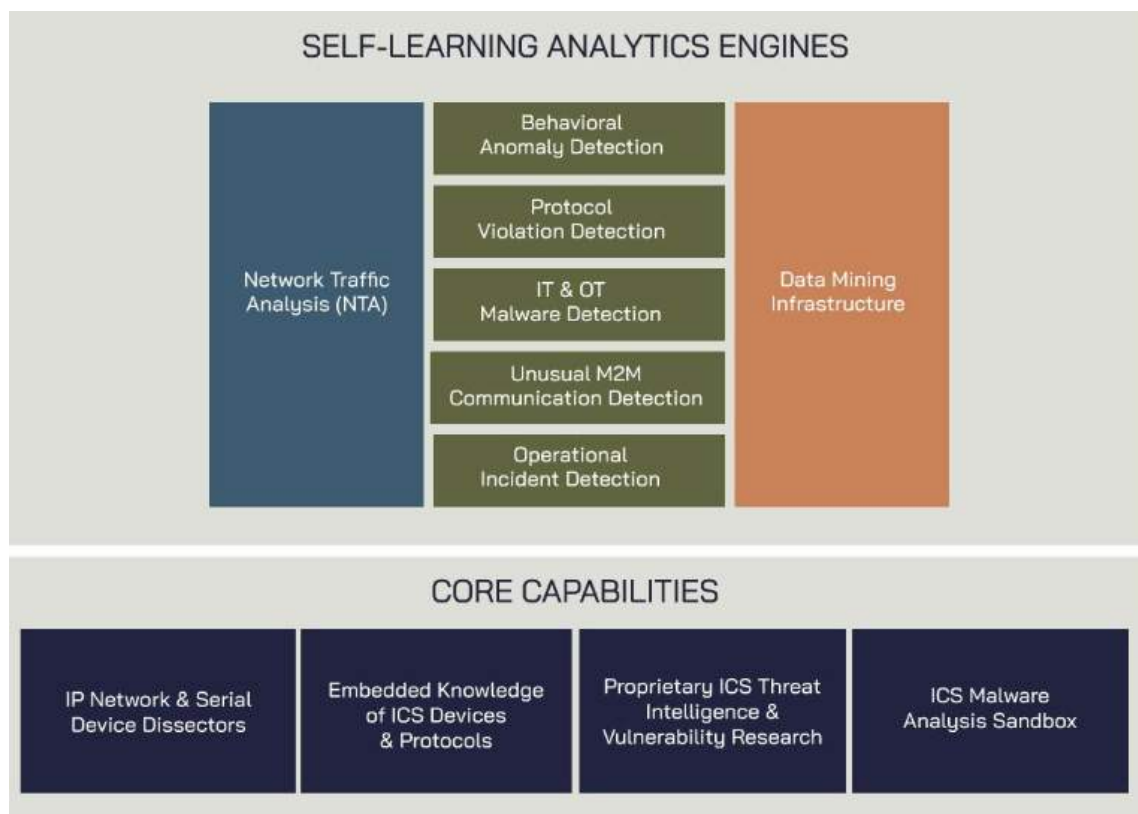
Not Listed

**Headcount:** 80

**Open Positions:** 10

U.S. based: 3  
 International: 7  
 Sales: 2  
 Other: 8

*Source: Company website, all revenues are CY-18*



### CYE



**Founded:** 1996  
**Revenue:** <\$25M

[www.cysec.com](http://www.cysec.com)  
+972.77.557.5881

Abba eban 1  
Herzliya, Israel

**Company Summary:** CYE offers expert services that are augmented with proactive cybersecurity technologies. The company leverages artificial and natural intelligence, along with veteran security experts. CYE's technology enables organizations to take a proactive security approach and make informed decisions by presenting complex, cyber-risk optimization problems so that they can adapt to rapid changes in the threat landscape. Its platform continuously analyzes behaviors, ultimately gaining a deep understanding of threats across environments with high levels of accuracy based on real attacks.

#### Key Officers:

Reuven Aronashvili – CEO  
Ronen Lago – CTO  
Ofer Malka – COO  
Noy Saban – CFO

#### Competition:

NA

#### Total Funding:

Not Listed

#### Board of Directors:

Not Listed

#### Key Investors:

Not Listed

**Headcount:** ~40

#### Open Positions: 6

U.S. based: 1  
International: 5  
Sales: 1  
Other: 5

*Source: Company website, all revenues are CY-18*



#### VIRTUAL EXPERTS

Hacking Bots that mimic attack vectors and vulnerabilities to expose potential threats.



#### COMMUNITY WISDOM

Private network of global vetted experts who research and explore new vulnerabilities.



#### RED TEAM

Nation-level experienced members who develop the future generation of potential attack scenarios.



## CYMULATE



**Founded:** 2016  
**Revenue:** <\$25M

www.cymulate.com  
 212.652.2632

2 Nim Blvd  
 Rishon LeZion, Israel 7546302

**Company Summary:** Cymulate is a SaaS-based, cyberattack simulation company that delivers easy-to-use, comprehensive security solutions to safeguard business-critical digital assets. The company develops a unique breach and attack simulation platform that empowers organizations with complex security solutions to safeguard their business-critical assets. By mimicking the myriad of strategies hackers deploy, the system allows businesses to assess their true preparedness to handle cyber security threats effectively.

**Key Officers:**

Eyal Wachsmann – CEO & Co-founder  
 Avihai Ben-Yossef – CTO & Co-founder  
 Sharon Nakash – COO  
 Gily Netzer – CMO

**Competition:**

Bugcrowd  
 HackerOne  
 Synack

**Total Funding:** \$11M

**Board of Directors:**

Eyal Gruner – CEO, Cynet  
 Emanuel Timor – GP, Vertex Ventures Capital  
 Alon Weinerg – Director, Dell Technologies Capital  
 Jonathan Klahr – MD, Susquehanna Growth Equity  
 Noa Wolfson – Investor, Susquehanna Growth Equity

**Key Investors:**

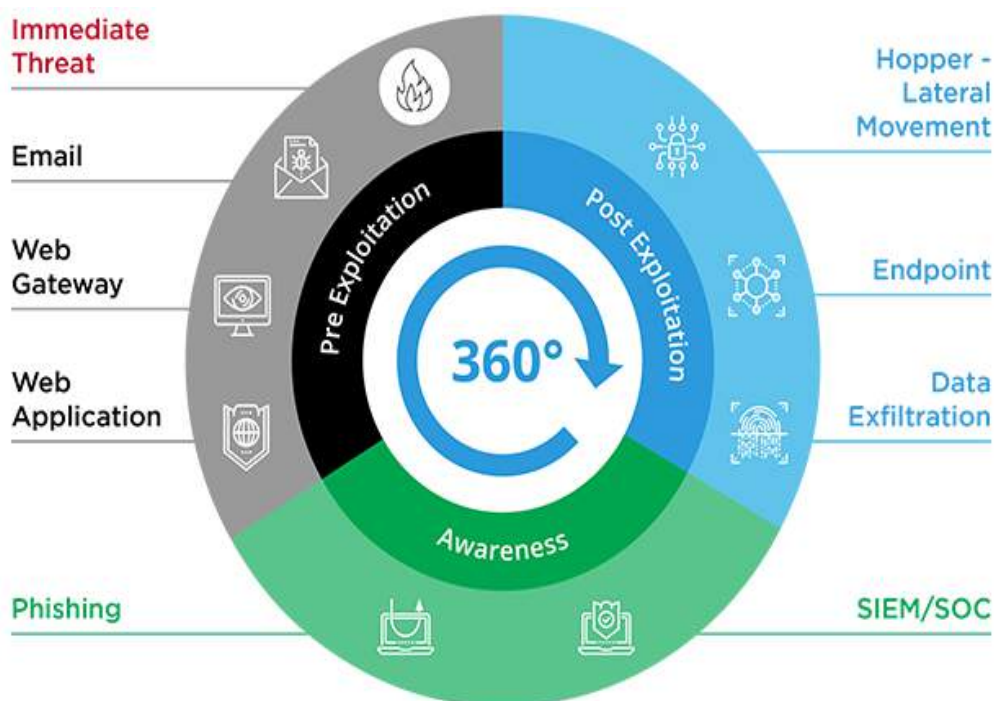
Susquehanna Growth Equity  
 Eyal Gruner  
 Dell Technologies Capital  
 Vertex Ventures

**Headcount:** 25

**Open Positions:** 4

U.S. based: 0  
 International: 4  
 Sales: 0  
 Other: 4

Source: Company website, all revenues are CY-18



### GUARDICORE



**Founded:** 2013  
**Revenue:** <\$25M

www.guardicore.com  
628.220.2670

23rd Floor, 23 Menachem Begin Rd.  
Tel Aviv, Israel 6618356

**Company Summary:** Founded in 2013, GuardiCore looks to serve enterprises that aim to gain significantly enhanced visibility into their hybrid cloud environments. By providing segmentation in the cloud and combining with orchestration tools, GuardiCore provides microsegmentation that allows companies to robustly protect their growing hybrid cloud environments in a seamless manner. In addition to microsegmentation and orchestration, it also provides detection capabilities, which allows its products to rapidly detect breaches within a hybrid environment.

