Third Annual Study on Exchanging Cyber Threat Intelligence: There Has to Be a Better Way

Sponsored by Infoblox

Independently conducted by Ponemon Institute LLC

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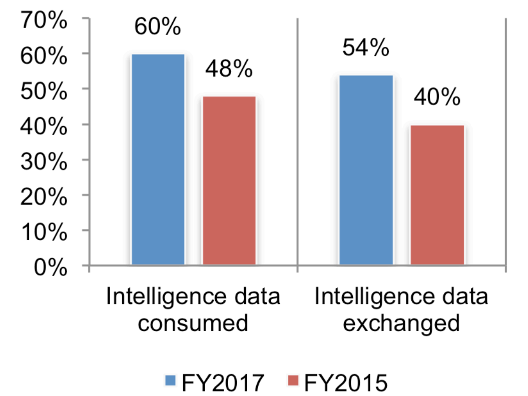
Part 1. Introduction

In a world of increasingly stealthy and sophisticated cyber criminals, it is difficult, costly and ineffective for companies to defend themselves against these threats alone. As revealed in *The Third Annual Study on Exchanging Cyber Threat Intelligence: There Has to Be a Better Way*, more companies are reaching out to their peers and other sources for threat intelligence data. Sponsored by Infoblox, the study provides evidence that participating in initiatives or programs for exchanging threat intelligence with peers, industry groups, IT vendors and government results in a stronger security posture.

According to 1,200 IT and IT security practitioners surveyed in the United States and EMEA[1], the consumption and exchange of threat intelligence has increased significantly since 2015, as shown in Figure 1. **This increase can be attributed to the fact that 66 percent of respondents say they now realize that threat intelligence could have prevented or minimized the consequences of a cyber attack or data breach.**

Figure 1. Is your organization consuming & exchanging more threat intelligence?
Significantly increasing and Increasing combined



Despite the increase in the exchange and use of threat intelligence, most respondents are not satisfied with it. The inability to be actionable, timely and accurate is the most common complaint about threat intelligence.

Following are 12 trends that describe the current state of threat intelligence sharing.

1. Most companies engage in informal peer-to-peer exchange of threat intelligence (65 percent of respondents) instead of a more formal approach such as a threat intelligence exchange service or consortium (48 percent and 20 percent of respondents, respectively). Forty-six percent of respondents use manual processes for threat intelligence. This may contribute to the dissatisfaction with the quality of threat intelligence obtained.

2. Organizations prefer sharing with neutral parties and with an exchange service and trusted intermediary rather than sharing directly with other organizations. This indicates a need for an exchange platform that enables such sharing because it is trusted and neutral.

3. More respondents believe threat intelligence improves situational awareness, with an increase from 54 percent of respondents in 2014 to 61 percent of respondents in this year's study.

4. Sixty-seven percent of respondents say their organizations spend more than 50 hours per week on threat investigations. This is not an efficient use of costly security personnel, which should be conducting threat hunting and not just responding to alerts received.

5. Forty percent of respondents say their organizations measure the quality of threat intelligence. The most often used measures are the ability to prioritize threat intelligence (61 percent of respondents) and the timely delivery of threat intelligence (53 percent of respondents).

[1] This year, the scope of this research was expanded to include EMEA.

6. Respondents continue to be concerned about the accuracy, timeliness and ability to be actionable of the threat intelligence they receive. Specifically, more than 60 percent of respondents are only somewhat satisfied (32 percent) or not satisfied (28 percent) with the quality of threat intelligence obtained. However, this is a significant decrease from 70 percent in 2014, which indicates some improvement as the market matures. Concerns about how threat intelligence is obtained persist because information is not timely and is too complicated, according to 66 percent and 41 percent of respondents, respectively.

7. Companies are paying for threat intelligence because it is considered better than free threat intelligence. Fifty-nine percent of respondents also believe it has proven effective in stopping security incidents.

8. Seventy-three percent of respondents say they use threat indicators and that the most valuable types of information are indicators of malicious IP addresses and malicious URLs.

9. The value of threat intelligence is considered to decline within minutes. However, only 24 percent of respondents say they receive threat intelligence in real time (9 percent) or hourly (15 percent).

10. Forty-five percent of respondents say they use their threat intelligence program to define and rank levels of risk of not being able to prevent or mitigate threats. The primary indicators of risk are uncertainty about the accuracy of threat intelligence and an overall decline in the quality of the provider’s services (66 percent of respondents and 62 percent of respondents).

11. Many respondents say their organizations are using threat intelligence in a non-security platform, such as DNS. The implication is that there is a blurring of lines in relation to what are considered pure networking tools and what are considered security tools. Security means defense-in-depth, plugging all gaps and covering all products.

12. Seventy-two percent of respondents are using or plan to use multiple sources of threat intelligence. However, 59 percent of respondents have a lack of qualified staff and, therefore, consolidate threat intelligence manually.

Part 2. Key findings

In this section we provide an analysis of the key findings. We have organized the results of the research according to the following themes:

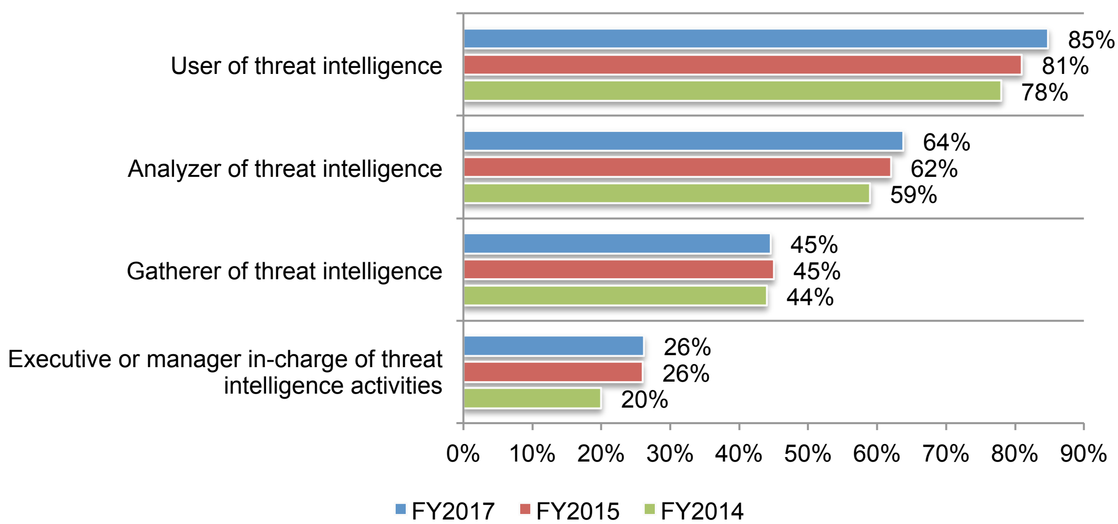
- Trends in the exchange of threat intelligence
- Trends in the management of threat intelligence
- Measuring the quality and risk of threat intelligence

Trends in the exchange of threat intelligence

Most respondents are focused on the use and analysis of threat intelligence. All 1,200 participants in this research have some degree of involvement in their organizations cyber intelligence activities. Eighty-four percent of these respondents either fully or partially participate in a program for exchanging threat intelligence with peers and/or industry groups.

As shown in Figure 2, most respondents in this research continue to be users of threat intelligence, and this is followed by analyzers of threat intelligence (85 and 64 percent of respondents, respectively).

Figure 2. How are you involved in your company's cyber threat intelligence activities or process?
More than one response permitted



Threat intelligence sharing is believed to improve the security posture of organizations and the nation's critical infrastructure. Eighty-four percent of organizations represented in this research either fully participate or partially participate in an initiative or program for exchanging threat intelligence with peers and/or industry groups.

While not many respondents believe the exchange of threat intelligence makes threat data more actionable and timely, respondents do believe it has a positive effect on their security posture and the nation's critical infrastructure, as shown in Figure 3. Since 2014 more respondents see the exchange of threat intelligence as improving the security posture of the organization (76 percent of respondents this year vs. 71 percent of respondents in 2014). The perceived benefit of improving situational awareness has increased since 2014 (54 percent of respondents vs. 61 percent of respondents).

Figure 3. Reasons for full participation in a program for exchanging threat intelligence
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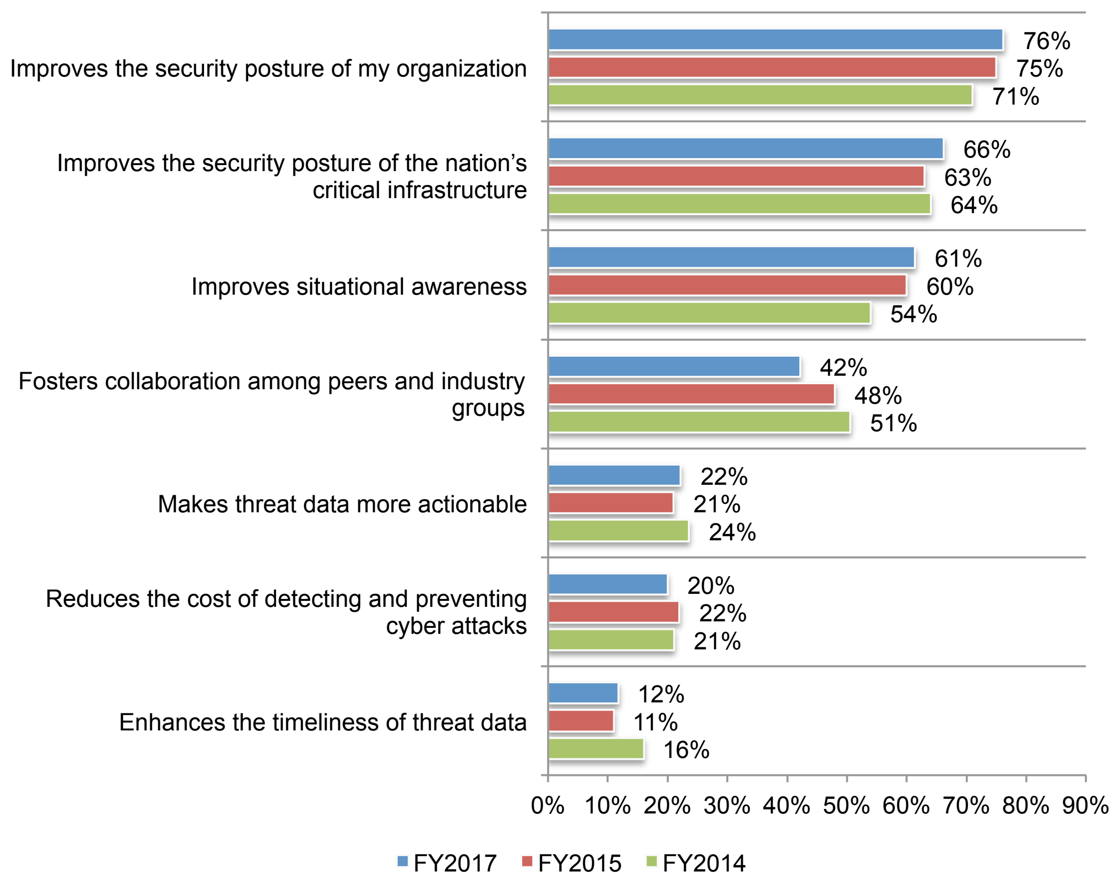
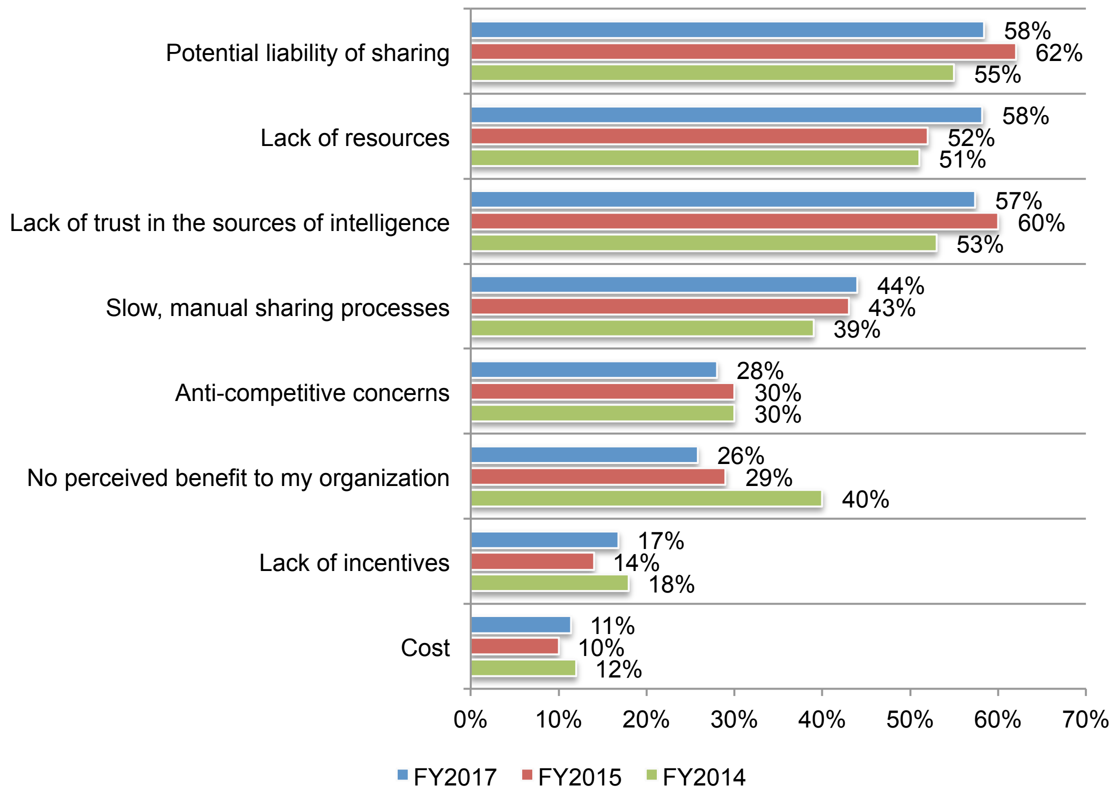


As in last year's study, potential liability and the lack of trustworthiness of intelligence providers keep some organizations from fully participating. Last year 62 percent of respondents said the potential liability of sharing keeps their companies from only partially participating in a threat intelligence exchange program and this decreased slightly to 58 percent of respondents.

