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Women in IT Security Project Management

Objective of this paper is to determine if there is a common skill set, besides technical expertise, which plays an important role in thriving within the IT security profession as well as within IT security project management. This study will further ascertain how well equipped women are to excel in IT security project management.

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Women in IT Security Project Management

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Abstract

Objective of this paper is to determine if there is a common skill set, besides technical expertise, which plays an important role in thriving within the IT security profession as well as within IT security project management. This study will further ascertain how well equipped women are to excel in IT security project management.

Research indicates the number of women specializing in the IT security profession is very low. I have long noticed that fewer women have explored opportunities to specialize in IT security project management. In this study, I have tried to determine if IT security project management is a viable career choice for women. If so, do they have what it takes to be a successful IT Security Project Manager? I would like to emphasize that IT profession cannot be generalized based on gender. No conclusion has been drawn to indicate if one sex is better than the other in any of the subsets within IT field. A sincere effort has been made to encourage more women into IT security and IT project management. This should fit into the broader industry initiatives to address the gender imbalance in technology.

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1. Introduction

As this paper will show, much of the prior research regarding women in technology fields has been focused on overall IT workforce studies. However, there has been little gender analysis within the subset of the IT security profession. Recent studies assert that women constitute a very small percentage of IT security workforce (SANS, 2008; SC Magazine and Millward Brown, 2008; Carey, 2006; Lee, Bagchi-Sen, Rao, & Upadhyaya, 2009).

Various studies emphasize the importance of IT security project management for successful realization of security goals of an organization (Ellison, 2006; Gentile & Collette, 2007). This paper will provide information about specific skills, which may have developed or acquired within the IT security field. These skills play a critical role in IT security project management as well. This paper will not reference technical proficiency, but it assumes the reader knows about IT security fundamentals.

Leadership skills that are heavily utilized in IT security can help an individual excel in management of IT security projects. Attributes like communication and interpersonal skills, team-building acumen and motivational influencing are critical for a successful career in IT security (CISO Skill Set, 2009; Lee, Bagchi-Sen, Rao, & Upadhyaya, 2009). Similarly, several studies assert that ability to direct and motivate are necessary for the success of a project (Gillard, 2009; PMI, 2008; Schwartz, 2007).

Now that we understand that leadership qualities are important for both IT security and project management, it can be inferred that leadership skills are an important ingredient for a successful career in IT security project management.

There is one question that now remains to be answered in this paper; in fact, details discussed so far are meant to build appropriate background for this inquiry "Do women possess these critical leadership skills?". It is interesting to note that research from fields of psychology, business and medicine indicate that women not only possess these skills, they generally outscore men in most of the attributes that make an effective leader for today's world (Eagly, Johannesen-Schmidt, & van Engen, 2003; Ibarra & Obodaru, 2009; Mckinsey, 2008; Oliwenstein, 2009).

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I hope that this paper will provide a useful insight into IT security field and aid in articulation of a clear path for advancement of qualified women within IT security project management.

2. Women, Security, Project Management - how does this all fit together?

This paper will first explore various studies regarding women in the IT security field. It will provide evidence to support the importance of project management in IT security. Then it will determine if leadership skills play an important role in both IT security and project management; leading to the conclusion that these are essential to achieve success in enterprise security program management. Finally, it will evaluate how women score in leadership skills and if they can be effective IT security project managers. In order to arrive at a logical conclusion, this paper has been broken into five key points:

2.1 What is the gender composition of the IT security profession? Why should women choose to join IT security?

2.2 Is project management important for the success of enterprise security? Is it important to manage enterprise security initiatives as projects? Can project management help an organization with successful deployment of security solutions?

2.3 Is there a common set of crucial skills required for success in the information security profession and project management? Are leadership skills important for IT security project management?

2.4 How do women score in leadership skills?

2.5 Can women transition successfully from IT Security into IT Security Project Management?

2.1 Women in IT Security

Women account for a small percentage of the total IT security workforce. This is consistently highlighted by results of industry surveys conducted over the last three years.

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1. In an IT security workforce survey conducted by a leading industry publication, only 13 percent of the respondents were females. In a similar survey conducted in 2007, 11 percent of respondents were women (SC Magazine 2008 Salary and Career Survey).

2. SANS salary and certification survey for 2008 confirms that "IT security remains a male-dominated industry" (p 3). Only 17 percent of the respondents to their annual salary and certification survey were women.