#### Key Officers:

Pavel Gurvich – CEO & Co-founder  
Ariel Zeitlin – Co-founder & CTO  
Yaron Bartov – CFO  
Ofer Wolf – COO  
Dror Sal'ee – VP, Biz Dev & Co-Founder  
Sharon Besser – VP, Products  
Ori Aldor – VP, R&D  
Nathan Perdue – VP, Sales North America

#### Board of Directors:

Pavel Gurvich – CEO, GuardiCore  
Ariel Zeitlin – CTO, GuardiCore  
Prof. Ehud Weinstein – Chairman of the Board, GuardiCore  
Scott Tobin – General Partner, Battery Ventures  
Erez Ofer – General Partner, 83North

#### Competition:

Cisco (Tetration)  
VMware (NSX)  
Illumio  
CloudPassage

**Total Funding:** \$46M

#### Investors:

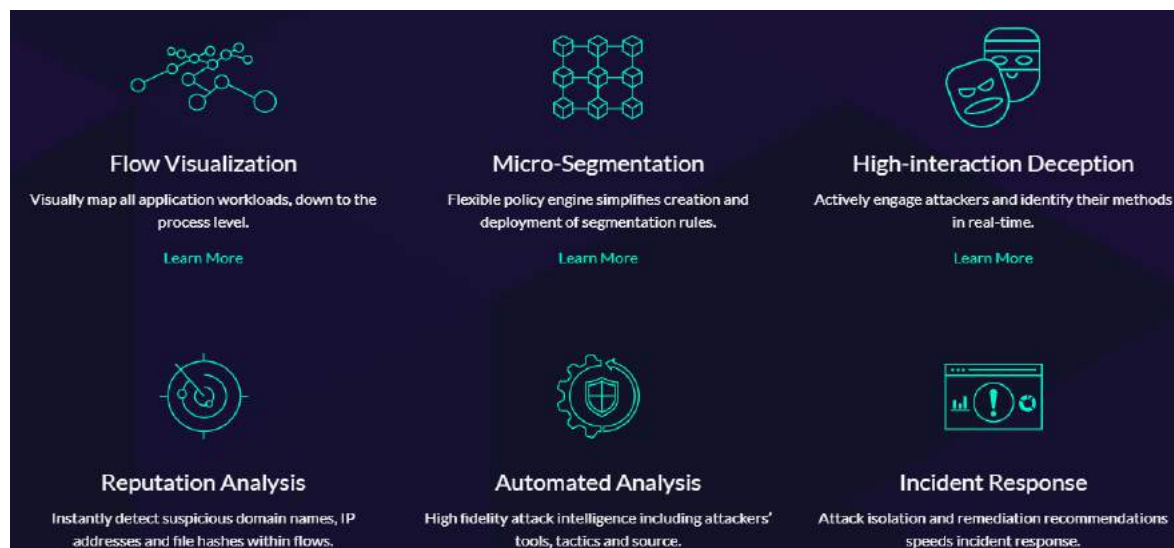
Battery Ventures  
83North  
TPG Growth  
Qumra Capital  
T Capital Partners  
Partech  
Claltech

**Headcount:** ~130

#### Open Positions: 13

U.S. Based: 5  
International: 6  
Sales: 4  
Other: 9

*Source: Company website, all revenues are CY-18*





## ILLUSIVE NETWORKS



**Founded:** 2014  
**Revenue:** <\$25M

www.illusivenetworks.com  
 844.455.8748

Totseret Ha-Arets St. 7  
 Tel Aviv-Yafo, Israel 6789104

**Company Summary:** Illusive Networks is a pioneer of deception-based cybersecurity technology, empowering security teams to take informed action against advanced, targeted cyberattacks by detecting and disrupting lateral movement toward critical business assets early in the attack lifecycle. Agentless and driven by intelligent automation, Illusive technology enables organizations to significantly increase proactive defense while adding almost no operational overhead. By saturating the environment with deceptive information, Illusive creates a distorted reality that the attacker cannot confidently navigate. It is a solution that disrupts the attacker's operations and helps security teams detect and resolve advanced attacks, to prevent cyber incidents from becoming business crises.

**Key Officers:**

Ofer Israeli – CEO & Founder  
 Arik Levi – CFO  
 Kirby Wadsworth – CMO

**Competition:**

Cobalt  
 Synack  
 Bugcrowd

**Board of Directors:**

Nadav Zafrir – CEO, Team8  
 Dave DeWalt – Ex-CEO, FireEye  
 Yuval Shachar – Partner, Marker LLC  
 Aaron Jacobson – Board Member

**Total Funding:** \$30M

**Investors:**

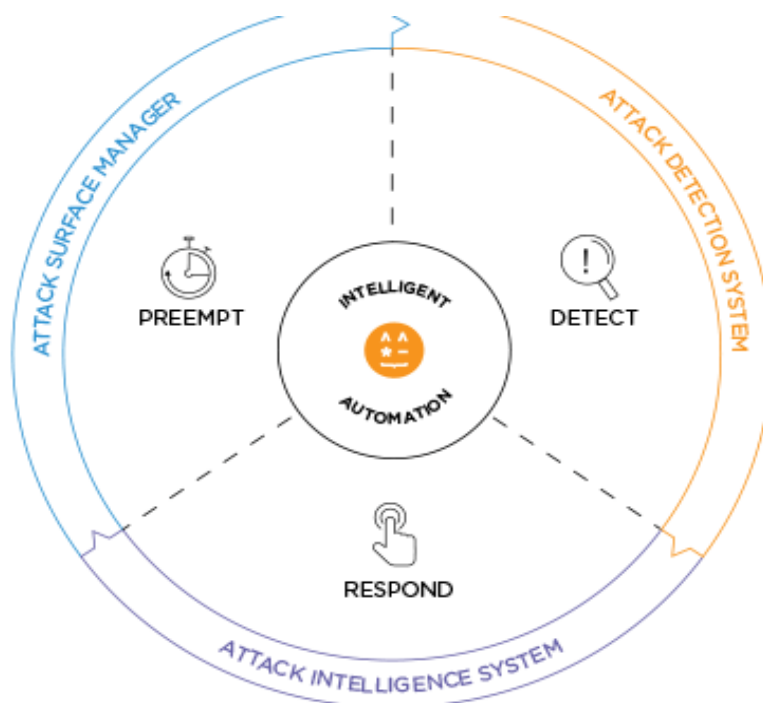
NEA  
 Bessemer Venture Partners  
 Cisco  
 Marker LLC  
 Citi Ventures  
 Innovation Endeavors

**Headcount:** 100

**Open Positions:** 14

U.S. Based: 11  
 International: 3  
 Sales: 2  
 Other: 12

Source: Company website, all revenues are CY-18



### INDEGY



**Founded:** 2014  
**Revenue:** <\$25M

[www.indegy.com](http://www.indegy.com)  
866.801.5394

1460 Broadway St.  
New York, NY 10036

**Company Summary:** Founded in 2014, Indegy's Industrial Cybersecurity Suite arms security and operations teams with full visibility, security, and control of industrial control systems (ICS) activity and threats. Its unparalleled, patent-pending hybrid technologies combine policy monitoring and network anomaly detection with unique device integrity checks. Indegy's solutions are installed in automotive, pharmaceutical, energy, water, electric and other industrial organizations worldwide.

#### Key Officers:

Barak Perelman – Co-founder & CEO  
Mille Gandelsman – Co-founder & CTO  
Ido Trivizki – Co-founder & VP, R&D  
Dvora Nuriel-Valach – CFO  
Joe Scotto – CMO

#### Board of Directors:

Not Listed

**Headcount:** 60

**Open Positions:** Not Listed

#### Competition:

NA

**Total Funding:** \$35M

#### Investors:

Shlomo Kramer  
Aspect Ventures  
Centrica Innovations  
Magma Ventures  
Vertex Venture  
Liberty Technology Venture Capital  
General David H. Petraeus

*Source: Company website, all revenues are CY-18*



#### Indegy Security Platform

This is the core component of the Indegy Suite, responsible for analyzing network traffic data, performing Device Integrity checks, and aggregating sensors' data.