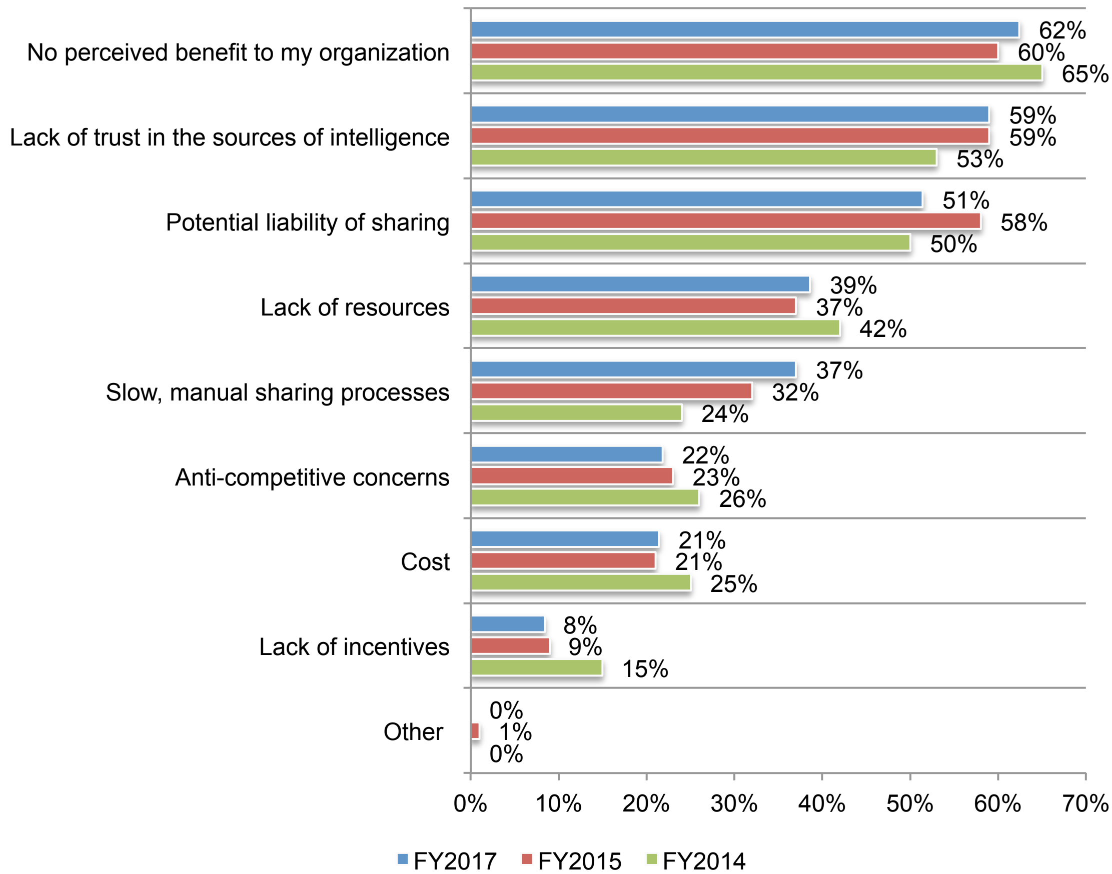
Lack of trust in the sources of intelligence decreased from 60 percent of respondents last year to 57 percent of respondents this year. However, more respondents do see the exchange of threat intelligence as beneficial. Last year, 29 percent of respondents did not see these programs as a benefit. That has decreased to 26 percent of respondents in this years study.

Figure 4. Reasons for only partial participation in the exchange of threat intelligence
More than one response permitted



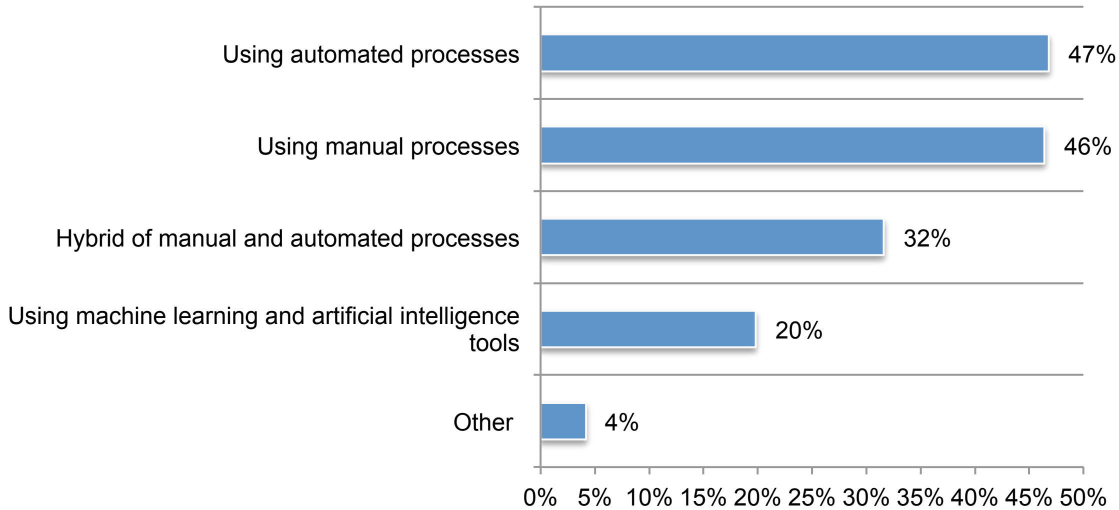
Barriers to threat sharing continue to be the perceived lack of benefits and trust in sources of intelligence. As shown in Figure 5, the number one deterrent for organizations that do not participate in the exchange of threat intelligence continues to be the perception that there is no benefit to sharing. The biggest increase regarding not participating is slow, manual sharing processes (37 percent of respondents vs. 32 percent of respondents in 2015). However, concerns about the potential liability of sharing has decreased (51 percent of respondents vs. 58 percent of respondents in 2015).

Figure 5. Reasons for not participating in threat intelligence exchange programs
More than one response permitted



According to the 1,200 respondents, most threats are investigated either using automated (47 percent of respondents) or manual processes (46 percent of respondents), as shown in Figure 6. Only 32 percent of respondents say their organizations investigate threats using a hybrid of manual and automated processes, and 20 percent say they use machine learning and artificial intelligence tools.

Figure 6. How are threats investigated?
More than one response permitted

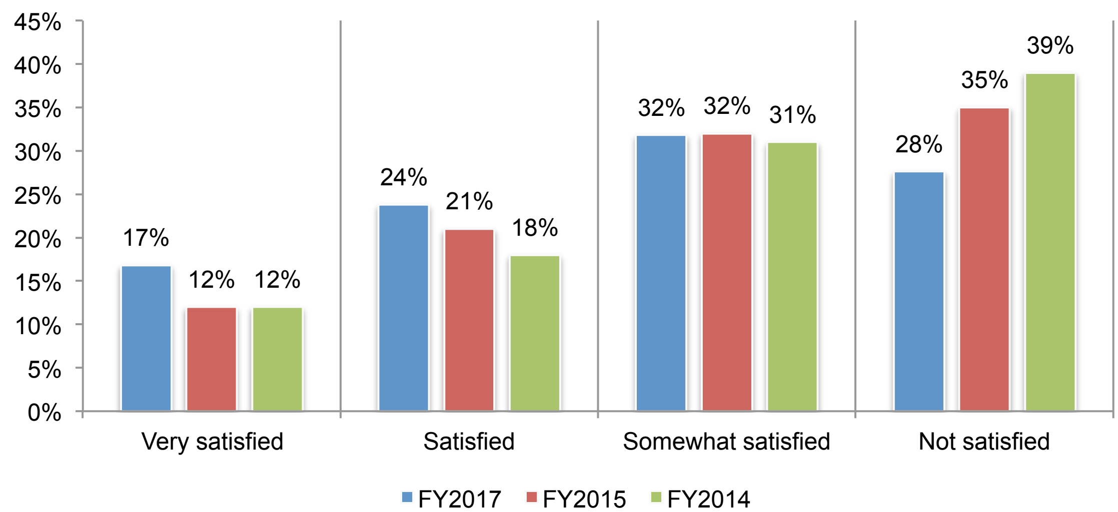


Trends in the management of threat intelligence activities

In this section, we only present the findings from respondents who participate fully or partially in the exchange of treat intelligence (84 percent of respondents).

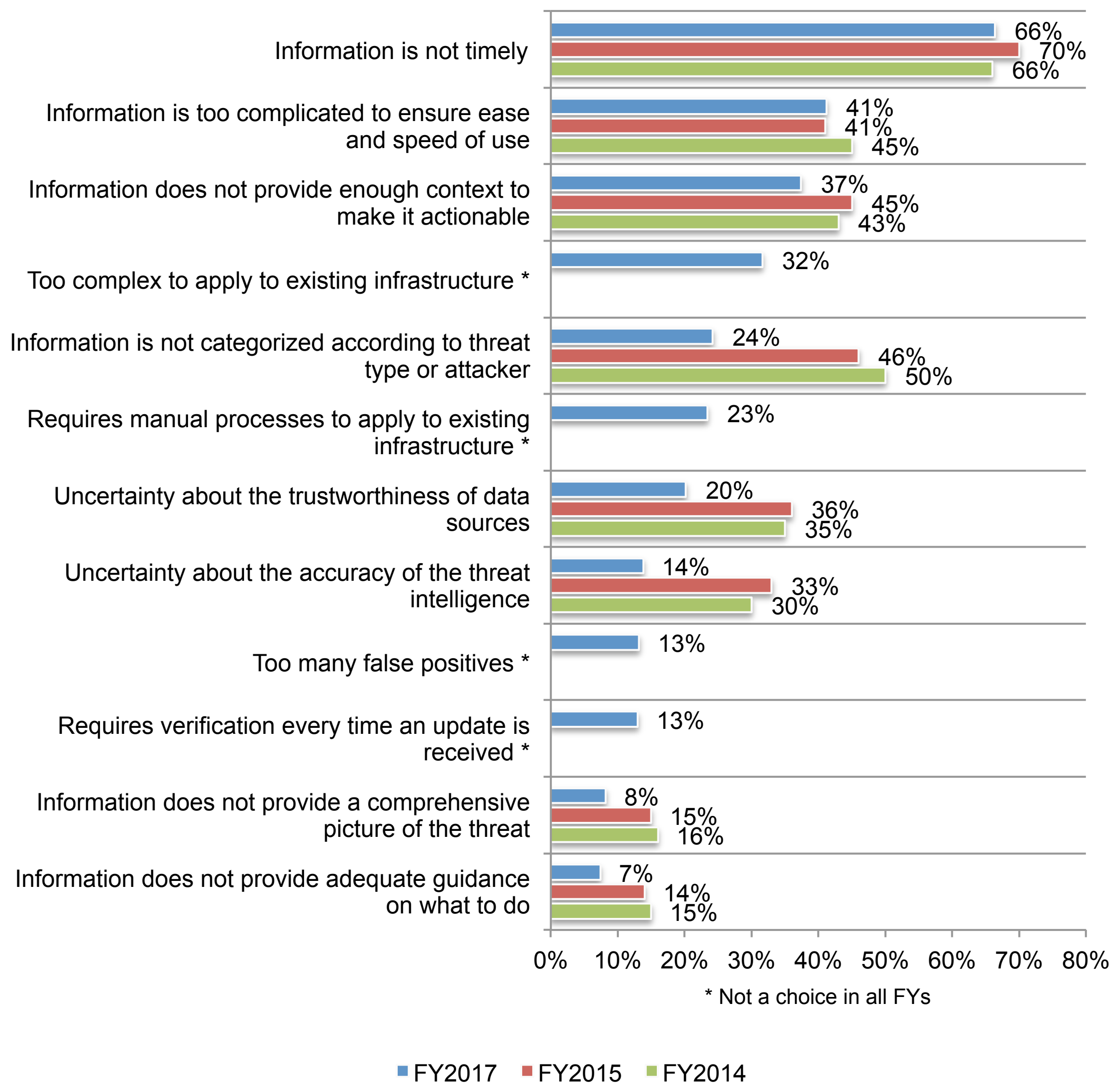
Satisfaction with the ability to obtain threat intelligence increases. While most respondents are either somewhat or not satisfied, there are signs of improvement**.** As shown in Figure 6, respondents who are very satisfied (17 percent) or satisfied (24 percent) increased significantly from 2015 when 12 percent were very satisfied and 21 percent were satisfied. This is a total increase in overall satisfaction from 33 percent in 2015 to 41 percent in 2017. Since 2014, respondents who are not satisfied decreased from 39 percent of respondents to 28 percent of respondents in this year's research.

Figure 6. How satisfied are you in the way your organization is able to obtain threat intelligence?



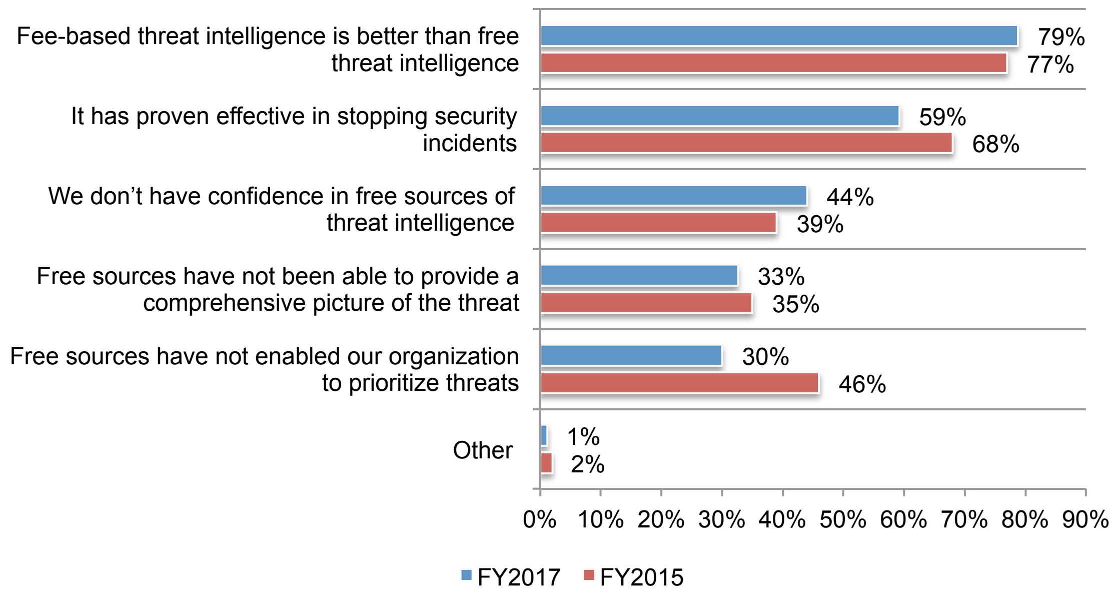
The same concerns about how threat intelligence is obtained persist. Sixty percent of respondents are only somewhat satisfied or not satisfied with how they obtain threat intelligence. As shown in Figure 7, dissatisfaction continues because the information obtained is not timely or the information is too complicated to ensure ease and speed of use. Some areas that seem to be improving, based on the reduction in respondents, are having enough context to make the intelligence actionable and having it categorized according to threat type or attacker.

Figure 7. Why is your organization only somewhat or not satisfied?
Three responses permitted



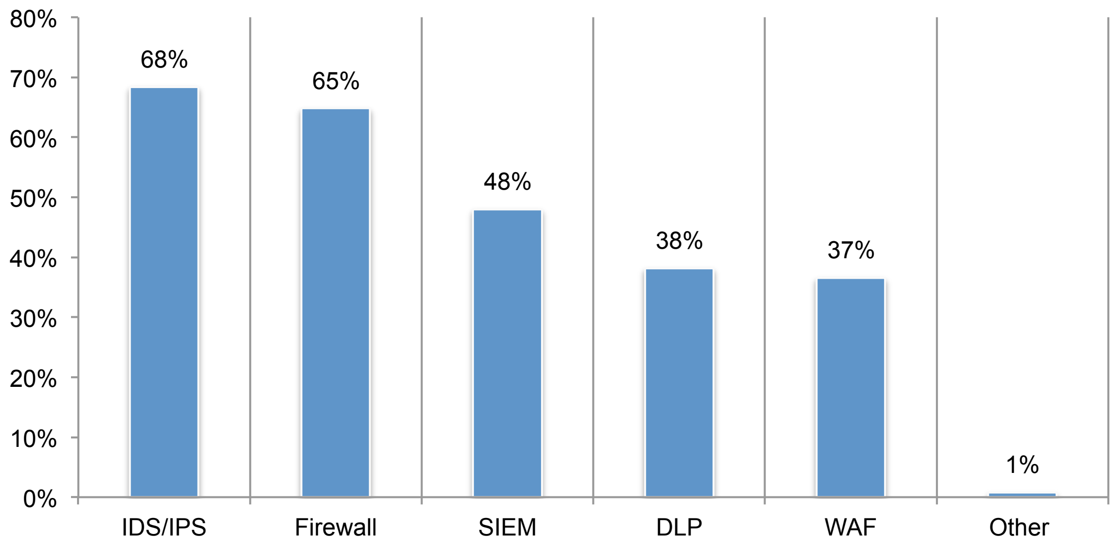
Threat intelligence that is paid for is considered better. Most of the respondents (67 percent) say their organizations are using a combination of paid and free sources (35 percent of respondents) and mostly paid subscriptions (32 percent of respondents). According to Figure 8, companies are using fee-based threat intelligence because they think it is better (79 percent of respondents), it has proven effective in stopping security incidents (59 percent of respondents) and they do not have confidence in free sources of intelligence (44 percent of respondents).