3. An annual workforce study conducted by International Information Systems Security Certification Consortium (ISC2), a leading information security certification and education organization, determined that no significant increase has been established in the number of women choosing information security as a profession. Compared with the surveys conducted in the previous two years, slightly more women were represented in the annual survey for 2006. 13 percent of respondents in 2006 survey were women versus 10 percent in 2005 and 11 percent in 2004 (Carey, 2006). ISC2 acknowledged that gender analysis of IT security employment was not represented in the annual workforce study conducted in 2008.

4. In a very recently completed study, supported in part by National Science Foundation Grant, only 8.4 percent of respondents in the industry-focused sample group were female. Further analysis in the same study indicates that only 26.3 percent of respondents in the women-focused sample groups are employed in IT security sector (Lee, Bagchi-Sen, Rao, & Upadhyaya, 2009).

The lower percentage of women within information security field is at least partially related to the declining percentage of women within the IT field itself. According to the ITAA (2005) study, women comprised 41 percent of the IT sector in 1996. That percentage fell to 32.4 percent in 2004. In contrast to this fact, the number of women in US labor force actually gained 0.5 percent by rising from 46 to 46.5 percent, during the same period.

IT security workforce studies indicate that the percentage of women in the IT security field has remained stable for last few years, leading to the conclusion that there is no noticeable gendered attrition in this section of the IT field.

There are some very attractive reasons to join IT security profession. IT Security is a complex, multidisciplinary and challenging profession. It is an evolving field and touches almost everything within IT. Security needs to be built into operating systems and software. Hardware

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needs to be secured and perimeters must be protected. Most organizations have a significant web presence to stay competitive in today's world. Physical boundaries are no longer the only borders that need to be protected. A malicious user thousands of miles across the globe may be able to gain unauthorized access to sensitive company data if appropriate IT security controls are not put in place. According to Richardson (2008), financial fraud has been reported to be the most expensive computer security incident, followed by the cost of dealing with "bot" computers within an organization. The IT security profession provides an opportunity to connect with the business community. Security professionals can influence business decisions to ensure the company's assets and reputation are well protected. Due to constantly evolving technologies, the IT security profession is showing no signs of slowing down. There is an increasing demand in IT security, for talented and dedicated people, to come up with innovative solutions to protect the individuals and organizations from computer related crime (Outstanding Women in Computer Security: A Panel).

There are many economic benefits as well, that may encourage entry into the IT security field:

1. As per the results of survey conducted by SC magazine and Millward Brown (2008), "IT security initiatives are ranking higher on the list of overall business priorities for most companies. The upshots are escalating salaries and additional hires".

2. A survey conducted by SANS institute reveals that information security professionals earn well over the national average salary of $37,440 for US workers. Only 1.65% of respondents earn less than US$40,000 annually while over 38% earn US$100,000 or more per year (SANS, 2008).

3. IT security workforce study conducted by ISC2 determined that a US based IT security professional with 5 or more years of experience earns an average salary of $81,000 (Frost and Sullivan, 2008).

2.2 Role of Project Management in Enterprise IT Security

Enterprise security programs may be comprised of multiple projects, based upon an organization's size and sector. An IT security project may be initiated to address OS security, application security, network security, data security, identity management, intrusion detection and prevention, and security incident management.

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A security initiative is undertaken by an organization to address risk and compliance issues. A well-defined security program can increase collaboration between security and other teams as they all come together and join forces as a formal project team. If the project manager possesses necessary skills to lead a team composed of diverse backgrounds, she can steer combined efforts towards creation of a secure solution. Effective utilization of project management as a "touch-point" for the security program can highlight the role of security as an enabler of business processes (Gentile & Collette, 2007).

Higher learning institutions have recognized convergence of IT security and project management and have added related courses to their curricula. These courses prepare IT security professionals for effective utilization of project management techniques in enterprise security management. University of Houston offers a Master of Science in Technology Project Management with an emphasis in Information Security (tech.uh.edu). The SANS Technology Institute offers a course with focus on Project Management for Security professionals (SANS Technology Institute).

Mike Celero (2006) has offered an interesting explanation for "convergence" of IT security and project management fields. Pioneer institutions in both fields have divided essential knowledge into well-defined domains, for example, ISC2 defined the Common Body of Knowledge (CBK) domains for IT security professionals, and Project Management Institute (PMI) has defined Project Management Body of Knowledge (PMBOK) domains. An IT security professional is widely expected to be proficient in CBK domains that make up the Certified Information Systems Security Professional (CISSP) certification. A project manager exhibits expertise in PMBOK domains via Project Management Professional (PMP) certification. Interestingly, an IT security project manager must be an expert in both sets of domains and can become an office hero by marshalling her knowledge of these domains for deployment of the security program.