#### Indegy Sensors

Optional, lightweight sensors provide full visibility into remote network segments by capturing, filtering and forwarding traffic to the Indegy Security Platform for further analysis.



#### Indegy Enterprise Manager

Ideal for multi-site distributed environments, IEM enables enterprise-wide visibility and control by aggregating data from Indegy Security Platforms with centralized configuration and policy management.

## INTSIGHTS



**Founded:** 2015  
**Revenue:** <\$25M

www.intsights.com  
 800.532.4617

155 W. 19th St, 5th Floor  
 New York, NY 10011

**Company Summary:** IntSights is revolutionizing cybersecurity with its Enterprise Threat Intelligence & Mitigation platform which delivers proactive defense by transforming threat intelligence into automated security action. It monitors the external risk profile, aggregates and analyzes tens of thousands of threats, and automates the risk mitigation lifecycle. IntSights' ground breaking data mining algorithms and unique cyber reconnaissance capabilities continuously scan the clear, deep and dark web to deliver tailored contextual insights about potential threats to an organization.

**Key Officers:**

Guy Nizan – CEO & Co-founder  
 Alon Arvatz – CPO & Co-founder  
 Gal Ben David – CTO & Co-founder  
 Ron Reinfeld – CFO  
 Jay Zimet – Chief Revenue Officer

**Competition:**

FireEye  
 Recorded Future  
 Digital Shadows  
 Palo Alto Networks  
 Symantec

**Board of Directors:**

David Blumberg – MP, Blumberg Capital  
 Sheila Gulati – MD, Tola Capital  
 Ron Zoran – CRO, CyberArk  
 Jay Leek – MD, ClearSky Security  
 Kobi Samboursky – Founder and MP, Glilot Capital Partners

**Total Funding:** \$41.3M

**Investors:**

Wipro Ventures  
 Glilot Capital  
 Blumberg Capital Partners  
 Blackstone Group  
 ClearSky Security  
 Tola Capital

**Headcount:** 150

**Open Positions:** 9

U.S. based: 3  
 International: 6  
 Sales: 2  
 Other: 7

*Source: Company website, all revenues are CY-18*



## IRONSCALES



**Founded:** 2014  
**Revenue:** <\$25M

[www.ironcales.com](http://www.ironcales.com)  
888.275.4740

Tel-Aviv-Yafo, Israel

**Company Summary:** Founded in 2014, IronScales has pioneered an advanced, anti-phishing threat protection platform combining human and machine intelligence to automatically analyze, detect and remove malicious emails before and after they land in the inbox using a multi-layered and automated approach. Its suite of products ensures that employees are prepared to take an active role in protecting the integrity of their organizations, while reinforcing their efforts with technology that can automatically defend enterprises from attacks in real time.

### Key Officers:

Eyal Benishti – CEO & Founder  
Erez Fingerman – COO  
Lomy Ovdia – Head of R&D  
Koby Bar – Head of Product

### Competition:

Mimecast  
Proofpoint  
Zix  
FireEye

### Board of Directors:

Not listed

**Total Funding:** \$8M

### Key Investors:

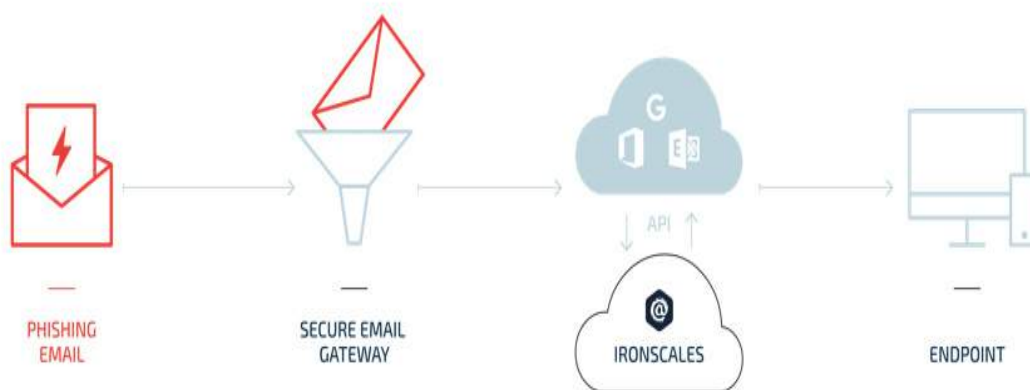
K1 Enterprise Software Investors  
RDC (Rafael Development Corporation)

**Headcount:** 30

### Open Positions: 5

U.S. based: 0  
International: 5  
Sales: 0  
Other: 5

Source: Company website, all revenues are CY-18



## KARAMBA SECURITY



**Founded:** 2015  
**Revenue:** <\$25M

www.karambasecurity.com  
 248.574.5171

24 HaNagar St.  
 Hod Hasharon, Israel 45277-13

**Company Summary:** Karamba Security provides industry-leading automotive cybersecurity solutions for autonomous and connected cars. Its Autonomous Security software products, including ThreatHive, Carwall, and SafeCAN, provide end-to-end, in-vehicle cybersecurity for the endpoints and the internal messaging bus. Karamba Security's solutions prevent cyberattacks with zero false positives and secure communications, including over-the-air updates, with negligible performance impact. Karamba is engaged with 17 OEM and tier-1 customers.

**Key Officers:**

Ami Dotan – CEO & Co-founder  
 David Barzilai – Executive Chairman & Co-founder  
 Tal Ben-David – VP, R&D & Co-founder  
 Assaf Harel – Chief Scientist & Co-founder  
 Idit Mor – CFO  
 Guy Sagy – CTO

**Board of Directors:**

Ofer Schreiber – MD, YL Ventures  
 Chris Stallman – MD, Fontinalis Partners  
 Neil Schloss – Independent Board Member

**Headcount:** Unknown

**Competition:**

NA

**Total Funding:** \$27M

**Key Investors:**

YL Ventures  
 Fontinalis Partners  
 Paladin Capital Group  
 Liberty Mutual  
 Presidio Ventures  
 WTI  
 The GlenRock Group  
 Asgent

**Open Positions: 11**

U.S. based: 1  
 International: 10  
 Sales: 2  
 Other: 9

*Source: Company website, all revenues are CY-18*



### Electronic Control Unit (ECU) protects itself

The security policy is automatically embedded into the ECU code. Detection and prevention decisions are made locally on the ECU. No connectivity required.



### Zero false positives

Patented deterministic algorithms ensure that only legitimate binaries and function calls, based on factory settings, are allowed to run on the car's ECU. Everything else is blocked. Period.



### Negligible performance impact

The embedded security policy performs real-time inspection of the operations running in the ECU, with minimal CPU and storage footprints that don't require any hardware change.



### Supports all ECUs

ARM and Intel processors, Linux, QNX, and AutoSAR operating systems and schedulers are supported. Any controller can be protected.



### No anti-malware updates required

Security policy is based on factory settings. No need to update the policy with new, anti-malware signatures.



### No developer intervention

Patented algorithm automatically generates the security policy, and is embedded automatically into the ECU software. Developers can focus on developing new features instead of spending resources, flushing out hidden security bugs.



## MINERVA LABS



**Founded:** 2014  
**Revenue:** <\$25M

www.minerva-labs.com  
404.806.2322

14 Imber St.,  
Petah Tikva, Israel 49511

**Company Summary:** Minerva Labs exploits the very nature of evasive malware using trickery and deception. Its endpoint security solution blocks advanced attacks designed to evade an enterprise's existing defenses by creating an environment that the malware perceives as hostile and unsafe for execution. Minerva's radically different approach to endpoint protection delivers effective malware prevention without the human intervention required of other next-gen malware detection solutions.