Figure 8. Why does your organization pay for threat intelligence?
More than one response permitted



Companies represented in this study have 11 separate subscriptions. As shown in Figure 9, most of the received threat intelligence feeds IDS/IPS and firewalls.

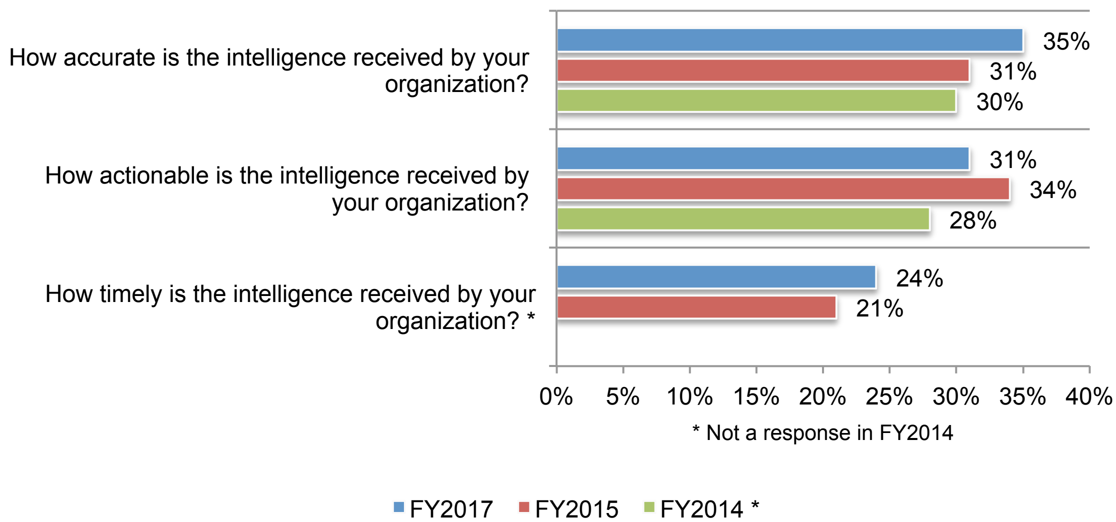
Figure 9. The threat intelligence that we receive feeds the following security technologies in our organization
More than one response permitted



More threat intelligence is being consumed but is the information effective in dealing with cyber threats? As discussed previously, over the past 12 months, 60 percent of respondents say the amount of threat intelligence their organizations have consumed has increased.

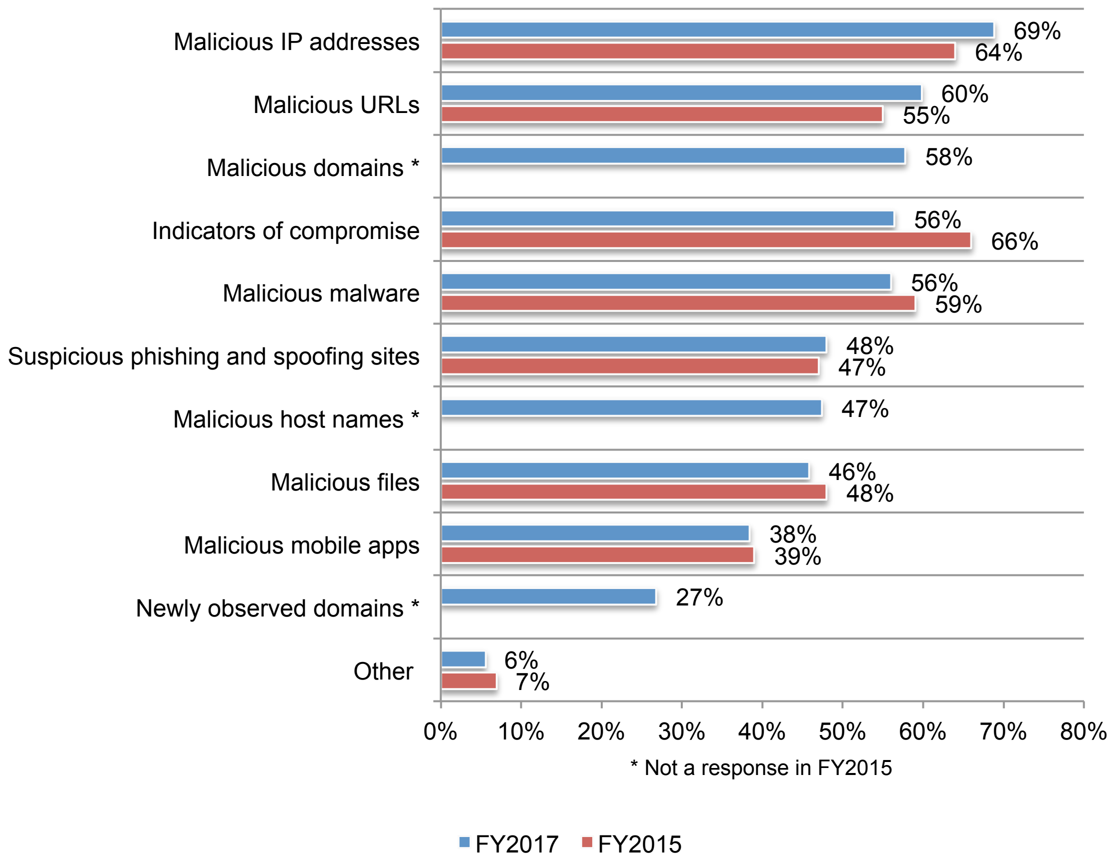
When asked to rate the effectiveness of the threat intelligence received on a scale of 1 = low effectiveness to 10 = high effectiveness, very few believe it is effective in preventing cyber attacks. As shown in Figure 10, only 35 percent of respondents (31 percent last year) rate the intelligence as very effective in terms of accuracy, and only 24 percent of respondents say its real-time effectiveness is very high. Similarly, only 31 percent of respondents say threat intelligence is actionable.

Figure 10. How effective is the accuracy, timeliness and ability to be actionable of threat intelligence?
1 = low effectiveness to 10 = high effectiveness, 7+ responses reported



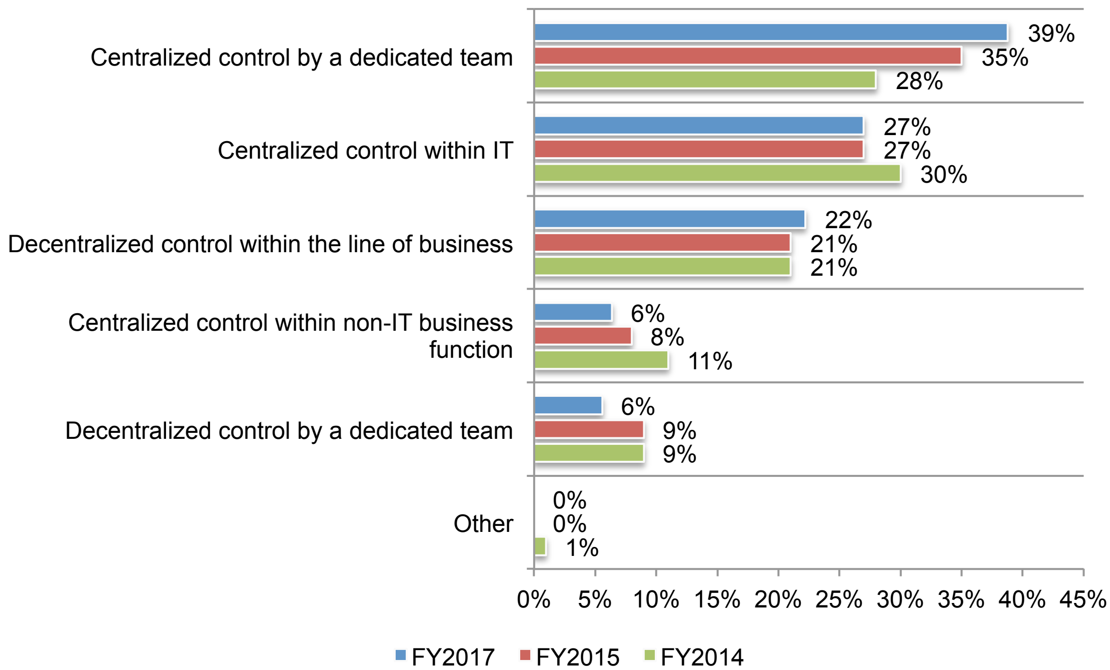
Threat indicators provide valuable intelligence. Seventy-three percent of respondents say they use threat indicators, and they consider the most valuable types of information, as shown in Figure 11, to be indicators of malicious IP addresses (69 percent of respondents) and indicators of malicious URLs (60 percent of respondents). Indicators of compromise decreased in its value since last year (56 percent of respondents vs. 66 percent of respondents).

Figure 11. If your organization uses threat indicators, what information is most valuable?
More than one response permitted



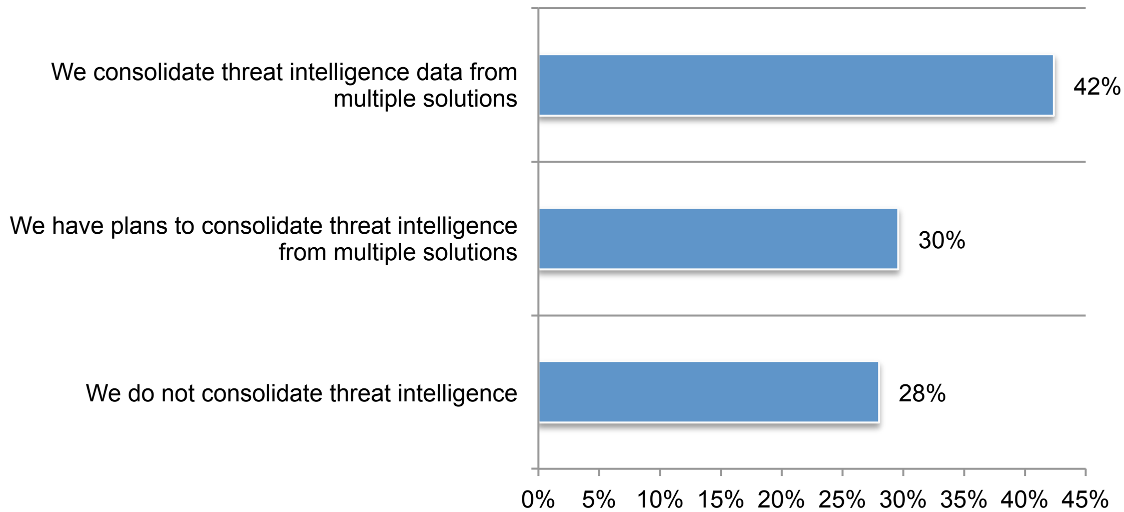
The management of threat intelligence continues to be more centralized and controlled by a dedicated team. According to respondents, the most important goals for a threat intelligence program are to enhance overall security posture, improve incident response and quickly detect attacks. As shown in Figure 12, centralized control by a dedicated team has continued to increase since 2014.

Figure 12. What statement best describes how threat intelligence is managed within your organization?
Only one response permitted



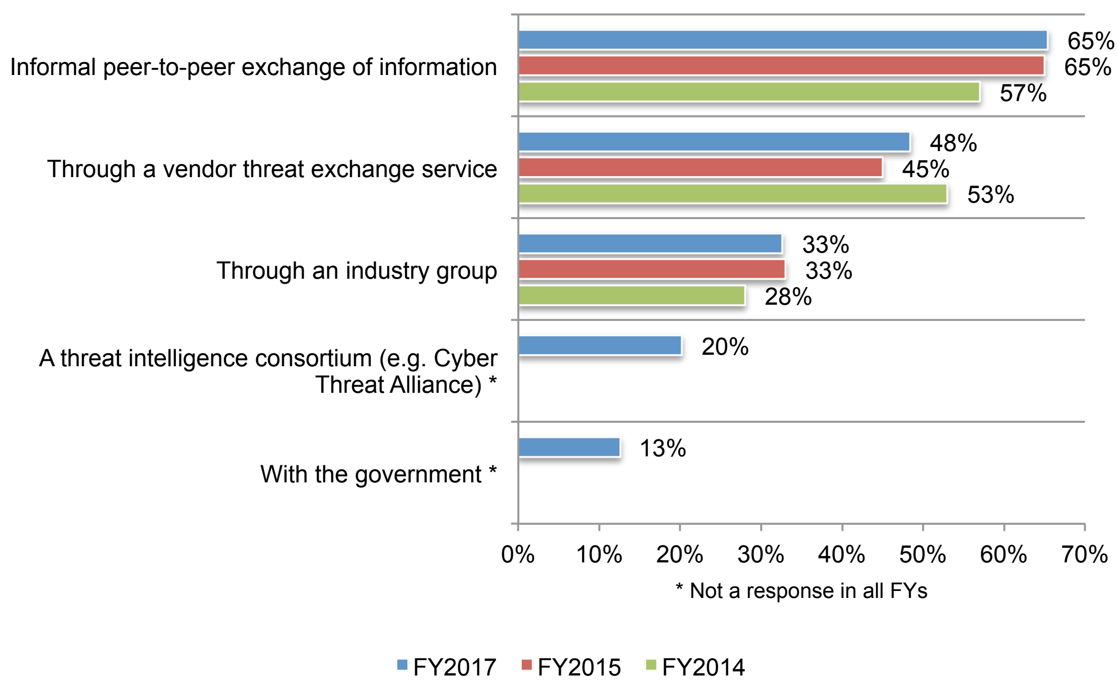
As shown in Figure 13, 42 percent of respondents say their companies consolidate threat intelligence data from multiple solutions. These respondents mostly use a manual process (59 percent of respondents).

Figure 13. Does your organization consolidate threat intelligence data from multiple solutions?



More organizations rely on informal interaction with peers and security vendors for threat intelligence. As presented in Figure 14, 65 percent of respondents say intelligence is most often shared through informal peer-to-peer exchanges, an increase from 57 percent of respondents in in 2014. The exchange of intelligence through industry groups also increased.

Figure 14. How does your organization exchange threat intelligence?
More than one response permitted



There is a trend of more companies both providing and receiving threat intelligence. Fewer respondents are saying their organizations use and provide threat intelligence in nearly equal proportions (37 percent of respondents vs. 42 percent of respondents), as shown in Figure 15. Those who say they mostly receive intelligence data has also declined significantly since 2014 (28 percent of respondents vs. 42 percent of respondents in 2014).