In order to reap the benefits of managing a security program with project management methodologies, an organization has 4 options:

- Security team establishes an internal project office to manage security projects.
- Align security project management with corporate PMO.
- Utilize services offered by 3rd parties.

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- If none of the above options is viable due to business or logistical constraints, atleast basic project management techniques should be utilized.

Consulting companies like Gotham Digital Science market the combination of project management experience and IT security skills that their professionals bring to the table for effective management of enterprise security initiatives (Gotham).

2.3 Common link between IT security and project management - Leadership skills?

"People ask the difference between a leader and a boss. The leader works in the open, and the boss in covert. The leader leads, and the boss drives."

- Theodore Roosevelt

In this section, research has been conducted to determine if leadership skills are crucial for a successful career in information security as well as project management.

2.3.1 Leadership skills in Project Management

"Successful projects require strong leadership skills" (PMI, 2008). Leadership is often referred to as the human side of project management and is considered critical for the success of any project. Project management is not only about managing the task list; it is primarily about managing the people assigned to the project team. You may have the cream of subject matter experts (SMEs) assigned to your dream project, but chances of success will be slim unless the entire team fully understands that the project aligns with the "mission, vision and values" of their organization (Glen, 2003).

Schwartz (2007) states "Effective project managers can translate essential project information into both technical terminology and straight-up business talk". The successful project manager constantly works for the success of the project by utilizing multi-faceted leadership skills. A project manager must be adept at fulfilling the roles of an effective communicator, mentor, facilitator, problem-finder, and out-of-the-box solution provider. It can be loosely compared to the skills that a parent would utilize to deal with a toddler throwing tantrums at the dinner table or a teenager reluctant to comply with house rules.

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In a study conducted by Posner (1987), communication and leadership skills were rated as essential skills for a successful project manager. A project manager needs to adopt different styles of leadership, based upon the situation at hand. 84 percent of respondents rated communication skills as essential skills for project management. 68 percent of respondents also agreed that various other attributes such as vision, positive attitude, analysis, and team-building have a tremendous impact on the outcome

2.3.2 Leadership skills in IT Security

Information security professionals do not work in a vacuum. They are constantly in touch with the business to determine ways to safeguard the organization's security. Security and business units need to work closely to ensure that the organization's name does not end up in the headlines due to a security breach. To establish an effective relationship with the business, the security professional needs a relevant combination of communication and interpersonal skills, along with technical knowledge. An IT security professional must be able to present technical analysis of a security threat in a format that is clearly understood by the business team while resolving any conflicts that may arise in terms of design and security (Lee, Bagchi-Sen, Rao, & Upadhyaya, 2009). An IT security professional should come across as an enabler of business initiatives. She should strive to build a constructive relationship with the business (Hayes, Kotwica, & Blades, 2008). Results of the following surveys highlight the importance of leadership skills for IT security professionals:

1. Respondents to the annual survey conducted by ISC2, cited communication skills as one of the top five skills needed to be a successful information security professional (Frost and Sullivan, 2008).

2. In a CISO survey, oral and written communication skills, teamwork, collaboration, and influencing were all rated "very important" for successfully leading an information security organization (Fitzgerald & Krause, 2007).

IT security is a multidisciplinary field. Technology is changing at an ever-increasing pace. The IT security professional must not only understand the security side of emerging technologies, she must be savvy enough to present the bits and bytes to the business community in an effective manner, preferably accompanied by dollar figures. An IT security practitioner

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should be able to convert tech talk into business talk without marginalizing the security impact and at the same time take precautions to avoid alienating the business community. A panel to determine the essentials skills for a Chief Information Security Officer (CISO) unanimously agreed the future CISO would be a great communicator, consensus builder, and a change agent (CISO Skill Set, 2009).

2.4 Do women possess leadership skills?

A number of studies have reported that women are in a better position to lead than men. These studies indicate that organizations may be wasting their existing pool of talent if they do not recognize and utilize leadership skills in women.

"We found women were slightly more likely than men to have a 'transformational' leadership style, which organizational researchers have found is especially effective in today's work environment." This has been stated by Ms. Eagly in a comprehensive meta-analysis published in the Psychological Bulletin (Eagly, Johannesen-Schmidt, & van Engen, 2003). Results of following studies also affirm these findings:

1. In a research published in Harvard Business Review, women outscored men in seven key leadership competencies out of ten. These competencies are Energizing, Designing and Aligning, Rewarding and Feedback, Team Building, Outside Orientation, Tenacity and Emotional Intelligence. Men scored higher in three out of ten competencies: Envisioning, Global Mindset and Empowering (Ibarra & Obodaru, 2009).