### Key Officers:

Eddy Bobritsky – Co-founder & CEO  
Erez Breiman – Co-founder & CTO  
Omri Moyal – Co-founder & VP, Research

### Competition:

Symantec  
CrowdStrike  
SentinelOne  
McAfee  
Palo Alto Networks  
Cisco

### Board of Directors:

Not Listed

**Headcount:** 15

**Total Funding:** \$7.5M

### Open Positions: 1

U.S. based: 1  
International: 0  
Sales: 1  
Other: 0

### Key Investors:

Amplify Partners  
StageOne Ventures  
Webb Investment Network

Source: Company website, all revenues are CY-18

## Minerva Anti-Evasion Platform PATENTED

**HOSTILE ENVIRONMENT  
SIMULATION**  
[LEARN MORE >>](#)

**MEMORY INJECTION  
PREVENTION**  
[LEARN MORE >>](#)

**MALICIOUS DOCUMENT  
PREVENTION**  
[LEARN MORE >>](#)


**RANSOMWARE  
PROTECTION**  
[LEARN MORE >>](#)

**ENDPOINT MALWARE  
VACCINATION**  
[LEARN MORE >>](#)


**CRITICAL ASSET  
PROTECTION**  
[LEARN MORE >>](#)

### Minerva VR™ Shared Technology >>


### INTEGRATES WITH AND ENHANCES THE DEFENSE ECOSYSTEM >>



NAC




ANTIVIRUS



FIREWALL



IPS



CLOUD SOLUTIONS



SANDBOX

**MORPHISEC**

**Founded:** 2014  
**Revenue:** <\$25M

www.morphisec.com  
 617.209.2552

77 Haenergia St., Gav Yam Park  
 Bldg. 1, Beer-Sheva, Israel

**Company Summary:** Morphisec is transforming endpoint security with its pioneering Moving Target Defense. Its unique solutions deliver operationally simple, proactive prevention unbound by the limits of detection and prediction. Morphisec protects businesses around the globe from the most dangerous and sophisticated cyberattacks immediately, efficiently, and absolutely.

**Key Officers:**

Ronen Yehoshua – CEO  
 Omri Dotan – Chief Business Officer  
 Arthur Braunstein – VP, U.S. Sales  
 Michael Gorelik – CTO and VP, R&D  
 Mordechai Guri, Ph.D. – Chief Science Officer

**Competition:**

Symantec  
 CrowdStrike  
 SentinelOne  
 McAfee  
 Palo Alto Networks  
 Cisco

**Board of Directors:**

Yoav Tzruya – MD, JVP  
 Gadi Tirosh – MD, JVP  
 Prof. Yuval Elovici – Ben-Gurion University Head of  
 Cyber Security Research Center  
 Remi Prunier – MD, Orange Digital Ventures

**Total Funding:** \$19M

**Key Investors:**

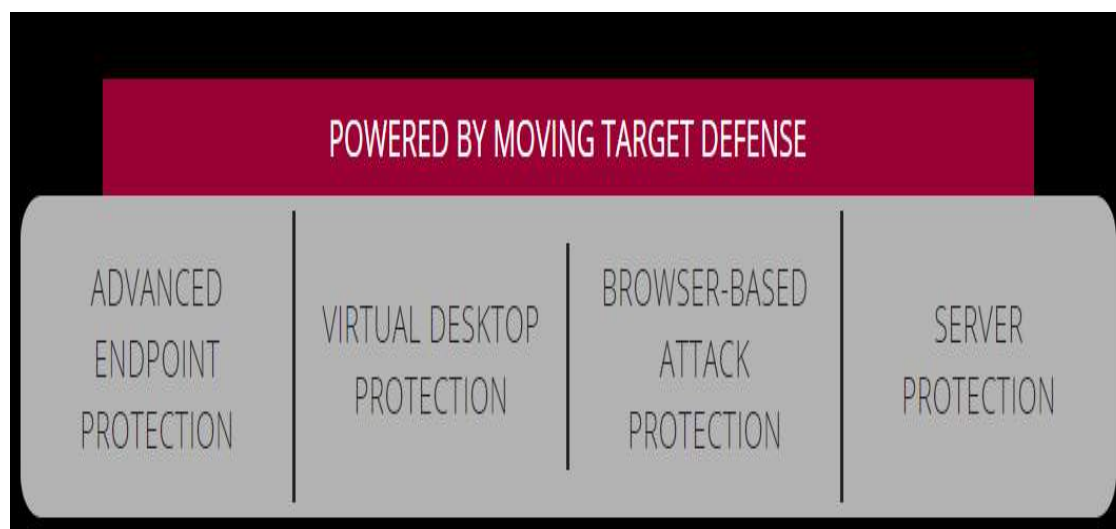
T-Mobile Capital Partners  
 JVP  
 GE Capital Bank  
 Orange Digital Ventures  
 Portage Partners  
 Kodem Growth Partners  
 OurCrowd

**Headcount:** 70

**Open Positions: 10**

U.S. based: 2  
 International: 8  
 Sales: 2  
 Other: 8

*Source: Company website, all revenues are CY-18*



### PERIMETER 81



**Founded:** 2012  
**Revenue:** <\$25M

[www.perimeter81.com](http://www.perimeter81.com)  
800.979.6988

Tel-Aviv, Israel

**Company Summary:** Founded in 2012, Perimeter 81 offers a secure Network-as-a-Service that replaces outdated, complex and hardware-based traditional network security technologies with a user-friendly and easy-to-use software solution. Perimeter 81's service utilizes a Zero-Trust and a Software-Defined Perimeter model which enable businesses to more easily secure access to local network resources, cloud environments, and business applications, with a seamless and highly intuitive SaaS solution. Since the launch of the product, the company has grown at a rapid, double-digit rate month over month and quickly acquired hundreds of clients — including Fortune 500 companies.

**Key Officers:**

Amit Bareket – Co-founder & CEO  
Sagi Gidali – Co-founder & CPO

**Competition:**

Zscaler  
Symantec  
OpenVPN

**Board of Directors:**

Not Listed

**Total Funding:** Not Listed

**Headcount:** 40

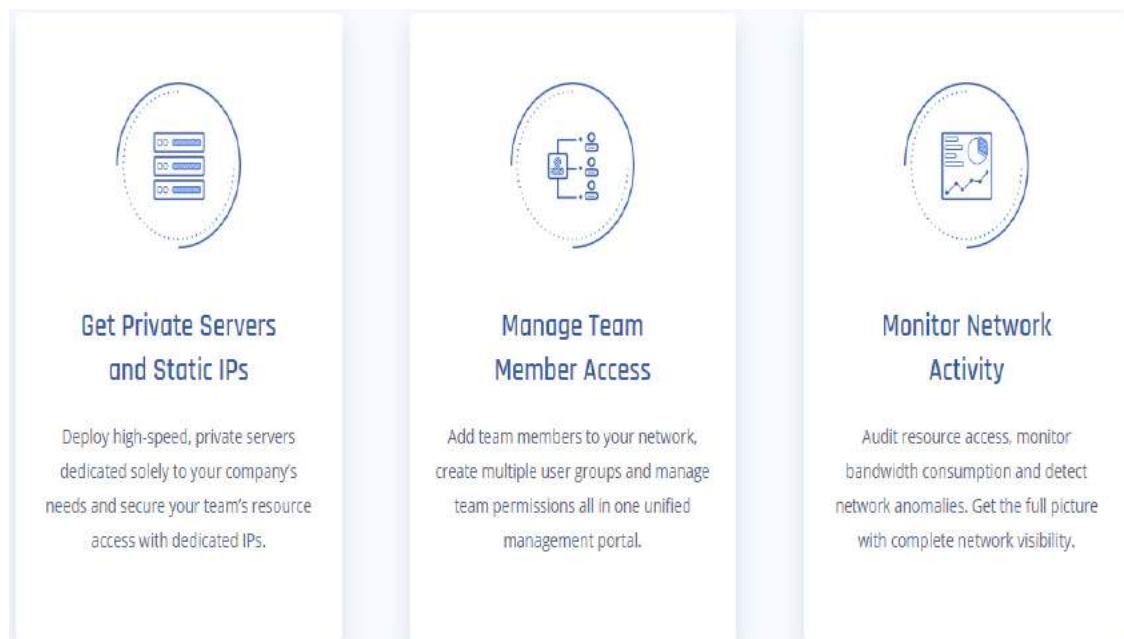
**Key Investors:**

Not Listed

**Open Positions: 4**

U.S. based: 2  
International: 2  
Sales: 1  
Other: 3

*Source: Company website, all revenues are CY-18*



## SAFE BREACH



**Founded:** 2014  
**Revenue:** <\$25M

www.safebreach.com  
 408.743.5279

Yosef Karo 18th St., 4th Floor Rose House,  
 Tel Aviv, Israel

**Company Summary:** SafeBreach is an early leader in the emerging breach and attack simulation (BAS) market. The company's solution utilizes more than 11 million breach methods to look for weaknesses in an organization's cyber defenses. It also has a partner program for vendors and service providers that want to incorporate BAS technology into their capabilities. It attempts to look at systems and defenses from a hacker's perspective, and the company also offers a "Hacker's Playbook" that details some of the latest cyberattack strategies.