Figure 15. What describes your organization's role in exchanging threat intelligence?
Only one response permitted

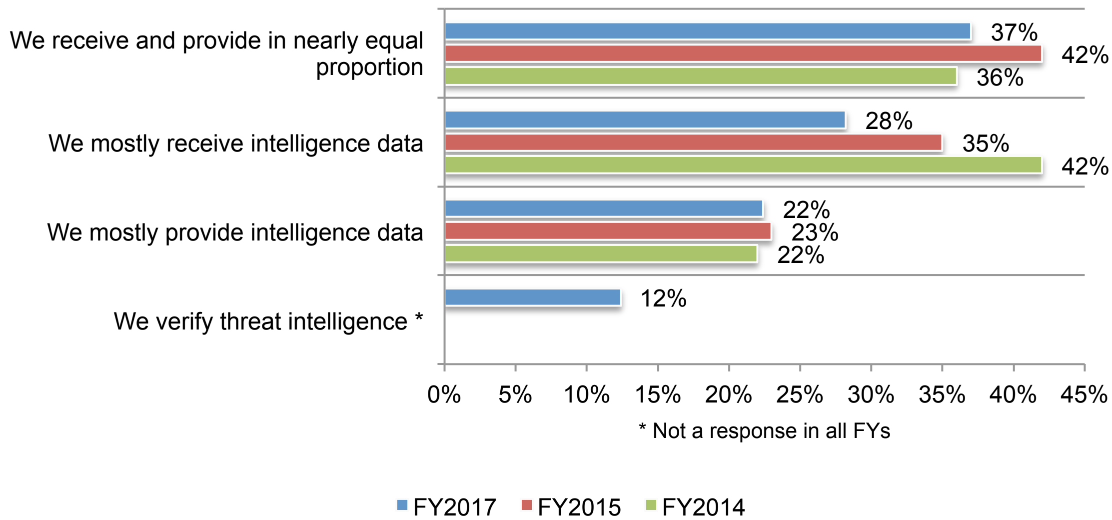
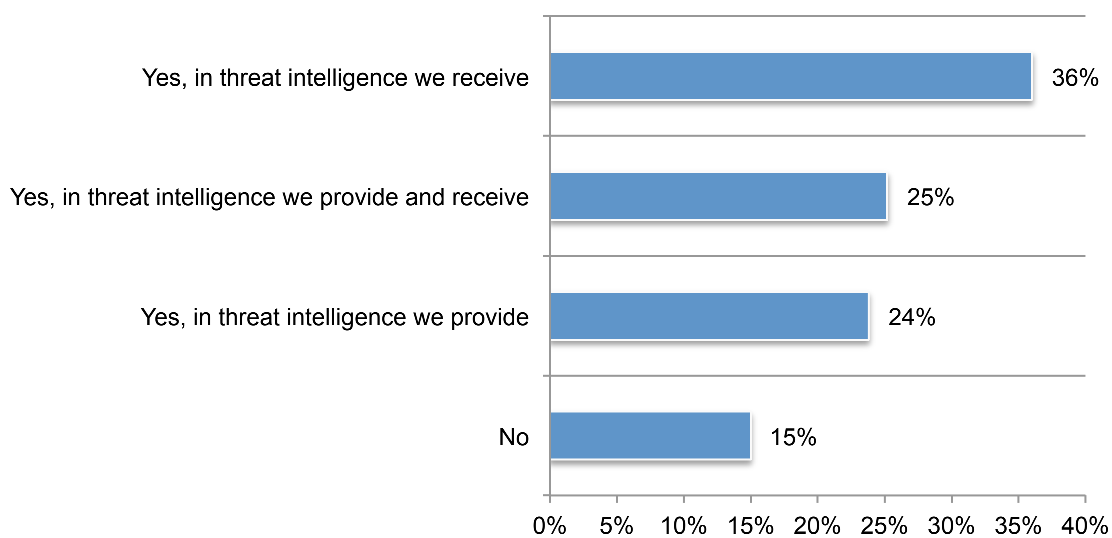


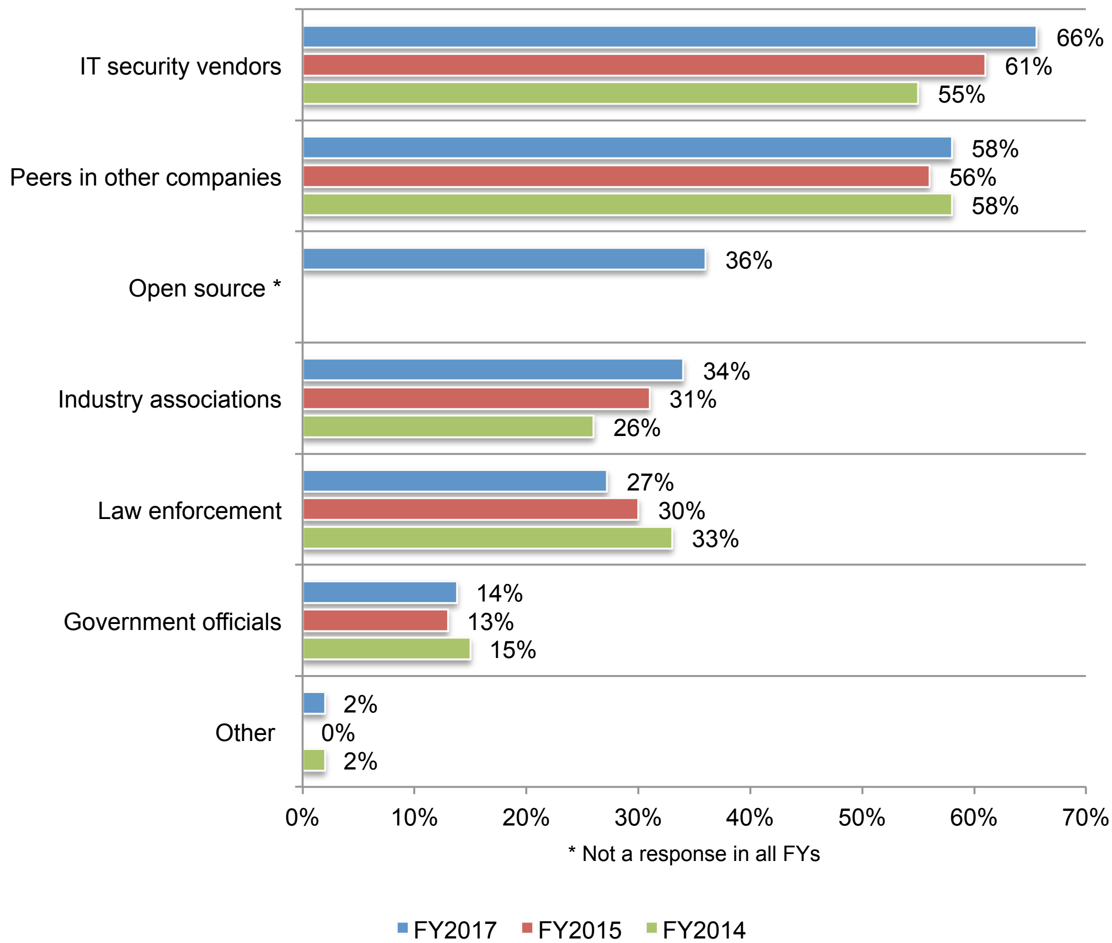
Figure 16 reveals that 85 percent of respondents report they are involved at some level in verifying the quality of threat intelligence provided and received.

Figure 16. Does your organization have a role in verifying the quality of threat intelligence sent or received?
Only one response permitted



Peers and security vendors provide the most actionable intelligence. According to Figure 17, the main sources of threat intelligence received by organizations continue to be IT security vendors and peers in other companies. Law enforcement and government officials as sources of intelligence remains low and even decreased slightly from last year.

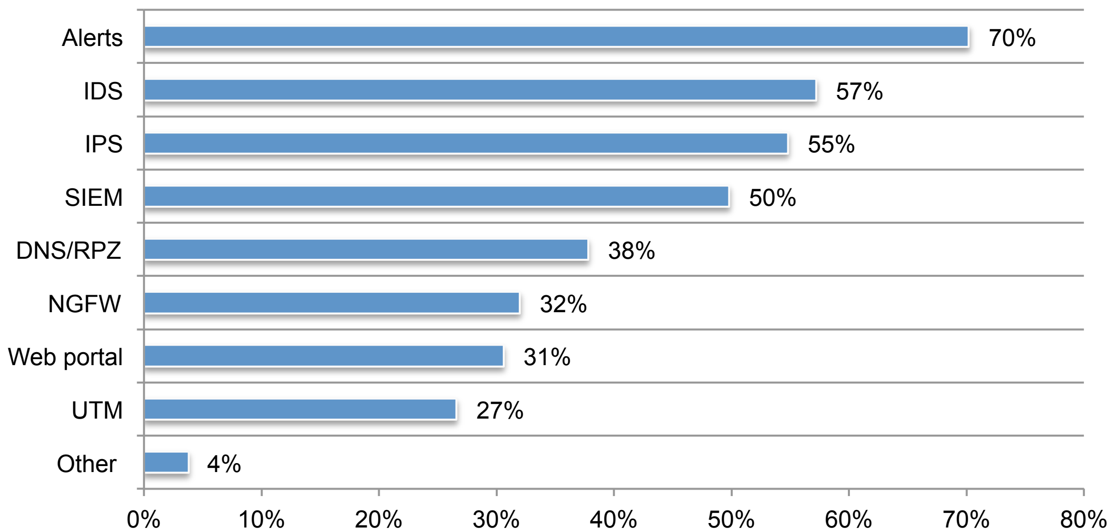
Figure 17. What are the main sources of threat intelligence received by your organization?
More than one response permitted



To disseminate threat intelligence through the network, the majority of respondents use alerts to feed the security infrastructure. According to Figure 18**,** most respondents say threat intelligence is disseminated internally through alerts and IDS.

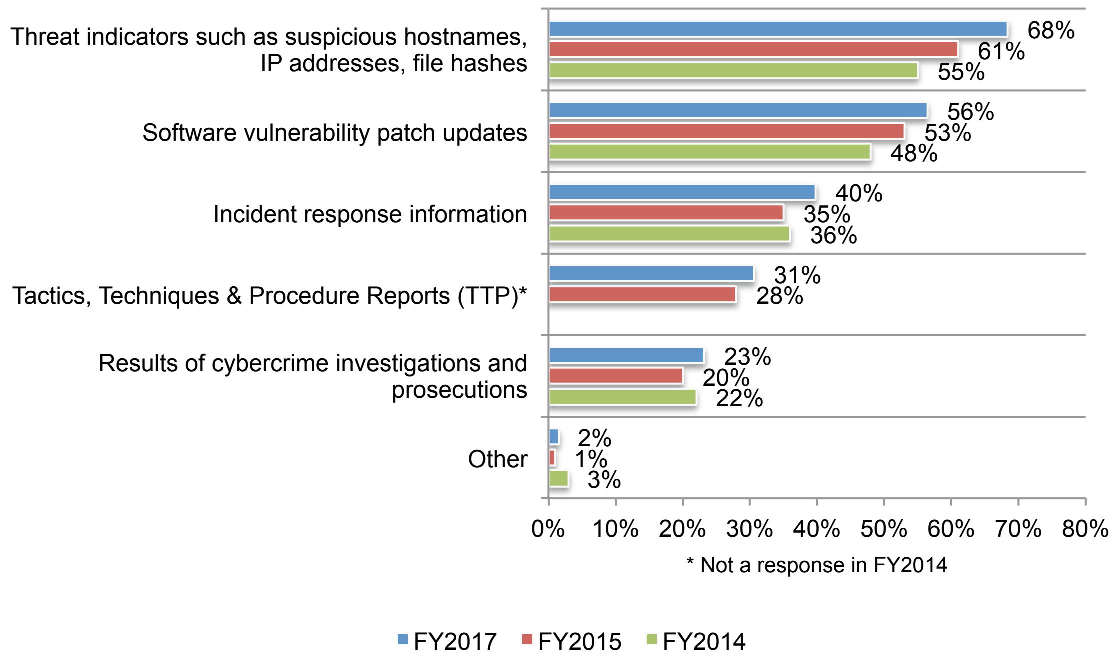
Security analysts (79 percent of respondents), threat intelligence teams (72 percent of respondents) and security operations (65 percent of respondents) are mostly using threat intelligence.

Figure 18. What best describes how threat intelligence is being used and disseminated in the network?
More than one response permitted



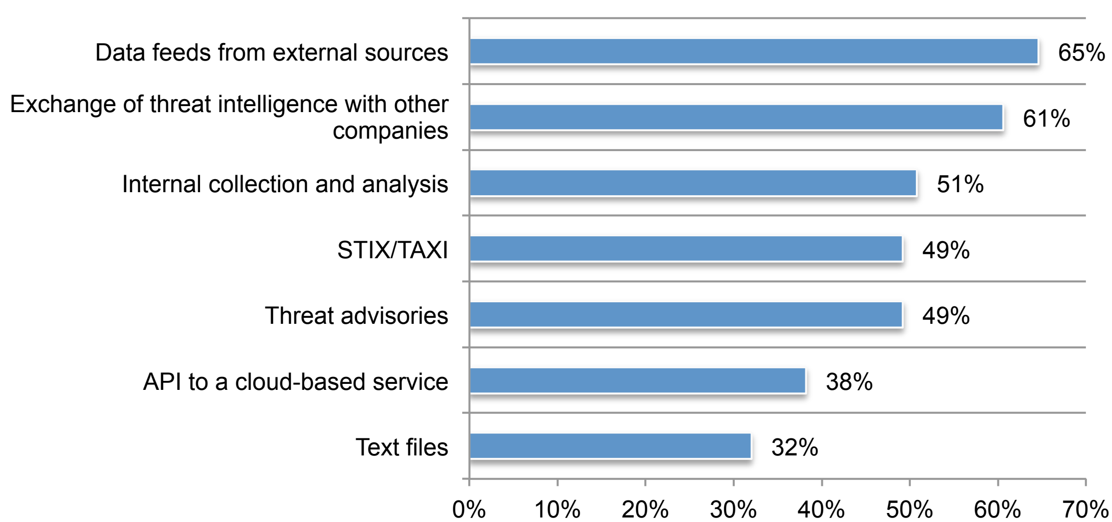
According to the research, more respondents this year (68 percent vs. 61 percent in 2015) say the information contained in intelligence reports are threat indicators such as suspicious hostnames, IP addresses and file hashes, as shown in Figure 19. Software vulnerability patch updates have increased significantly since 2014 (56 percent of respondents vs. 48 percent of respondents).