2. In a related research conducted by Mckinsey, women scored high on five key leadership criteria out of nine. Women use People Development, Expectations and Rewards, Role Model, Inspiration, and Participative Decision Making behaviors more frequently than men do. Both genders use equally often Intellectual Stimulation, and Efficient Communication (Mckinsey, 2008).

What does Science say?

Extensive medical research is consistently being conducted to determine the gender differences in the human brain. According to the most recent study (Oliwenstein, 2009); brain scientists agree that the female brain is better at:

a) Networking - Female brains have more space between neurons, which means more connections.

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b) Communication - Two key language centers are larger in females than males.

c) Interpersonal skills - The left side of the female brain stays more alert, overseeing internal and interpersonal matters.

All of these skills play an important role in developing the leadership qualities; hence, this medical study supports the argument that female brains are well equipped for leadership roles.

A typical woman manager prefers leading over ruling. She tends to have a more interactive relationship with her team via active engagement and open dialogue. She does not find the need to control the team inorder to achieve desired results. A woman manager embraces inclusive and transformational style of leadership. She is willing to listen to the viewpoint of other people, actively asking questions for clarification and strives to address the concerns of team members. She does not hesitate to accept ideas, even if they differ from her own plan but are a better fit in the bigger picture (Tremmel, 2003). Women leaders tend to be persuasive, flexible, collaborative, mentors, role models, empathetic sociable and assertive (Caliper, 2005).

2.5 Can women transition successfully into IT Project Management?

IT security and IT project management demand certain skills to be present; irrespective of sex. IT project management has opened up gates for women who aspire to have a career in IT but prefer to play a greater role in collaboration of resources to build a creative, useful and secure product/service. It may also include women who have a profound interest in technology; but are not into coding or programming. IT is a very broad profession and there are many options to consider when choosing a career in it. A woman may choose the route that encompasses multiple streams like networking, system architecture, system administration. IT security is an integral piece of all the streams and also provides better prospects for utilization of soft skills. Transformational style of leadership is very important in IT security project management due to the progressive nature of technology and the multiple teams that are touched by security design. In order to make an informed decision, an IT security project manager must collect and analyze facts and opinions from multiple sources. Equipped with technical knowledge and well-utilized leadership skills, female IT security professional can venture into enterprise security management as well as IT Project management. It's worth mentioning that she must learn and

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train on other aspects of project management which are very well defined in the PMBOK domains (PMI, 2008).

3.0 How to encourage women into IT Project Management?

Before trying to get into IT project management, women first need to be encouraged to join IT. There is a gender imbalance in overall IT field, which is at least partially related to the dwindling percentage of women in Science, Technology, Engineering, and Math (STEM). A multi-pronged approach must be implemented to eliminate this gender gap.

3.1 Build a strong foundation.

Girls tend to start drifting away from science and technology during middle and high school years. My personal observation has been that parents are to be partly blamed for this behavior. We tend to draw the conclusion for them when we, as parents, succumb to media pressure, and social expectation, and end up buying all pink for daughter, and all blue for son. We decide to buy dollhouse for daughter and legos set for son. In a way, we are giving subtle hints to our children that it's okay to generalize on the basis of gender. Ms Eliot , author of "Pink Brain, Blue Brain" states "Girls are plenty competitive, but it's usually over appearance and thinness. Girls should be taught that competition can be a good thing but should be channeled into athletic, academic or other achievement, rather than beauty or social climbing"(Shelley, 2009). Parents must provide equal encouragement to daughters to pursue STEM courses. Due to biological changes at puberty, girls may require additional support and motivation to help concentrate in math and science courses.

Digigirlz program (Microsoft) has been designed to give high school girls an insight into technology as a career option. High school girls are provided with a learning opportunity via hands-on classes and technology workshops.

Half the battle will be won if schools succeed in sparking the interest of girls in science and technology courses. A support network in colleges can fortify this interest and motivate female students to pursue advanced education in IT and other technology fields. Institutions like Carnegie Mellon strive to achieve this through "mentoring, outreach, and social events and activities".

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3.2 What can organizations do?

An organization can help women join IT project management by providing an environment conducive to the development of knowledge, skills, personality and attitude for that particular job. Regular training sessions are extremely important to keep employees abreast of emerging technology. Formal and informal mentoring can go a long way in provding guidance and motivation to the aspiring leaders within an organization. Women tend to look up to a female role model, but she should also feel comfortable to reach out to her male counterparts for technical support and knowledge-sharing. Managers in an organization should receive professional training to effectively manage diverse teams. The single most important thing that a manager can do is treat everyone equally. Flexible work schedule and tele-commuting are highly valued by working parents. IT Project managers may be in a better position to utilize these benefits if their project team is spread across multiple locations.