**Key Officers:**

Guy Bejerano – CEO & Co-founder  
 Itzik Kotler – CTO & Co-founder  
 Neil Stratz – VP, Worldwide Sales  
 Yael Ben Arie – VP, R&D

**Competition:**

Attivo Networks  
 AttackIQ  
 HackerOne  
 BugCrowd  
 Synack

**Board of Directors:**

Gili Ra'anan – Partner, Sequoia Capital  
 Guy Bejerano – CEO, SafeBreach  
 Itzik Kotler – CTO, SafeBreach  
 Guy Horowitz – GP, DTCP  
 Rio Hiro Maeda – DNX Ventures  
 Jeff Williams – Operating Partner, Bain Capital  
 Jay Ganatra – PayPal  
 Abhishek Shukla – Head of Global Venture Capital Investments, HP

**Total Funding:** \$34M

**Key Investors:**

Sequoia Capital Israel  
 Draper Nexus Ventures  
 Pathfinder  
 DTCO  
 PayPal

**Headcount:** 50

**Open Positions: 4**

U.S. based: 2  
 International: 2  
 Sales: 1  
 Other: 3

*Source: Company website, all revenues are CY-18*

**Chief Security Officer**

Quantify board level insights on your true enterprise risks so you can track and improve security posture over time

**Security Analysts**

Analyze simulated breach scenarios and validate how well your security controls are working

**Security Red Team Engineer**

Automate security validation and operationalize blue team remediation so you can focus on more strategic tasks.

### SCADAFENCE



**Founded:** 2014  
**Revenue:** <\$25M

[www.scadafence.com](http://www.scadafence.com)  
646.475.2173

4 Menorat Ha'Maor St.  
Tel Aviv, Israel 6744832

**Company Summary:** SCADAFence provides continuous OT network monitoring that offers visibility, risk management and threat detection. As OT network connectivity has become a mandatory business requirement, there has been a shift in the security mindset to question how to stay connected in a secure manner. The SCADAFence platform is a non-intrusive continuous network monitoring solution that was purposely built to provide the required visibility and security for organizations adopting advanced Industrial IoT (IIoT) technologies. In CY18 the company grew revenue ~300% Y/Y and grew headcount more than 200%.

#### Key Officers:

Elad Ben-Meir – CEO  
Ofer Shaked – CTO and Co-founder  
Yoni Shohet – Co-founder & VP Business Development  
Chen Lipman – CFO

#### Competition:

NA

**Total Funding:** \$10M

#### Board of Directors:

Yoav Tzruya – GP, JVP  
Eric Cohen – Chief Development Officer, InterDigital  
Barrel Kfir – Principal, JVP

#### Key Investors:

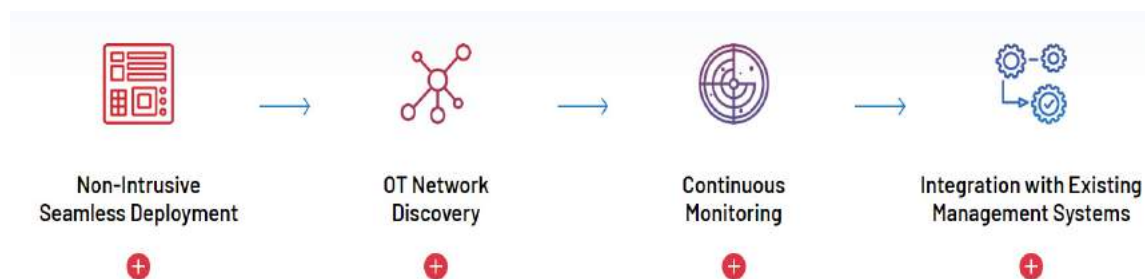
NexStar Partners  
Global Brain  
31 Ventures  
Angels  
JVP

**Headcount:** Unknown

#### Open Positions:

No Openings

Source: Company website, all revenues are CY-18



## SENTINELONE



**Founded:** 2013  
**Revenue:** \$50M-\$100M

www.sentinelone.com  
 855.868.3733

605 Fairchild Dr.  
 Mountain View, CA 94043

**Company Summary:** SentinelOne offers advanced endpoint detection and response (EDR) solutions. Its platform has the ability to detect, inspect, and mitigate threats automatically in real time, ensuring best-in-class speed and reliability. SentinelOne also has the ability to monitor every stage of the attack cycle by using a proprietary architecture that employs code execution on the endpoint. It provides a management interface, allowing enterprises to visualize activity at all endpoints in real time. With revenue more than tripling in 2018, SentinelOne is looking to disrupt the next-gen anti-virus (AV) and EDR market.

**Key Officers:**

Tomer Weingarten – CEO & Co-founder  
 Almog Cohen – CTO & Co-founder  
 Bob Parker – CFO  
 Gareth Green – VP, EMEA & APAC Sales  
 Daniel Bernard – Chief Marketing Officer  
 Nick Warner – Chief Operating Officer  
 David Ginat – VP, R&D

**Competition:**

IBM  
 CrowdStrike  
 Carbon Black  
 Cylance  
 Cybereason  
 Tanium  
 McAfee

**Board of Directors:**

Tomer Weingarten – Co-founder, SentinelOne  
 Almog Cohen – Co-founder, SentinelOne  
 Steve Westly – Founder, The Westly Group  
 Matt Okco – Co-MP, Data Collective  
 Sameet Mehta – Managing GP, Granite Hill Capital Partners  
 Justin Somaini – Chief Trust Officer, Box  
 Daniel Scheinman – Individual Investor  
 Tom Dyal – MD, Redpoint

**Total Funding:** \$110M

**Key Investors:**

Accel Partners  
 Data Collective  
 Vintage Investment Partners  
 Redpoint  
 SineWave Ventures  
 Sound Ventures  
 The Westly Group  
 Third Point Ventures  
 Tiger Global Management  
 UpWest Labs

**Headcount:** ~300

**Open Positions: 14**

U.S. based: 4  
 International: 10  
 Sales: 2  
 Other: 12

*Source: Company website, all revenues are CY-18*

The next-gen suite of the future - born from the endpoint and orchestrated by AI

One Agent Windows Mac Linux On-prem Cloud

EPP	EDR	Manageability	Services	Cloud Intel
Static AI	Threat Hunting	Device Control	Vigilance MDR	Threat Feeds
Behavior AI	IOC Search	API and SDK		IP Reputation
Anti-Exploitation	Remediation	Application Inventory		Automated Analysis
Lateral Movement	Encrypted Traffic Visibility	File Integrity Monitoring		Shared Intelligence
Credential Theft Prevention	Containment and Rollback	Vulnerability & Patch Management		



### SEPTIER COMMUNICATION



**Founded:** 1999  
**Revenue:** <\$25M

[www.septier.com](http://www.septier.com)  
+972.3.914.1000

35 Efal St.  
Petah Tikva, 4951132, Israel

**Company Summary:** Founded in 1999, Septier Communication is a fast-growing company that serves customers worldwide with innovative, robust, and cost-effective solutions and products for various markets, such as intelligence agencies, law enforcement agencies (LEAs), telecom and internet service providers (ISP). These solutions include communications interception and analysis systems, cellular positioning systems, telecom resources protection and more.

**Key Officers:**

Yaron Baratz – President & CEO  
Yigal Abram – EVP, Global Sales  
Uri Savoray – CTO  
Andrey Antoni – VP, Projects  
Arik Moskovich – CFO

**Competition:**

NA

**Total Funding:** Not Listed

**Key Investors:**

Not Listed

**Board of Directors:**

Not Listed

**Headcount:** 100

**Open Positions:**

Not Listed

*Source: Company website, all revenues are CY-18*



INTERCEPTION



CELLULAR POSITIONING



MANAGED ACCESS



FRAUD DETECTION AND  
PREVENTION

## SIEMPLIFY



**Founded:** 2015  
**Revenue:** <\$25M

www.siemplify.co  
 877.487.7222

4 Ariel Sharon St, 28th Floor  
 Tel Aviv-Yafo, Israel

**Company Summary:** Siemplify's Security Orchestration and Automation Response (SOAR) platform is based on the way security analysts actually work. Its workbench brings together and streamlines all the elements an analyst needs to investigate, analyze, and remediate threats. Its platform allows professionals to easily build security playbooks for automating repetitive tasks and ensure consistent processes. Siemplify also uniquely combines security orchestration and automation to provide instant insights into the who, what, and when of an event to quickly and easily build a full threat storyline in minutes.