Figure 19. What information is contained in threat intelligence reports?
More than one response permitted



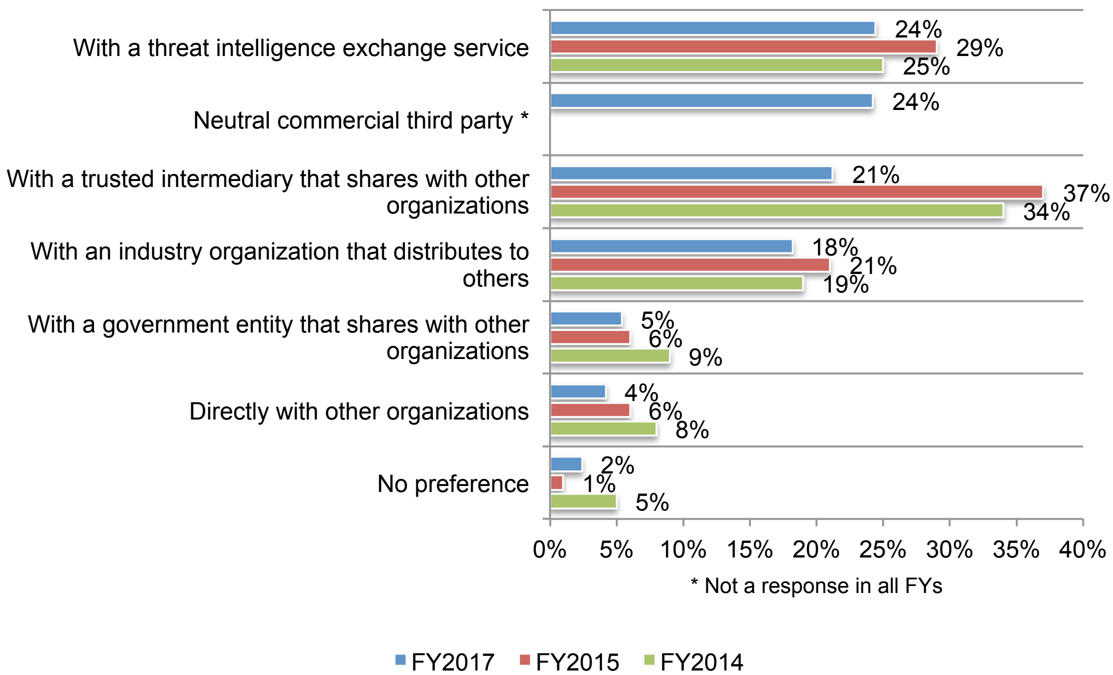
As presented in Figure 20, data feeds are the most common way to receive threat intelligence (65 percent of respondents) followed by the exchange of threat intelligence with other companies (61 percent of respondents).

Figure 20. How is threat intelligence received by their organization?
More than one response permitted



There is a trend away from using trusted intermediaries to exchange threat intelligence. When asked to name the one best way to improve threat intelligence sharing, it is to have a threat intelligence exchange service or neutral commercial third party, as shown in Figure 21.

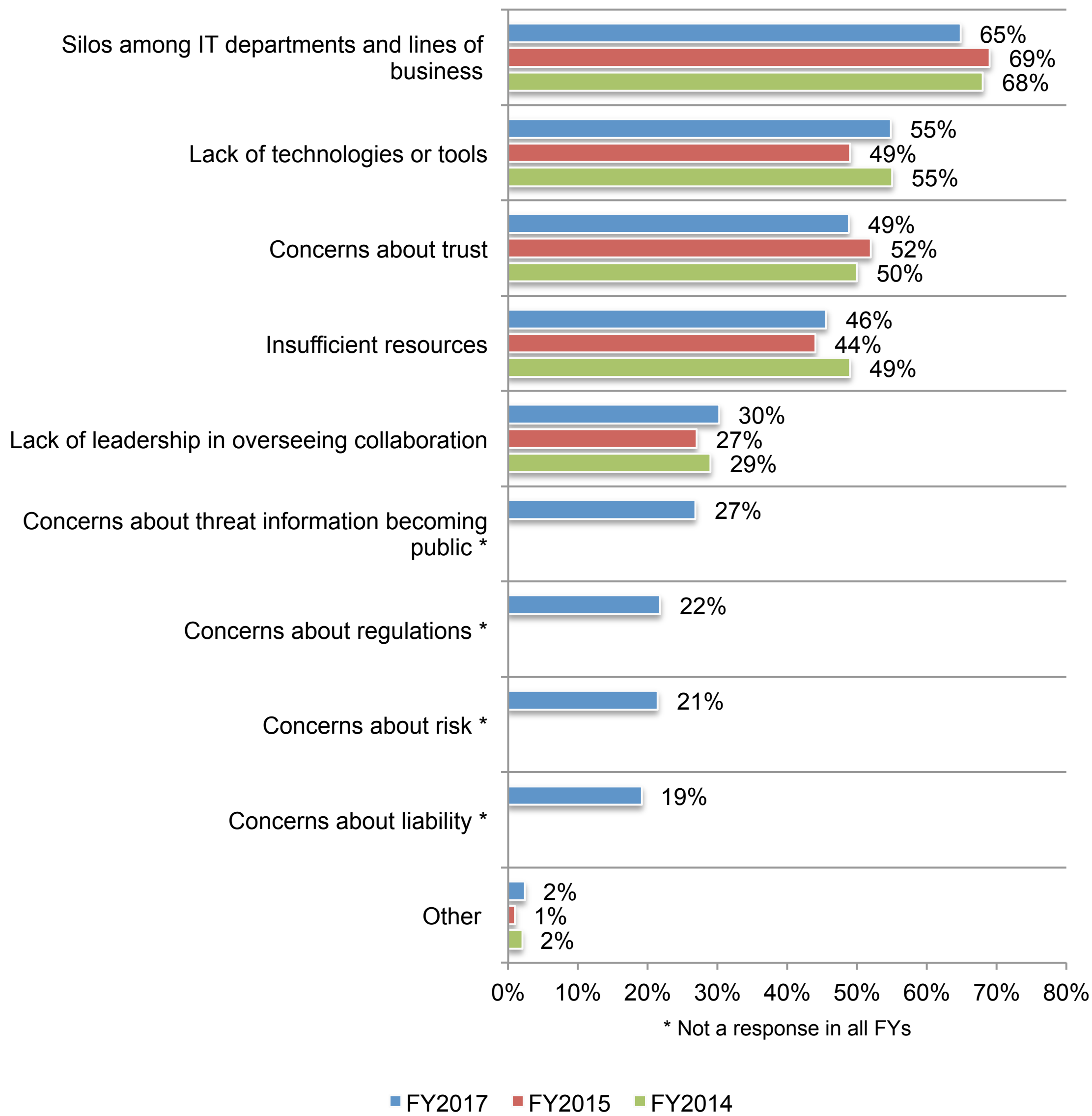
Figure 21. What is the one best way to exchange threat intelligence?
Only one choice permitted



Internal silos prevent more effective collaboration in the exchange of threat intelligence. Only 33 percent of respondents say the collaboration between their organization and other companies in the exchange of threat intelligence is either very effective or effective.

The biggest barrier to the exchange of threat intelligence is the existence of silos among IT departments and lines of business, as shown in Figure 22. This finding indicates the importance of a centralized program controlled by a dedicated team.

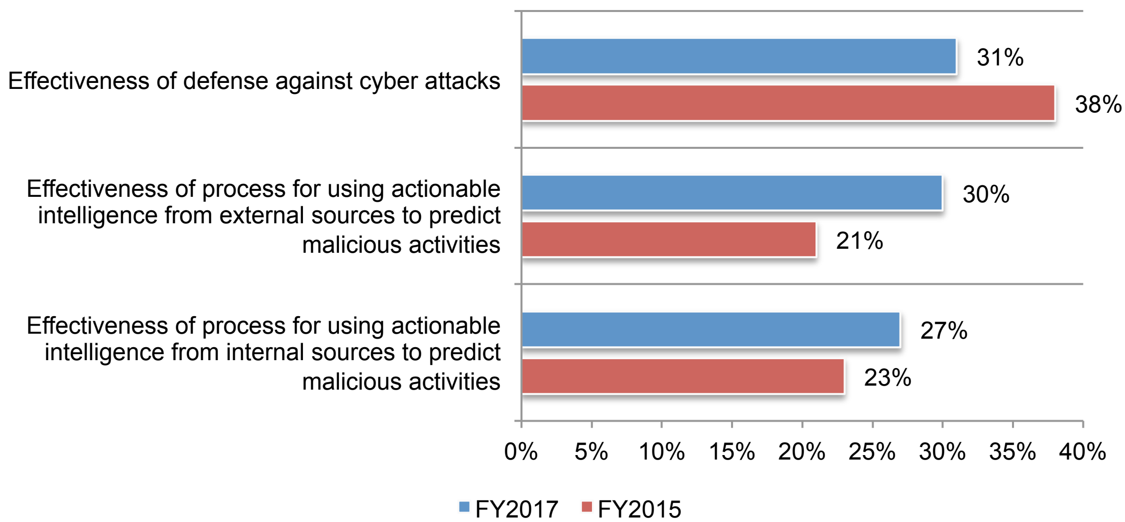
Figure 22. Why is collaboration in exchanging threat intelligence with other organizations not effective?
More than one response permitted



An effective defense against cyber attacks declines because of the lack of actionable intelligence. Respondents were asked to rate the effectiveness of their organization's process for using actionable intelligence from both internal and external sources on a scale of 1 = low effectiveness to 10 = high effectiveness.

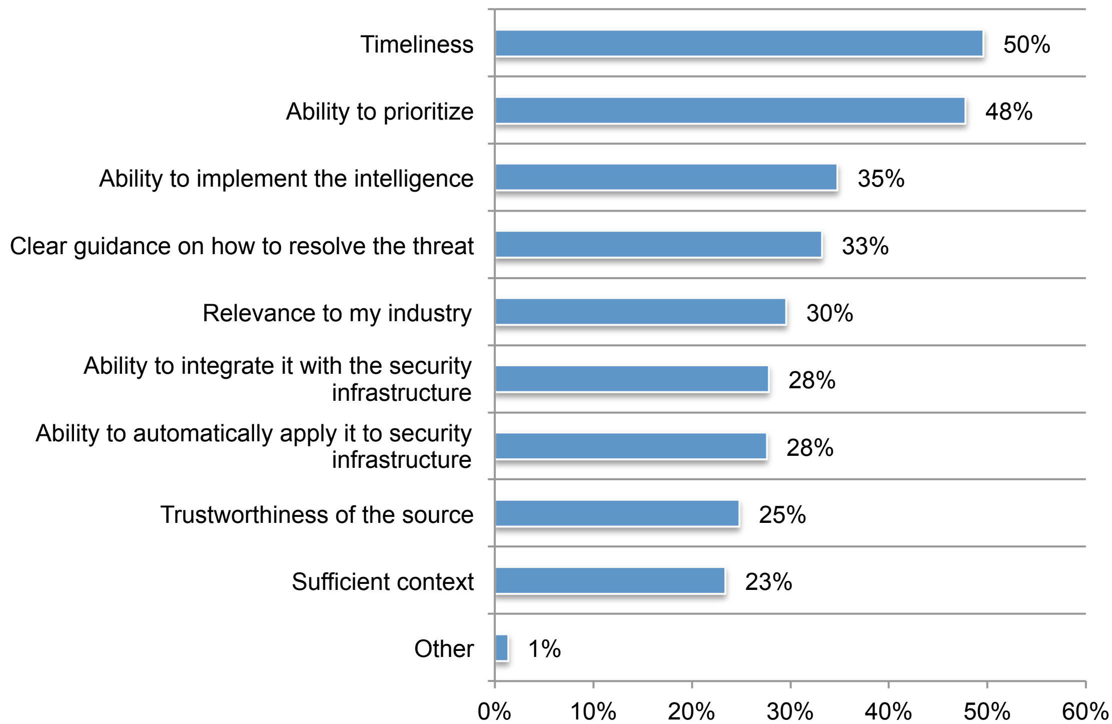
As shown in Figure 23, only 31 percent rate their companies' defense against cyber attacks as highly effective. Even worse, only 27 percent of respondents rate their process of using internal sources (such as configuration log activities) as highly effective. However, more respondents since last year rate the process for using actionable intelligence from external sources (such as vendor-supplied threat feeds) to predict malicious activities as highly effective (30 percent of respondents vs. 21 percent of respondents).

Figure 23. How effective is your organization's cyber defense and how effective are your processes for using threat intelligence from internal and external sources?
1 = low effectiveness to 10 = high effectiveness, 7+ responses reported



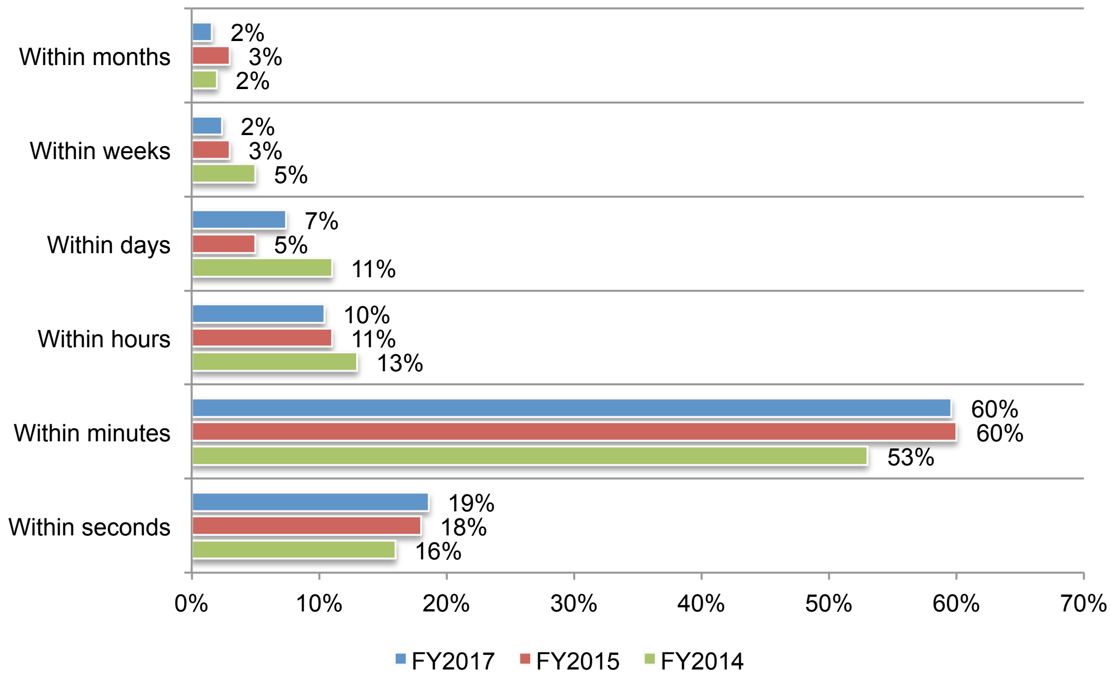
To be actionable, threat intelligence must be timely. As shown in Figure 24, the most important objective of an organization's threat intelligence activities is to quickly detect attacks and improve incident response. Features that make threat intelligence actionable are the need to have the threat intelligence received in a timely manner with the ability to prioritize the threats.

Figure 24. What features make threat intelligence actionable?
Three responses permitted



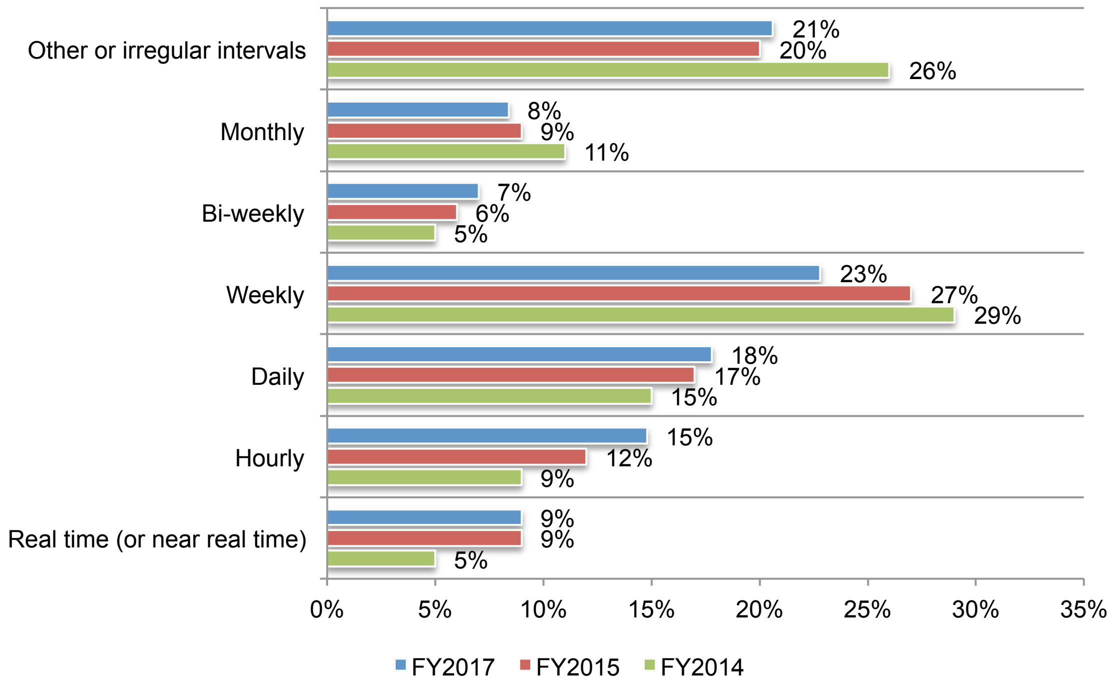
Real-time intelligence continues to be critical. As discussed previously, respondents are not satisfied with threat intelligence because it is not timely. According to 60 percent of respondents, threat intelligence becomes stale within minutes, as shown in Figure 25.

Figure 25. When does threat intelligence become stale or not fresh?



Lack of timeliness can make threat intelligence irrelevant. According to Figure 26, only 9 percent of respondents say they receive threat intelligence in real time, which is unchanged from last year. Most likely, threat intelligence is received weekly (23 percent) or on an irregular basis (21 percent).

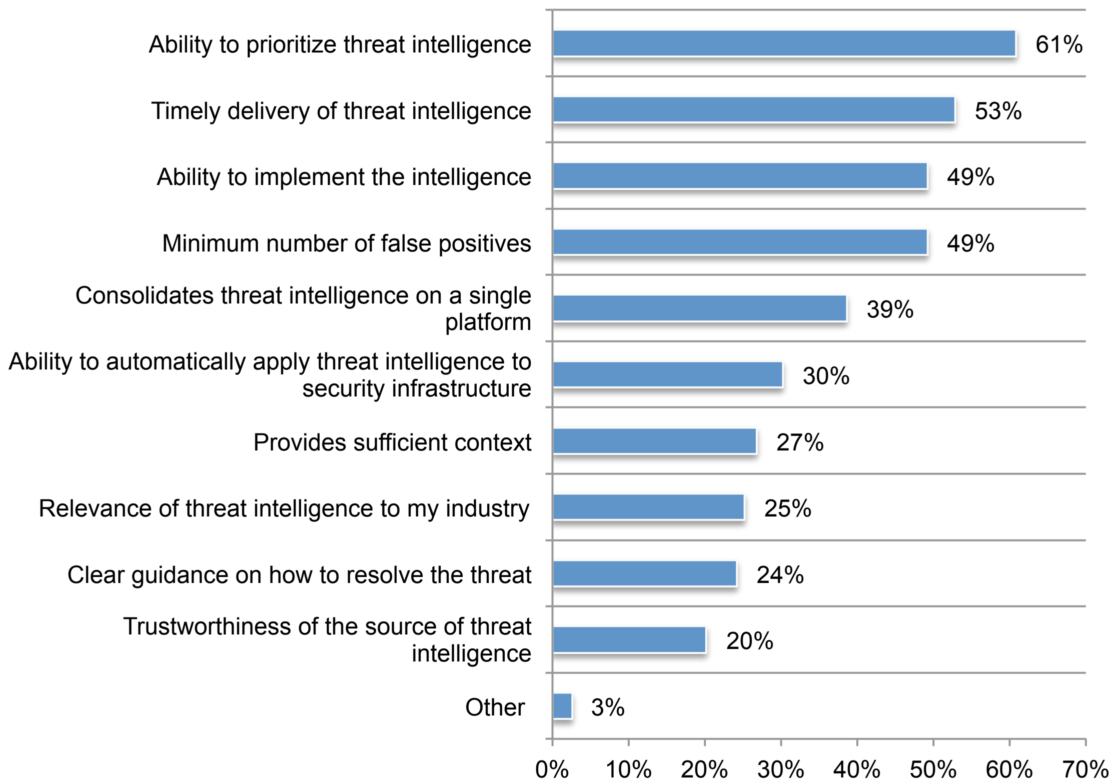
Figure 26. How frequently does your organization receive threat intelligence?



Measuring the quality and risk of threat intelligence

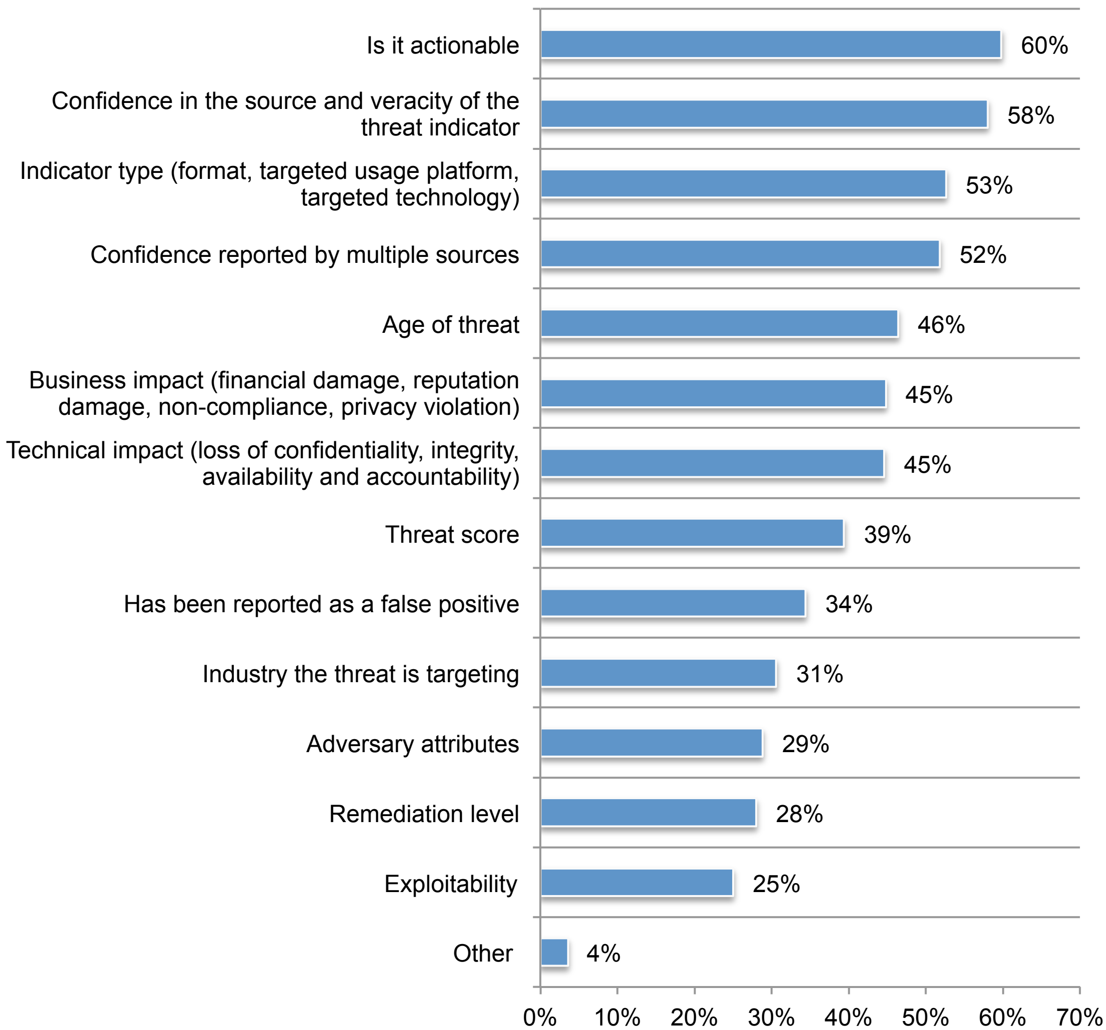
Only 41 percent of respondents say their organizations evaluate the quality of the threat intelligence provider and the information received. Companies that do such an evaluation rely on certain metrics presented in Figure 27. These are the ability to prioritize threat intelligence and timely delivery of threat intelligence (61 percent of respondents and 53 percent of respondents, respectively).

Figure 27. What metrics do you use to evaluate the quality of the threat intelligence provider and the information received?
More than one response permitted



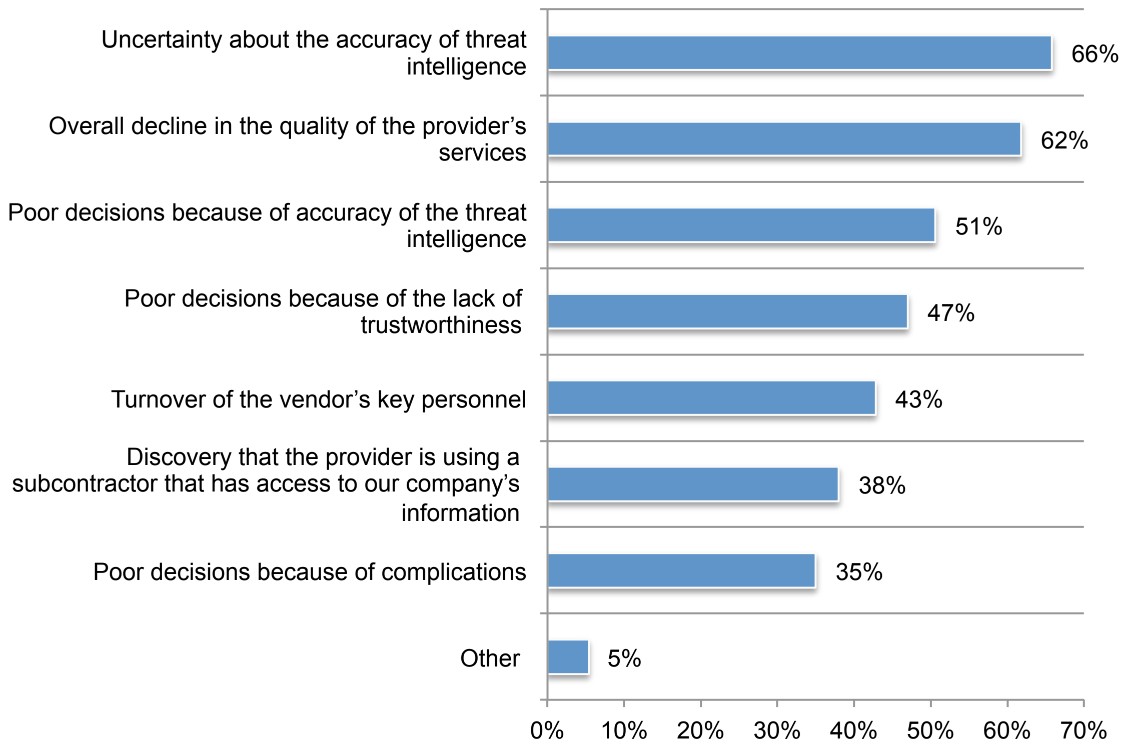
Similar to metrics, only 40 percent of respondents say their organization uses a risk score to evaluate threat intelligence. Figure 28 presents what factors are used to calculate a risk score. The most important factors in determining the risk in using threat intelligence are whether it is actionable, confidence in the source and veracity of the threat indicator and indicator type (60 percent of respondents, 58 percent of respondents and 53 percent of respondents, respectively).

Figure 28. Do you take the following into account when calculating a risk score?
More than one response permitted



Forty-five percent of respondents say their organizations are using their threat intelligence program to define and rank levels of risk. As shown in Figure 29, the primary indicators of risk are uncertainty about the accuracy of threat intelligence and overall decline in the quality of providers' services.

Figure 29. What are indicators of risk?
More than one response permitted



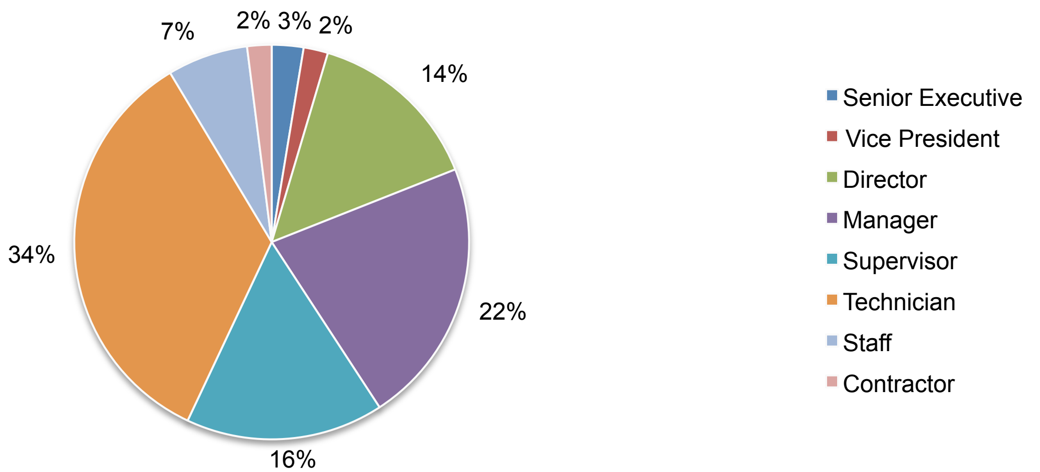
Part 3. Methods

This year's research included respondents from EMEA. A sampling frame of 31,646 experienced IT and IT security practitioners located in the United States and EMEA were selected as participants to this survey. To ensure knowledgeable responses, all participants in this research are familiar and involved in their company's cyber threat intelligence activities or process. Table 1 shows 1,345 total returns. Screening and reliability checks required the removal of 145 surveys. Our final sample consisted of 1,200 surveys (3.8 percent response rate).

Table 1. Sample response	FY2017	FY2015	FY2014
Total sampling frame	31,646	18,705	19,915
Total returns	1,345	785	808
Rejected or screened surveys	145	93	107
Final sample	1,200	692	701
Response rate	3.8%	3.7%	3.5%

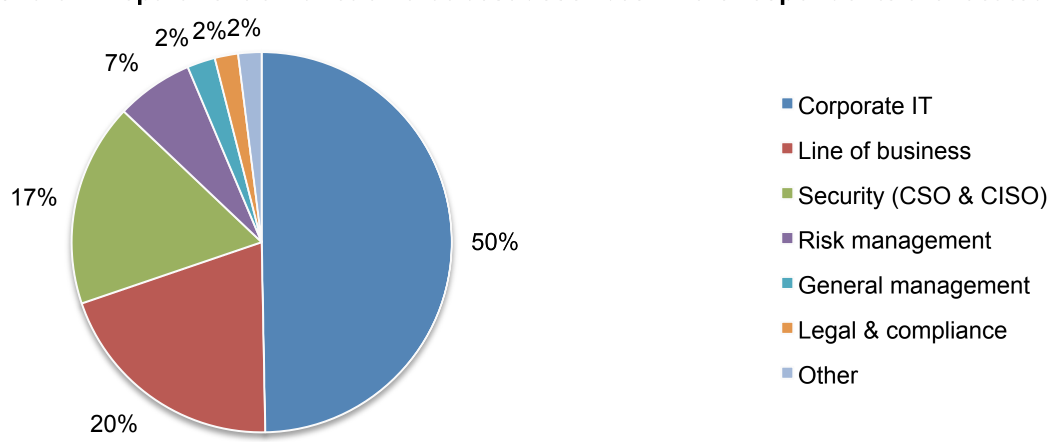
Pie Chart 1 reports the respondent's organizational level within participating organizations. By design, more than half of respondents (57 percent) are at or above the supervisory levels.