**Key Officers:**

Amos Stern – Co-founder & CEO  
 Alon Cohen – Co-founder & CTO  
 Garry Fatakhov – Co-founder & COO  
 Danielle Hefetz-Cohen – CFO  
 Miguel Carrero – Chief Revenue Officer  
 Nimmy Reichenberg – CMO

**Board of Directors:**

Yoram Snir – MD, 83North  
 Bill Wiberg – MD, G20 Ventures  
 Saurabh Sharma – MD Jump Capital  
 Steve Leightell – MD, Georgian Partners  
 Alex Pinchev – MD, Capri Ventures

**Competition:**

Splunk  
 Palo Alto Networks

**Total Funding:** \$28M

**Key Investors:**

G20 Ventures  
 83 North  
 Jump Capital  
 Georgian Partners  
 Capri Ventures

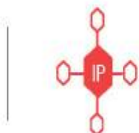
**Headcount:** 70

**Open Positions: 8**

U.S. based: 3  
 International: 5  
 Sales: 1  
 Other: 7

Source: Company website, all revenues are CY-18

## TECHNOLOGIES



Graph Analysis



Data Fusion



Machine Learning



Noise Reduction



Automatic Correlation  
Engine



Easy Integration And  
Flexible API

### SILVERFORT



**Founded:** 2016  
**Revenue:** <\$25M

[www.silverfort.io](http://www.silverfort.io)  
202.688.3098

30 Ha'arbaa St., Floor 26  
Tel Aviv, Israel

**Company Summary:** Silverfort seamlessly enables adaptive multi-factor authentication (MFA) across all sensitive corporate assets including systems that previously required agents or proxies. Its platform delivers AI-based adaptive authentication across entire networks without installing software or changing individual assets and without reducing productivity. With a unified authentication platform for hybrid and multi-cloud environments, it can consolidate all authentication management, policies, and tokens across public cloud, private cloud, and on-premise for reduced costs, unified visibility and a consistent user experience.

#### Key Officers:

Hed Kovetz – CEO & Co-founder  
Matan Fattal – President & Co-founder  
Yaron Kassner – CTO & Co-founder  
Leonid Shtilman – Executive Chairman & VP Business Development

#### Competition:

Cisco  
Ping  
Okta

**Total funding:** \$11.5M

#### Board of Directors:

Not Listed

#### Key Investors:

TLV Partners  
Singtel Innov8  
StageOne Ventures

**Headcount:** Unknown

#### Open Positions: 4

U.S. based: 1  
International: 3  
Sales: 1  
Other: 3

Source: Company website, all revenues are CY-18



## THETARAY



**Founded:** 2013  
**Revenue:** <\$25M

[www.thetaray.com](http://www.thetaray.com)  
 646.757.4956

8 Hanagar St.  
 Hod HaSharon, Israel 4501309

**Company Summary:** ThetaRay provides faster, more accurate analytics solutions for identifying emerging risk, discovering new opportunities, and exposing blind spots within large, complex data sets. Its proprietary AI algorithms detect anomalies in real time, radically reduce false positives and uncover unknown unknowns. ThetaRay's primary focus is protecting financial institutions with its Financial Crime platform, which immediately detects suspicious behavior anywhere within the enterprise before it can disrupt operations, balloon costs, or damage brand reputation.

**Key Officers:**

Mark Gazit – CEO  
 Prof. Amir Averbuch – Co-founder & CTO  
 Dana Maor Megiddo – Chief People Officer  
 Barak Klein – VP, Finance

**Competition:**

Splunk  
 AT&T (AlienVault)  
 SolarWinds

**Total Funding:** \$66.5M

**Board of Directors:**

Not Listed

**Key Investors:**

JVP  
 SVB Capital  
 OurCrowd  
 Fort Ross Ventures

**Headcount:** 70

**Open Positions:** 11

U.S. based: 4  
 International: 7  
 Sales: 2  
 Other: 9

Source: Company website, all revenues are CY-18

## Why ThetaRay for Financial Services



### Strengthen resiliency

Why financial institutions across the world leverage our solutions for fighting financial crimes.

Minimize impact or downtime with early detection of unknown risks and threats.



### Reduce operational costs

Automate the first line of defense with accurate rules-free detection and industry low false positive levels.



### Modernize legacy systems

Deploy rapidly and accelerate time to value with minimal disruption to existing workflows.



### Achieve regulatory compliance

Strengthen compliance with transparent algorithmic detection.



### Future-proof detections

Without supervision, gain foresight about threats and opportunities that are moving faster than legacy systems.

## TWISTLOCK



**Founded:** 2015  
**Revenue:** <\$25M

www.twistlock.com

Arieh Shenkar St, 11, 3rd Floor  
Herzliya, Israel 4672551

**Company Summary:** Twistlock is a cloud native cybersecurity tool that protects across the full lifecycle of the DevSecOps process by delivering holistic protection on the host, network and application. It provides real-time prevention and forensics, intelligent policies and compliance, while enabling a rapid pace of innovation. As a leading provider of full-stack, full-lifecycle container and cloud native security, Twistlock is used with Docker, Kubernetes, serverless and other cloud native technologies. Twistlock integrates with any continuous integration (CI) tool and registry and runs wherever a customer chooses to run its VM containers and cloud native apps.

### Key Officers:

Brian Lake – Chief Revenue Officer  
John Morello – CTO  
Dima Stopel – Co-founder & VP, R&D  
Ben Bernstein – Co-founder & CEO

### Competition:

Qualys  
StackRox  
Aqua  
Alcide

### Board of Directors:

Brendan Hannigan – Entrepreneur Partner, Polaris Partners  
Yoav Leitersdorf – Managing Partner, YL Ventures  
Alex Doll – Managing Partner, 1011 Ventures  
Matt Jacobson – GP, ICONIQ Capital  
Ben Bernstein – Co-founder & CEO, Twistlock  
Dima Stopel – Co-founder & VP R&D, Twistlock

**Total Funding:** \$63.1M

### Key Investors:

YL Ventures  
Polaris Partners  
Rally Ventures  
TenEleven Ventures  
ICONIQ Capital  
Dell Technologies Capital

**Headcount:** 100

### Open Positions: 4

U.S. based: 0  
International: 4  
Sales: 0  
Other: 4

Source: Company website, all revenues are CY-18

## Complete Container Security in a Single Platform



### VULNERABILITY MANAGEMENT

Security from development to production—Twistlock provides unmatched vulnerability detection, understanding, and prevention at every stage of the application lifecycle.

[Learn more →](#)



### RUNTIME DEFENSE

Machine learning that creates least privilege, whitelist, runtime models for every version of every app to protect your environments at scale.

[Learn more →](#)



### COMPLIANCE

Easily implement and maintain compliance for the CIS Benchmarks, PCI, HIPAA, GDPR, NIST, and custom requirements.

[Learn more →](#)



### CI/CD INTEGRATION

Integrate security directly into the CI process to find and fix problems before they ever make it into production.

[Learn more →](#)



### CLOUD NATIVE FIREWALLS

Layer 3 and Layer 7 network security built for cloud native applications.

[Learn more →](#)

## UPSTREAM

## Upstream

**Founded:** 2017  
**Revenue:** <\$25M

www.upstream.auto  
 857.453.1134

3 Sapir St.  
 Herzliya, 4685207 Israel

**Company Summary:** Upstream Security's C4 (Centralized Connected Car Cybersecurity) Platform is the first comprehensive automotive cybersecurity solution in the industry, purpose built for protecting connected vehicles. C4 is data-driven and designed to ingest any present and future automotive data feeds, where it is the only solution that can protect vehicles already on the road as well as vehicles and services of the future. C4 is deployed in the Automotive Cloud, between the operational network and the IT network, ensuring the protection of the communication data between the vehicles and command and control servers.

**Key Officers:**

Yoav Levy – Co-founder & CEO  
 Yonatan Appel – Co-founder & CTO  
 Oded Yarkoni – VP, Marketing  
 Ron Shragai – VP, Services

**Competition:**

Karamba Security  
 Continental AG

**Total Funding:** \$11M

**Board of Directors:**

Izhar Armony – Partner, Charles River Ventures  
 Arik Klienstein – Managing Partner, Gliot Capital Partners

**Key Investors:**

Charles River Ventures  
 Maniv Mobility  
 Gliot Capital Partners

**Headcount:** Unknown

**Open Positions: 12**

U.S. based: 0  
 International: 12  
 Sales: 4  
 Other: 8

Source: Company website, all revenues are CY-18





### VOTIRO



**Founded:** 2009  
**Revenue:** <\$25M

[www.votiro.com](http://www.votiro.com)  
415.231.3725

126 Yigal Alon St., 3rd Floor  
Tel Aviv, Israel 67443

**Company Summary:** Established in 2010 by a team of senior cybersecurity experts, Votiro develops and licenses the File Disarmer, a security solution based on proprietary Content Disarm & Reconstruction (CDR) technology. Its proprietary next-generation CDR technology allows users to safely open email attachments, download and transfer files, share content, and use removable media, while keeping performance and functionality intact.