Pie Chart 1. Current position within the organization



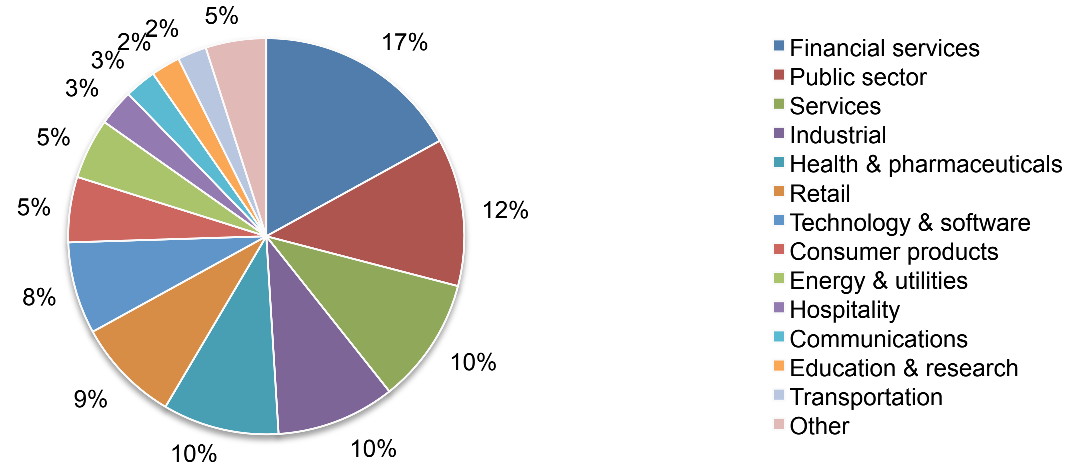
Pie Chart 2 reports that 50 percent of respondents reported their job function as being located within corporate IT. Twenty percent are located within the line of business.

Pie Chart 2. Department or function that best describes where respondents are located



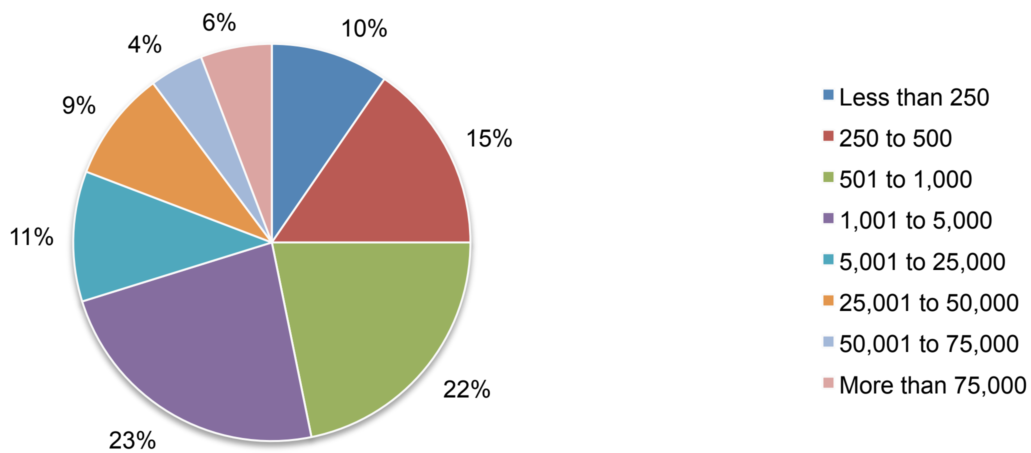
Pie Chart 3 reports the industry focus of respondents' organizations. This chart identifies financial services (17 percent) as the largest segment, followed by public sector (12 percent).

Pie Chart 3. Industry focus of respondents' organizations



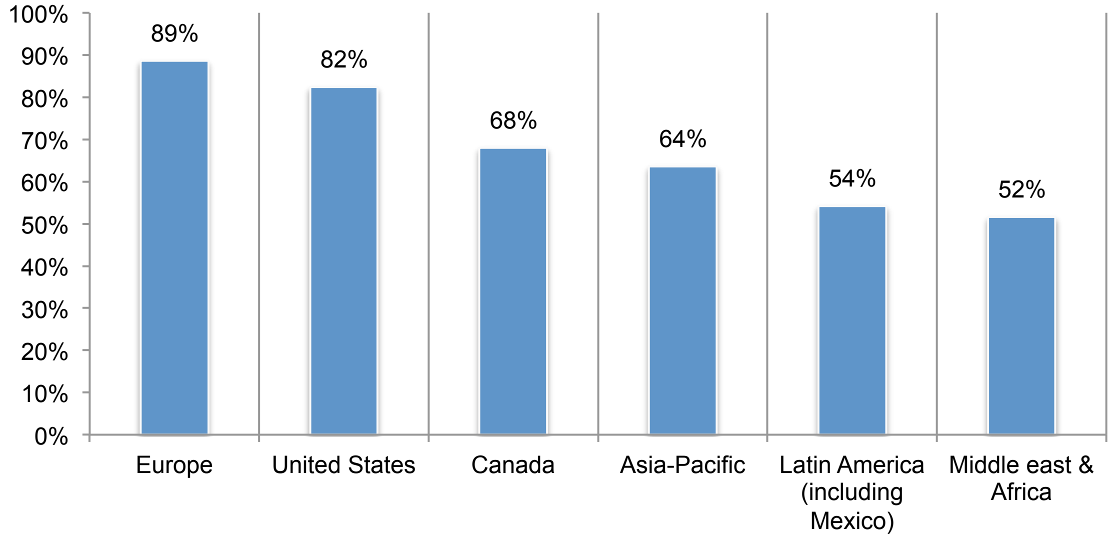
Fifty-three percent of respondents are from organizations with a global headcount of more than 1,000 employees, as shown in Pie Chart 4.

Pie Chart 4. Worldwide headcount of the organization



When asked where the employees are located, 89 percent of respondents indicated Europe, and 82 percent indicated the United States.

Figure 30. Location of employees
More than one response permitted



Part 4. Caveats to this study

There are inherent limitations to survey research that need to be carefully considered before drawing inferences from findings. The following items are specific limitations that are germane to most Web-based surveys.

- Non-response bias: The current findings are based on a sample of survey returns. We sent surveys to a representative sample of individuals, resulting in a large number of usable returned responses. Despite non-response tests, it is always possible that individuals who did not participate are substantially different in terms of underlying beliefs from those who completed the instrument.

- Sampling-frame bias: The accuracy is based on contact information and the degree to which the list is representative of individuals who are IT or IT security practitioners. We also acknowledge that the results may be biased by external events such as media coverage. Finally, because we used a Web-based collection method, it is possible that non-Web responses by mailed survey or telephone call would result in a different pattern of findings.

- Self-reported results: The quality of survey research is based on the integrity of confidential responses received from subjects. While certain checks and balances can be incorporated into the survey process, there is always the possibility that a subject did not provide accurate responses.

Appendix: Detailed Survey Results

The following tables provide the frequency or percentage frequency of responses to all survey questions contained in this study. All survey responses were captured between July 27, 2017 and August 28, 2017.

Survey response	FY2017	FY2015	FY2014
Total sampling frame	31,646	18705	19,915
Total returns	1,345	785	808
Rejected or screened surveys	145	93	107
Final sample	1,200	692	701
Response rate	3.8%	3.7%	3.5%

Part 1. Screening

S1. How familiar are you with threat intelligence collected and used by your company?	FY2017	FY2015	FY2014
Very familiar	35%	32%	29%
Familiar	46%	41%	38%
Somewhat familiar	20%	27%	33%
Not familiar (stop)	0%	0%	0%
Total	100%	100%	100%

S2. How are you involved in your company's cyber threat intelligence activities or process? Please select all that apply.	FY2017	FY2015	FY2014
User of threat intelligence	85%	81%	78%
Gatherer of threat intelligence	45%	45%	44%
Analyzer of threat intelligence	64%	62%	59%
Executive or manager in-charge of threat intelligence activities	26%	26%	20%
We do not use threat intelligence (stop)	0%	0%	0%
Total	219%	214%	201%

Part 2. Background

Q1a. Does your organization participate in an initiative or program for exchanging threat intelligence with peers and/or industry groups?	FY2017	FY2015	FY2014
Yes, fully participate	39%	36%	32%
Yes, partially participate (Skip to Q.1c)	45%	47%	47%
Do not participate (Skip to Q.1d)	17%	17%	21%
Total	100%	100%	100%

Q1b. If your organization fully participates, what are the main reasons? Please select only three choices.	FY2017	FY2015	FY2014
Improves the security posture of my organization	76%	75%	71%
Improves the security posture of the nation's critical infrastructure	66%	63%	64%
Reduces the cost of detecting and preventing cyber attacks	20%	22%	21%
Improves situational awareness	61%	60%	54%
Fosters collaboration among peers and industry groups	42%	48%	51%
Enhances the timeliness of threat data	12%	11%	16%
Makes threat data more actionable	22%	21%	24%
Other (please specify)	0%	0%	0%
Total	300%	300%	300%

Q1c. If your organization only partially participates in such an initiative, what are the main reasons keeping you from full participation? Please select only three choices.	FY2017	FY2015	FY2014
Cost	11%	10%	12%
Potential liability of sharing	58%	62%	55%
Anti-competitive concerns	28%	30%	30%
Lack of resources	58%	52%	51%
Lack of incentives	17%	14%	18%
No perceived benefit to my organization	26%	29%	40%
Slow, manual sharing processes	44%	43%	39%
Lack of trust in the sources of intelligence	57%	60%	53%
Other (please specify)	0%	0%	2%
Total	300%	300%	300%

Q1d. If your organization does not participate, what are the main reasons? Please select only three choices.	FY2017	FY2015	FY2014
Cost	21%	21%	25%
Potential liability of sharing	51%	58%	50%
Anti-competitive concerns	22%	23%	26%
Lack of resources	39%	37%	42%
Lack of incentives	8%	9%	15%
No perceived benefit to my organization	62%	60%	65%
Slow, manual sharing processes	37%	32%	24%
Lack of trust in the sources of intelligence	59%	59%	53%
Other (please specify)	0%	1%	0%
Total	300%	300%	300%

(Proceed to Part 5)

Q2. Please check **one** statement that best describes how threat intelligence is managed within your organization.	FY2017	FY2015	FY2014
Centralized control within IT	27%	27%	30%
Centralized control within non-IT business function	6%	8%	11%
Centralized control by a dedicated team	39%	35%	28%
Decentralized control by a dedicated team	6%	9%	9%
Decentralized control within the line of business	22%	21%	21%
Other (please specify)	0%	0%	1%
Total	100%	100%	100%

Q3a. Does your organization consolidate threat intelligence data from multiple solutions?	FY2017
We consolidate threat intelligence data from multiple solutions	42%
We have plans to consolidate threat intelligence from multiple solutions	30%
We do not consolidate threat intelligence	28%
Total	100%

Q3b. If your organization consolidates threat intelligence from multiple solutions, does the process utilize an automated platform?	FY2017
Yes	41%
No (mostly a manual process)	59%
Total	100%

Q4. What objective is most important to your organization's threat intelligence activities?	FY2017	FY2015
To prevent attacks	14%	21%
To quickly detect attacks	20%	30%
To improve incident response	21%	27%
To minimize false positives	8%	
Enhance overall security posture	22%	
All are equally important	16%	22%
Total	100%	100%

Part 3. Use of threat intelligence

Q5. How is threat intelligence being used and disseminated in the network? Please select all that apply.	FY2017
DNS/RPZ	38%
NGFW	32%
UTM	27%
IDS	57%
IPS	55%
Alerts	70%
Web portal	31%
SIEM	50%
Other (please specify)	4%
Total	363%

Q6. Who is using threat intelligence in your organization? Please select all that apply.	FY2017
Security operations	65%
Security analysts	79%
Threat intelligence team	72%
IT operations	32%
Lines of business	27%
Compliance/internal audit	21%
Other (please specify	0%
Total	296%

Q7a. Does your organization use free or paid sources of threat intelligence?	FY2017	FY2015 *
Mostly free sources [skip to Q9]	32%	68%
Mostly paid subscriptions	32%	54%
Combination of paid and free sources	35%	
Total	100%	

* This was a separate question in FY2015

Q7b. Why does your organization pay for threat intelligence?	FY2017	FY2015
Fee-based threat intelligence is better than free threat intelligence	79%	77%
It has proven effective in stopping security incidents	59%	68%
We don't have confidence in free sources of threat intelligence	44%	39%
Free sources have not enabled our organization to prioritize threats	30%	46%
Free sources have not been able to provide a comprehensive picture of the threat	33%	35%
Other	1%	2%
Total	246%	267%

Q8a. Approximately how many separate subscriptions does your organization have?	FY2017
1 to 5	18%
6 to 10	33%
11 to 15	27%
16 to 20	13%
21 to 25	6%
More than 25	2%
Total	100%
Extrapolated value	11.0

Q8b. The threat intelligence that we receive feeds the following security technologies in our organization. Please select all that apply.	FY2017
Firewall	65%
SIEM	48%
IDS/IPS	68%
DLP	38%
WAF	37%
Other (please specify)	1%
Total	257%

Q9a. Typically, what threat intelligence does your company use? Please select all that apply.	FY2017	FY2015
Threat indicators (proceed to 9b)	73%	75%
Indicators of compromise	63%	66%
Tactics, Techniques and Procedures Reports (TTPs)	30%	28%
Other (please specify	6%	5%
Total	172%	174%

Q9b. If you are using threat indicators, which threat indicators provide the most valuable information? Please select all that apply.	FY2017	FY2015
Malicious IP addresses	69%	64%
Malicious domains	58%	
Malicious host names	47%	
Malicious malware	56%	59%
Malicious URLs	60%	55%
Malicious files	46%	48%
Malicious mobile apps	38%	39%
Suspicious phishing and spoofing sites	48%	47%
Indicators of compromise	56%	66%
Newly observed domains	27%	
Other (please specify)	6%	7%
Total	511%	385%

Q10. Who is **most** responsible for deciding what threat intelligence sources are used?	FY2017	FY2015
Chief Information Officer	27%	34%
Chief Technology Officer	4%	6%
Chief Financial Officer	0%	1%
Chief Information Security Officer	15%	16%
Chief Risk Officer	6%	7%
Lines of business	13%	21%
Chief Security Officer	3%	
Leader of threat intelligence team	19%	
No one function is most responsible	14%	
Other (please specify)	0%	0%
Shared responsibility		15%
Total	100%	100%

Q11. Typically, how is threat intelligence received by your organization? Please select all that apply.	FY2017	FY2015	FY2014
Data feeds from external sources	65%	63%	57%
Threat advisories	49%	51%	49%
Internal collection and analysis	51%		
Exchange of threat intelligence with other companies	61%		
API to a cloud-based service	38%		
STIX/TAXI	49%		
Text files	32%		
Other (please specify)	0%	1%	4%
Intelligence briefs		32%	33%
Peer group discussion via phone, email or in-person		59%	54%
Total	345%	206%	197%