**Key Officers:**  
Not Listed

**Board of Directors:**  
Not Listed

**Headcount:** 25

**Open Positions:** 7  
U.S. based: 6  
International: 1  
Sales: 2  
Other: 5

**Competition:**  
SecureWorks  
Infocyte  
Morphisec  
SentinelOne

**Total Funding:** \$14M

**Key Investors:**  
Senetas  
Divergent Group  
Redfield Asset Management

*Source: Company website, all revenues are CY-18*

Security	Workflow	Deployment	Functionality
Disarming files from zero-day and other undisclosed attacks, no matter the source or type, before they reach the premise	Allowing fast, seamless flow of data across the organization with no complex security policies	Easy, quick integration with any existing security infrastructure	Preserving 100% functionality of content once neutralized from threats

## WHITESOURCE SOFTWARE



**Founded:** 2011  
**Revenue:** <\$25M

www.whitesourcesoftware.com  
 212.203.0391

4 Hashahar Tower, 32nd Floor,  
 Givatayim, Israel 5320047

**Company Summary:** In the next few years, it is estimated that 60-80% of applications will be based on open source components, yet there are very few companies that are tackling the problems associated with open source security. Founded in 2011, WhiteSource offers the only all-in-one security, licensing, quality, and reporting solution for managing open source components, and it is the only one that operates in real time. WhiteSource accomplishes this by continuously and automatically scanning open source repositories and cross-referencing the data with customers' own open source components. With revenue growth of 300% Y/Y for three consecutive years, WhiteSource is looking to make a presence in an emerging and rapidly-growing market.

**Key Officers:**

Rami Sass – Co-founder & CEO  
 Ron Rymon – Co-founder & Executive Chairman  
 Azi Cohen – Co-founder & GM, North America  
 Ilan Sidi – CFO  
 Gal Yaffe – GM, EMEA & APAC  
 Doron Cohen – VP, Engineering  
 Dan Gross – VP, Business Development  
 David Habusha – VP, Product  
 Maya Rotenberg – VP, Marketing

**Competition:**

Synopsys (Black Duck Software)  
 Sonatype

**Total Funding:** \$46M

**Key Investors:**

83North  
 M12 Microsoft Ventures  
 SGE

**Board of Directors:**

Ron Rymon – Co-founder, WhiteSource  
 Erez Ofer – Partner, 83North  
 Lior Shahory – Partner, Peregrine Ventures  
 Boaz Lifschitz – Co-founder, Peregrine Ventures

**Headcount:** 150

**Open Positions:** 22

U.S. based: 7  
 International: 15  
 Sales: 8  
 Other: 14

*Source: Company website, all revenues are CY-18*

**Detection**

Automatically detect all open source components in your code, while running your build

**Selection**

Discover the best open source components for your needs, while you search online

**Alerting**

Get real time alerts on security risks, policy pitfalls, and software bugs

**Reporting**

Generate comprehensive, always up to date reports on your open source usage, in one click

### ZERTO

# Zerto

**Founded:** 2009  
**Revenue:** >\$100M

www.zerto.com  
617.993.6331

10 Abba Eban Blvd. Building C  
Herzliya, Israel 46725

**Company Summary:** Zerto offers enterprise-class disaster recovery and business continuity software for virtualized data centers and cloud environments. As enterprise organizations migrate applications to virtualized or cloud-based infrastructure, traditional array-based business continuity/disaster recovery solutions frequently become more complex and difficult to scale. However, Zerto's hypervisor-based solution is optimized for a virtual paradigm and provides greater flexibility, better asset utilization, and reduced operational and maintenance costs providing enterprises with true IT resilience. Its DRaaS business has served as a growth engine, launching the company to obtain over 6,000 customers.

#### Key Officers:

Ziv Kedem – Co-founder & CEO  
Oded Kedem – Co-founder & Chief Architect  
Gil Levonai – CMO  
Ed Carter – Chief Revenue Officer  
Roy Golding – CFO  
Shlomi Oren – SVP, Engineering  
Robert Strechay – SVP, Product  
Avi Raichel – CIO  
Liat Nachmani – Chief Human Resources Officer

#### Competition:

EMC  
IBM  
NetApp  
Pure Storage  
VMware  
Veeam

**Total Funding:** \$130M

#### Key Investors:

83North  
Battery Ventures  
CRV  
Harmony Partners  
IVP  
RTP Ventures  
U.S. Venture Partners

#### Board of Directors:

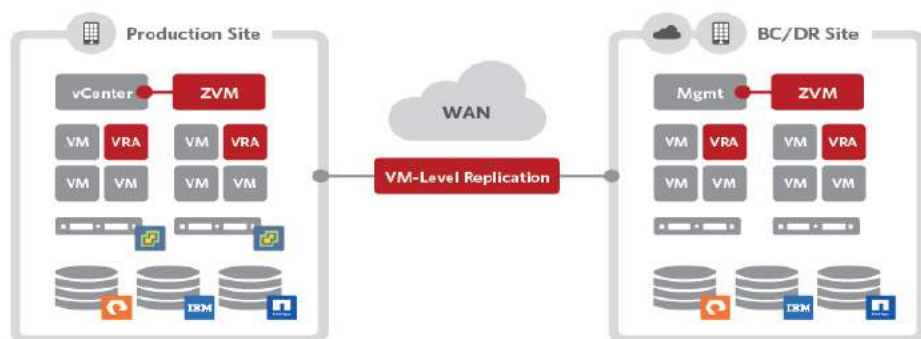
Jacques Benkoski – Investor, USVP  
Oded Kedem – Co-founder & Chief Architect, Zerto  
Ziv Kedem – Co-founder & CEO, Zerto  
Mark Leslie – Lecturer, Stanford Graduate School of Business, former VMware Board Member  
Erez Ofer – Partner, Greylock Partners  
Scott Tobin – General Partner, Battery Ventures  
Ken Goldman – CFO, Yahoo

**Headcount:** ~500

#### Open Positions: 74

U.S. based: 33  
International: 41  
Sales: 9  
Other: 65

Source: Company website, all revenues are CY-18



## ANALYST BIOGRAPHIES



**Erik Suppiger**  
Managing Director  
esuppiger@jmpsecurities.com  
415-835-3918

Erik Suppiger is a Managing Director and Senior Research Analyst covering cybersecurity, communications infrastructure, and data management.

Prior to joining JMP, Erik was a managing director and senior analyst at Signal Hill Capital covering Internet infrastructure technology and services. He was previously a managing director and senior analyst at Pacific Growth Equities and a senior analyst at J.P. Morgan and its predecessor, Hambrecht & Quist, following the networking and security sectors. Early in his career, Erik focused on the communications sector as a member of the Deutsche Bank DMG Technology Group.

Erik ranked third among all stock pickers in the Software category of the 2014 StarMine Analyst Awards. In the 2010 StarMine Analyst Awards, he ranked as the top stock picker in both the Communications Equipment category and the Internet Software & Services category. Also in 2010, Erik placed first in the Telecommunications Equipment category and second in the Internet & Computer Services category in the annual “Best on the Street” analyst survey conducted by The Wall Street Journal. In 2005, he placed second in the Communications Equipment category in the “Best Brokerage Analysts” rankings released by Forbes.com in conjunction with StarMine.

Erik holds a B.S. in business administration from the Boston University School of Management.



**Patrick D. Walravens**  
Director of Technology Research  
Senior Analyst, Software  
pwalravens@jmpsecurities.com  
415-835-8943

Pat Walravens joined JMP Securities in November 2001 and serves as Director of Technology Research and a Senior Research Analyst covering Software.

Prior to joining JMP, Pat spent five years at Lehman Brothers, where he served as a Senior Research Analyst in the equities group and a Vice President in the Technology Investment Banking group. Previously, Pat practiced corporate law with the firm of Cooley Godward Kronish, where he represented emerging technology companies and venture capital investors.

Pat ranked among the top three analysts in the software industry for stock picking, according to StarMine results published in Forbes in 2007. Pat is frequently quoted and interviewed by the media, including the Wall Street Journal, BusinessWeek, Forbes, CNBC, and Bloomberg.