Q12. What are the main sources of threat intelligence received by your organization? Please select all that apply.	FY2017	FY2015	FY2014
Peers in other companies	58%	56%	58%
IT security vendors	66%	61%	55%
Open source	36%		
Law enforcement	27%	30%	33%
Government officials	14%	13%	15%
Industry associations	34%	31%	26%
Other (please specify)	2%	0%	2%
Total	237%	191%	189%

Q13. How would you describe the trend in the amount of intelligence data your organization has **consumed** over the past 12 months?	FY2017	FY2015
Significantly increasing	24%	
Increasing	36%	48%
Staying the same	35%	32%
Decreasing	4%	7%
Significantly decreasing	0%	
Unable to determine		13%
Total	100%	100%

Q14. Typically, what information is contained in threat intelligence reports? Please select all that apply.	FY2017	FY2015	FY2014
Threat indicators such as suspicious hostnames, IP addresses, file hashes	68%	61%	55%
Software vulnerability patch updates	56%	53%	48%
Incident response information	40%	35%	36%
Results of cybercrime investigations and prosecutions	23%	20%	22%
Tactics, Techniques & Procedure Reports (TTP)	31%	28%	
Other (please specify)	2%	1%	3%
Total	220%	198%	164%

Q15. Which vendors of threat intelligence do you consider industry leaders? Please select all that apply.	FY2017
LookingGlass	31%
Anomali	43%
NCA	4%
Symantec	51%
ThreatStop	27%
ThreatConnect	30%
ThreatQuotient	19%
CiscoTalos	48%
Cisco OpenDNS	26%
Infoblox	43%
Other (please specify)	10%
Total	332%

Q16. Typically, how frequently does your organization receive updates to threat intelligence?	FY2017	FY2015	FY2014
Real time (or near real time)	9%	9%	5%
Hourly	15%	12%	9%
Daily	18%	17%	15%
Weekly	23%	27%	29%
Bi-weekly	7%	6%	5%
Monthly	8%	9%	11%
Other or irregular intervals	21%	20%	26%
Total	100%	100%	100%

Q17a. How satisfied are you in the way your organization is able to obtain threat intelligence?	FY2017	FY2015	FY2014
Very satisfied	17%	12%	12%
Satisfied	24%	21%	18%
Somewhat satisfied	32%	32%	31%
Not satisfied	28%	35%	39%
Total	100%	100%	100%

Q17b. If you are only somewhat or not satisfied, what are the three top reasons?	FY2017	FY2015	FY2014
Information is not timely	66%	70%	66%
Information is not categorized according to threat type or attacker	24%	46%	50%
Information does not provide enough context to make it actionable	37%	45%	43%
Information does not provide adequate guidance on what to do	7%	14%	15%
Uncertainty about the accuracy of the threat intelligence	14%	33%	30%
Too many false positives	13%		
Requires verification every time an update is received	13%		
Too complex to apply to existing infrastructure	32%		
Requires manual processes to apply to existing infrastructure	23%		
Uncertainty about the trustworthiness of data sources	20%	36%	35%
Information does not provide a comprehensive picture of the threat	8%	15%	16%
Information is too complicated to ensure ease and speed of use	41%	41%	45%
Other (please specify)	0%	0%	0%
Total	300%	300%	300%

Part 4. Threat intelligence exchanging

Q18. In your opinion, what is the best way to exchange threat intelligence?	FY2017	FY2015	FY2014
Directly with other organizations	4%	6%	8%
Neutral commercial third party	24%		
With a threat intelligence exchange service	24%	29%	25%
With an industry organization that distributes to others	18%	21%	19%
With a trusted intermediary that shares with other organizations	21%	37%	34%
With a government entity that shares with other organizations	5%	6%	9%
No preference	2%	1%	5%
Total	100%	100%	100%

Q19. How would you describe the trend in the amount of intelligence data your organization has **exchanged** over the past 12 months?	FY2017	FY2015	FY2014
Significantly increasing	24%		
Increasing	30%	40%	34%
Staying the same	40%	41%	42%
Decreasing	5%	9%	11%
Significantly decreasing	0%		
Unable to determine		10%	13%
Total	100%	100%	100%

Q20. Approximately, when does threat intelligence become stale or not fresh? (Your best guess is welcome)	FY2017	FY2015	FY2014
Within seconds	19%	18%	16%
Within minutes	60%	60%	53%
Within hours	10%	11%	13%
Within days	7%	5%	11%
Within weeks	2%	3%	5%
Within months	2%	3%	2%
Other (please specify)	0%	0%	0%
Total	100%	100%	100%

Q21. How does your organization exchange threat intelligence? Please select all that apply.	FY2017	FY2015	FY2014
Through an industry group	33%	33%	28%
A threat intelligence consortium (e.g. Cyber Threat Alliance)	20%		
Through a vendor threat exchange service	48%	45%	53%
Informal peer-to-peer exchange of information	65%	65%	57%
With the government	13%		
Total	179%	143%	138%

Q22. What best describes your organization's role in **exchanging** threat intelligence?	FY2017	FY2015	FY2014
We mostly receive intelligence data	28%	35%	42%
We mostly provide intelligence data	22%	23%	22%
We verify threat intelligence	12%		
We receive and provide in nearly equal proportion	37%	42%	36%
Total	100%	100%	100%

Q23. Does your organization have a role in verifying the quality of threat intelligence sent or received?	FY2017
Yes, in threat intelligence we provide	24%
Yes, in threat intelligence we receive	36%
Yes, in threat intelligence we provide and receive	25%
No	15%
Total	100%

Q24a. How effective is the collaboration between your organization and others in the exchange of threat intelligence?	FY2017	FY2015	FY2014
Very effective	15%	15%	15%
Effective	18%	19%	18%
Somewhat effective	37%	37%	35%
Not effective	30%	29%	32%
Total	100%	100%	100%

Q24b. If not very effective or effective, why is the collaboration not effective? Please select all that apply.	FY2017	FY2015	FY2014
Insufficient resources	46%	44%	49%
Lack of technologies or tools	55%	49%	55%
Concerns about trust	49%	52%	50%
Concerns about liability	19%		
Concerns about risk	21%		
Concerns about threat information becoming public	27%		
Concerns about regulations	22%		
Lack of leadership in overseeing collaboration	30%	27%	29%
Silos among IT departments and lines of business	65%	69%	68%
Other (please specify)	2%	1%	2%
Total	336%	242%	253%

Part 5. Measuring Quality of Threat Intelligence

Q25. How effective is your company's defense against cyber attacks? Please use the following scale from 1 = low effectiveness to 10 = high effectiveness.	FY2017	FY2015
1 to 2	10%	11%
3 to 4	16%	15%
5 to 6	33%	36%
7 to 8	23%	23%
9 to 10	18%	15%
Total	100%	100%
Extrapolated value	5.98	5.82

Q26. How effective is your company's process for using actionable intelligence from **internal sources** (such as configuration log activities) to predict malicious activities? Please use the following scale from 1 = low effectiveness to 10 = high effectiveness.	FY2017	FY2015
1 to 2	18%	21%
3 to 4	19%	21%
5 to 6	35%	35%
7 to 8	19%	13%
9 to 10	8%	10%
Total	100%	100%
Extrapolated value	5.22	4.90

Q27. How effective is your company's process for using actionable intelligence from **external sources** (such as vendor-supplied threat feeds) to predict malicious activities? Please use the following scale from 1 = low effectiveness to 10 = high effectiveness.	FY2017	FY2015
1 to 2	15%	23%
3 to 4	25%	25%
5 to 6	31%	31%
7 to 8	16%	13%
9 to 10	14%	8%
Total	100%	100%
Extrapolated value	5.28	4.66

Q28. How accurate is the intelligence received by your organization? Please use the following scale from 1 = not accurate to 10 = very accurate.	FY2017	FY2015	FY2014 *
1 to 2	11%	13%	16%
3 to 4	19%	24%	25%
5 to 6	34%	32%	29%
7 to 8	25%	19%	21%
9 to 10	10%	12%	9%
Total	100%	100%	100%
Extrapolated value	5.60	5.36	5.14

Q29. How timely is the intelligence received by your organization? Please use the following scale from 1 = slow to 10 = fast (real time).	FY2017	FY2015
1 to 2	21%	33%
3 to 4	23%	23%
5 to 6	31%	23%
7 to 8	15%	12%
9 to 10	9%	9%
Total	100%	100%
Extrapolated value	4.84	4.32

Q30. How actionable is the intelligence received by your organization? Please use the following scale from 1 = not actionable to 10 = very actionable.	FY2017	FY2015	FY2014 *
1 to 2	15%	19%	21%
3 to 4	20%	23%	27%
5 to 6	33%	25%	24%
7 to 8	18%	23%	20%
9 to 10	13%	11%	8%
Total	100%	100%	100%
Extrapolated value	5.392	5.24	4.84

Q31. What attributions make threat intelligence actionable (e.g., high quality)? Please select the top three attributes	FY2017	FY2015 Average rank *	FY2014 Average rank *
Timeliness	50%	1.41	1.33
Ability to automatically apply it to security infrastructure	28%		
Ability to integrate it with the security infrastructure	28%		
Trustworthiness of the source	25%	2.67	3.01
Relevance to my industry	30%	4.32	4.56
Ability to prioritize	48%	2.00	1.74
Clear guidance on how to resolve the threat	33%	5.37	5.13
Sufficient context	23%	5.70	5.48
Ability to implement the intelligence	35%	2.89	2.87
Other	1%		
Total	300%		

* FY2014 & FY2015 respondents ranked their responses

Q32a. Do you have metrics to evaluate the quality of the threat intelligence provider and the information received?	FY2017
Yes	41%
No	59%
Total	100%

Q32b. If yes, what metrics are you using?	FY2017
Consolidates threat intelligence on a single platform	39%
Timely delivery of threat intelligence	53%
Trustworthiness of the source of threat intelligence	20%
Minimum number of false positives	49%
Ability to automatically apply threat intelligence to security infrastructure	30%
Relevance of threat intelligence to my industry	25%
Ability to prioritize threat intelligence	61%
Clear guidance on how to resolve the threat	24%
Provides sufficient context	27%
Ability to implement the intelligence	49%
Other (please specify)	3%
Total	380%

Q32c. If yes, how confident are you in the use of metrics to evaluate the quality threat intelligence?	FY2017
Very confident	19%
Confident	20%
Somewhat confident	21%
Not confident	40%
Total	100%

Q33a. Do you use a risk score to evaluate threat intelligence?	FY2017
Yes	40%
No	60%
Total	100%

Q33b. If yes, are you taking the following into account when doing the calculation? Please check all that apply.	FY2017
Confidence in the source and veracity of the threat indicator	58%
Indicator type (format, targeted usage platform, targeted technology)	53%
Adversary attributes	29%
Industry the threat is targeting	31%
Age of threat	46%
Technical impact (loss of confidentiality, integrity, availability and accountability)	45%
Business impact (financial damage, reputation damage, non-compliance, privacy violation)	45%
Is it actionable	60%
Confidence reported by multiple sources	52%
Threat score	39%
Has been reported as a false positive	34%
Exploitability	25%
Remediation level	28%
Other (please specify)	4%
Total	548%

Q34a. Does your threat intelligence program define and rank levels of risk?	FY2017
Yes	45%
No	55%
Total	

Q34b. If yes, what are indicators of risk? Please check all that apply.	FY2017
Overall decline in the quality of the provider's services	62%
Discovery that the provider is using a subcontractor that has access to our company's information	38%
Uncertainty about the accuracy of threat intelligence	66%
Poor decisions because of accuracy of the threat intelligence	51%
Poor decisions because of the lack of trustworthiness	47%
Poor decisions because of complications	35%
Turnover of the vendor's key personnel	43%
Other (please specify)	5%
Total	

Q34c. If yes, how often are the risk levels updated?	FY2017
Bi-weekly	
Monthly	
Quarterly	
Every six months	
Annually	
Every two years	
As needed	
Never	
Total	

Part 6. Investigation of threats

Q35a. Did your company have a material security breach in the past 24 months?	FY2017	FY2015
Yes	50%	47%
No	47%	49%
Unsure	3%	4%
Total		100%

Q35b. If yes, do you believe that threat intelligence could have prevented or minimized the consequences of the attack?	FY2017	FY2015	FY2014 *
Yes	66%	65%	61%
No	34%	18%	19%
Unsure	0%	17%	20%
Total	100%	100%	100%

** This was not a two part question in FY2014 Q3 & Q4*

Q36. How are threats investigated?	FY2017
Using manual processes	46%
Using automated processes	47%
Using machine learning and artificial intelligence tools	20%
Hybrid of manual and automated processes	32%
Other (please specify)	4%
Total	149%

Q37. Approximately, how many hours each week are spent investigating threats? Please estimate the aggregate hours of the IT and IT security (SecOps) team.	FY2017
Less than 5	1%
5 to 10	6%
11 to 25	13%
26 to 50	14%
51 to 100	22%
101 to 250	9%
251 to 500	9%
More than 500	27%
Total	100%
Extrapolated value	233.30

Part 7. Role and organizational characteristics

D1. What organizational level best describes your current position?	FY2017	FY2015	FY2014
Senior Executive	3%	2%	2%
Vice President	2%	2%	1%
Director	14%	17%	16%
Manager	22%	21%	23%
Supervisor	16%	15%	16%
Technician	34%	34%	35%
Staff	7%	6%	5%
Contractor	2%	3%	2%
Other	0%		
Total	100%	100%	100%

D2. Check the department or function that best describes where you are located in your organization.	FY2017	FY2015	FY2014
General management	2%	3%	2%
Finance & accounting	1%	1%	0%
Legal & compliance	2%	2%	2%
Corporate IT	50%	53%	56%
Line of business	20%	21%	20%
Human resources	0%	0%	0%
Risk management	7%	6%	5%
Security (CSO & CISO)	17%	14%	15%
Other	1%		
Total	100%	100%	100%

D3. What industry best describes your organization's industry focus?	FY2017	FY2015	FY2014
Agriculture & food service	1%	0%	1%
Communications	3%	2%	3%
Consumer products	5%	5%	4%
Defense & aerospace	1%	1%	1%
Education & research	2%	2%	2%
Energy & utilities	5%	5%	5%
Entertainment & media	1%	1%	2%
Financial services	17%	19%	20%
Health & pharmaceuticals	10%	12%	11%
Hospitality	3%	4%	3%
Industrial	10%	9%	7%
Public sector	12%	12%	14%
Retail	9%	9%	9%
Services	10%	8%	8%
Technology & Software	8%	8%	6%
Transportation	2%	2%	3%
Other	2%	1%	1%
Total	100%	100%	100%

D4. Where are your employees located? Please choose all that apply.	FY2017	FY2015	FY2014
United States	82%	100%	100%
Canada	68%	84%	87%
Europe	89%	80%	78%
Middle east & Africa	52%	55%	56%
Asia-Pacific	64%	69%	69%
Latin America (including Mexico)	54%	64%	65%

D5. What is the worldwide headcount of your organization?	FY2017	FY2015	FY2014
Less than 250	10%	10%	11%
250 to 500	15%	16%	15%
501 to 1,000	22%	20%	21%
1,001 to 5,000	23%	23%	22%
5,001 to 25,000	11%	14%	15%
25,001 to 50,000	9%	9%	8%
50,001 to 75,000	4%	4%	3%
More than 75,000	6%	4%	5%
Total	100%	100%	100%

Please contact research@ponemon.org or call us at 800.887.3118 if you have any questions.

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Advancing Responsible Information Management

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We uphold strict data confidentiality, privacy and ethical research standards. We do not collect any personally identifiable information from individuals (or company identifiable information in our business research). Furthermore, we have strict quality standards to ensure that subjects are not asked extraneous, irrelevant or improper questions.