Pat received an MBA from the Anderson School of Management at UCLA and a JD from the UCLA School of Law, where he received Order of the Coif. Pat holds a BA in economics from Stanford University, where he served as an undergraduate teaching assistant in the computer science department.

## JMP COVERED COMPANIES MENTIONED

Company	Ticker	Rating	Price Target	Analyst
CyberArk Software, Ltd.	CYBR	MO	\$140	Erik Suppiger
Palo Alto Networks, Inc.	PANW	MO	\$250	Erik Suppiger

## JMP FACTS AND DISCLOSURES

### Analyst Certification:

The research analyst(s) who prepared this report does/do hereby certify that the views presented in this report are in accordance with my/our personal views on the securities and issuers discussed in this report. As mandated by SEC Regulation AC no part of my/our compensation was, is or will be directly or indirectly related to the specific views or recommendations expressed herein. This certification is made under the obligations set forth in SEC Regulation AC. Any other person or entity may not use it for any other purpose. This certification is made based on my/our analysis on the date of this report's publication. I/We assume no obligation to update this certification to reflect any facts, circumstances or events that may subsequently come to my/our attention. Signed Erik Suppiger and Patrick Walravens

### JMP Securities Disclosures:

JMP Securities currently makes a market in the securities of CyberArk Software, Ltd. and Palo Alto Networks, Inc.

JMP Securities expects to receive OR intends to seek compensation for investment banking services from CyberArk Software, Ltd. and Palo Alto Networks, Inc. in the next 3 months.

### JMP Securities Investment Opinion Definitions:

Market Outperform (MO): JMP Securities expects the stock price to outperform relevant market indices over the next 12 months.

Market Perform (MP): JMP Securities expects the stock price to perform in line with relevant market indices over the next 12 months.

Market Underperform (MU): JMP Securities expects the stock price to underperform relevant market indices over the next 12 months.

**JMP Securities Research Ratings and Investment Banking Services:** (as of July 17, 2019)

JMP Rating	Regulatory Equivalent	# Co's Under Coverage	% of Total	Regulatory Equivalent	# Co's Under Coverage	% of Total	# Co's Receiving IB Services in Past 12 Months	% of Co's With This rating
MARKET OUTPERFORM	BUY	244	58.65%	BUY	244	58.65%	61	25.00%
MARKET PERFORM	HOLD	139	33.41%	HOLD	139	33.41%	24	17.27%
MARKET UNDERPERFORM	SELL	3	0.72%	SELL	3	0.72%	0	0%
COVERAGE IN TRANSITION		29	6.97%		29	6.97%	1	3.45%
RATING SUSPENDED		0	0.00%		0	0.00%	0	0%
TOTAL:		415	100%		415	100%	86	20.72%

### Stock Price Chart of Rating and Target Price Changes:

Note: First annotation denotes initiation of coverage or 3 years, whichever is shorter. If no target price is listed, then the target price is N/A. In accordance with NASD Rule 2711, the chart(s) below reflect(s) price range and any changes to the rating or price target as of the end of the most recent calendar quarter. The action reflected in this note is not annotated in the stock price chart. Source: JMP Securities.



Created by: BlueMatrix



Created by: BlueMatrix



**JMP Disclaimer:**

JMP Securities LLC (the "Firm") compensates research analysts, like other Firm employees, based on the Firm's profitability, which includes revenues from the Firm's institutional sales, trading, and investment banking departments as well as on the quality of the services and activities performed that are intended to benefit the Firm's institutional clients. These data have been prepared by JMP Securities LLC for informational purposes only and are based on information available to the public from sources that we believe to be reliable, but we do not guarantee their accuracy or completeness. Any opinions and projections expressed herein reflect our judgment at this date and are subject to change without notice. These data are neither intended nor should be considered as an offer to sell or a solicitation or a basis for any contract for the purchase of any security or other financial product. JMP Securities LLC, its affiliates, JMP Group LLC, Harvest Capital Strategies LLC, and their respective partners, directors, officers, and associates may have a long or short position in, may act as a market maker for, or may purchase or sell a position in the securities mentioned herein. JMP Securities LLC or its affiliates may be performing, have performed, or seek to perform investment banking, advisory, or other services and may have acted as manager or co-manager for a public offering of securities for any company mentioned herein. The reader should assume that JMP Securities LLC will solicit business from the company covered in this report. Members of our Sales and Trading Department provide oral and/or written market opinions and trading strategies to our clients that reflect their personal opinions about stocks that are the subject of the firm's research reports. Our research analysts discuss trading strategies with clients that sometimes reflect short-term expectations for the price of the securities that are the subject of research reports. These trading strategies are distinct from the analysts' fundamental rating for the stock, which is based upon the analysts' view compared to other stocks under coverage for the relevant time period. © Copyright 2019. All rights reserved by JMP Securities LLC. JMP Securities LLC is a member of FINRA, NASDAQ, and SIPC.

**Jeffrey H. Spurr**  
**Director of Research**  
 (415) 835-3903

## RESEARCH PROFESSIONALS

### FINANCIAL SERVICES

#### Alternative Asset Managers

Devin Ryan	(212) 906-3578
Brian McKenna	(212) 906-3545

#### Commercial & Specialty Finance

Christopher York	(415) 835-8965
------------------	----------------

#### Consumer Finance

David M. Scharf	(415) 835-8942
Jeff Zhang, CFA	(415) 835-8948

#### Financial Processing & Outsourcing

David M. Scharf	(415) 835-8942
Jeff Zhang, CFA	(415) 835-8948

#### Insurance

Matthew J. Carletti	(312) 768-1784
Karol Chmiel	(312) 768-1786

#### Investment Banks & Brokers

Devin Ryan	(212) 906-3578
Brian McKenna	(212) 906-3545

#### Mortgage Finance

#### REITs: Agency, Hybrid, & Commercial Mortgage

Steven C. DeLaney	(212) 906-3517
Chris Muller	(212) 906-3559
Trevor Cranston, CFA	(415) 869-4431
Mikhail Goberman	(212) 906-3543

### HEALTHCARE

#### Biopharma

Donald Ellis, PharmD	(212) 906-3507
Nazibur Rahman	(212) 906-3519

#### Biotechnology

Liisa A. Bayko	(312) 768-1785
Jonathan Wolleben	(312) 768-1788
Neil Panchal, MD	(312) 768-1795
Jason N. Butler, PhD	(212) 906-3505
Roy Buchanan	(212) 906-3509

#### Healthcare Services & Facilities

Peter L. Martin, CFA	(415) 835-8904
Jonathan Freed	(415) 835-8908

#### Medical Devices & Supplies

David Turkaly	(212) 906-3563
Daniel W. Stauder	(212) 906-3535

### REAL ESTATE

#### Housing & Land Development

Peter L. Martin, CFA	(415) 835-8904
Aaron Hecht	(415) 835-3963
Doug Hansen	(415) 835-8934

#### Property Services

Mitch Germain	(212) 906-3546
Corey DeVito	(212) 906-3525

#### Residential Services

Aaron Hecht	(415) 835-3963
-------------	----------------

#### REITs: Healthcare & Specialty

Peter L. Martin, CFA	(415) 835-8904
Jonathan Freed	(415) 835-8908

#### REITs: Diversified, Industrial, Office, & Retail

Mitch Germain	(212) 906-3546
Corey DeVito	(212) 906-3525

#### REITs: Residential

Aaron Hecht	(415) 835-3963
-------------	----------------

### TECHNOLOGY

#### Energy Technology & Services

#### Industrial Technology

Joseph Osha	(415) 835-8998
Hilary Cauley	(415) 835-8996

#### Cybersecurity & IT Infrastructure

Erik Suppiger	(415) 835-3918
---------------	----------------

#### Internet & Digital Media

Ronald V. Josey III	(212) 906-3528
Andrew Boone	(415) 835-3902
Samuel Dimond	(415) 835-8916
David Yueh	(415) 835-3957

#### Software

Patrick Walravens	(415) 835-8943
Joe Goodwin	(415) 869-4477
Mark Chen	(415) 835-8930
Joey Marincek	(415) 869-4418

## ADDITIONAL CONTACTS

**Thomas R. Wright**  
**Director of Equities**  
 (212) 906-3599

**Charles Sweeney**  
**Director of Sales & Trading**  
 (212) 906-3573

**600 Montgomery Street, Suite 1100**  
 San Francisco, CA 94111  
[www.jmpsecurities.com](http://www.jmpsecurities.com)