3.3 What can women do?

One of the most important things that women must do is to truly believe that they are as talented as their male counterparts. It's important to prove expertise with an industry certification. Project Management Professional(PMP) certification is widely recognized in US and internationally. A woman will find it easier to gain respect from her counterparts if she has an equal footing on technical ground. A female project manager should refrain from trying to act like men to gain acceptance into the male-dominated team or organization. At the same time, she should also firmly establish her authority and decision-making power. Soft skills can be utilized effectively to bring the project team together in a collaborative and harmonious manner. Mentoring plays a very important role in career development. Generally, women who have well-achieved their career goals are enthusiastic about mentoring women who are working towards their goals. Based upon work experience, an aspiring project manager should volunteer to assist a senior project manager or offer to lead an IT project. She should not hesitate to reach out to program managers and cross-functional managers, irrespective of gender, because they can help her navigate the career maze more effectively. Networking is another tool which can be extremely useful for a successful career in project management. People feel comfortable to work with project managers with whom they already share a degree of acquaintance. Various special interest groups exist that are focused on providing guidance and support to women in IT Project

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management. Women in Technology International (WITI) and Women in Project Management Special Interest Group (WPMSIG) are great resources that cater to the needs of women in technology and project management respectively. Scumaci (Designed for Success, 2008,) sums up effectively with this statement: "Think like a project manager, and remember, the most important project you manage is you."

4.0 Conclusion

IT security is critical for any organization that utilizes computers to do business. Organizations must understand that security should be baked-in; it should not be an after-thought or an add-on to the pre-defined IT design for business solution. IT security practitioners must act as enablers of the business objectives when they propose solutions to address risks associated with the business initiatives and processes. Project management should be one of the pillars on which an enterprise security solution is built. There is a scarcity of female leaders in IT as well as an overall gender imbalance in the IT workforce. This is partly due to the lesser number of females pursuing STEM courses in high schools and colleges.

When I started to do the analysis of skills which may be common in these two subsets, namely IT security and IT project management within IT profession, I was primarily driven by my personal experience since I have the opportunity to work in both the subsets. I was delighted to determine that my observation is validated by various studies. Leadership skills play an important role in IT security as well as IT project management. What impressed me more was the growing evidence that women may actually have better leadership skills. But we must not assume that women (or men) are always better leaders; and good leaders always make good project managers. I would like to remind readers that skills vary within each gender. An important step is to identify the required skills. Then everyone, irrespective of gender, can streamline their efforts to excel in those skills to achieve professional success. I have personally been lucky enough to have worked with men and women, who are wonderful technologists, managers, mentors, role models, and above all, great human beings.

Based on the literature and research studies available, it can be surmised that women who currently possess technical expertise in the IT security field are also in a unique position to make use of their transformational leadership style to succeed within the IT security project

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management field. This may benefit them in terms of career enhancement and higher level of job satisfaction. At the same time, it will also benefit their management by helping the team to be better equipped to protect the organization against security threats and achieve higher rate of success in completion of projects.

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SANS Network Security 2015	Las Vegas, NVUS	Sep 12, 2015 - Sep 21, 2015	Live Event
SANS Seoul 2015	Seoul, KR	Sep 14, 2015 - Sep 19, 2015	Live Event
SANS Tallinn 2015	Tallinn, EE	Sep 21, 2015 - Sep 26, 2015	Live Event
SANS Baltimore 2015	Baltimore, MDUS	Sep 21, 2015 - Sep 26, 2015	Live Event
Data Breach Investigation Summit & Training	Dallas, TXUS	Sep 21, 2015 - Sep 26, 2015	Live Event
SANS Perth 2015	Perth, AU	Sep 21, 2015 - Sep 26, 2015	Live Event
SANS ICS Amsterdam 2015	Amsterdam, NL	Sep 22, 2015 - Sep 28, 2015	Live Event
SANS Bangalore 2015	Bangalore, IN	Sep 28, 2015 - Oct 17, 2015	Live Event
SANS Seattle 2015	Seattle, WAUS	Oct 05, 2015 - Oct 10, 2015	Live Event
SANS DFIR Prague 2015	Prague, CZ	Oct 05, 2015 - Oct 17, 2015	Live Event
SOS: SANS October Singapore 2015	Singapore, SG	Oct 12, 2015 - Oct 24, 2015	Live Event
SANS Tysons Corner 2015	Tysons Corner, VAUS	Oct 12, 2015 - Oct 17, 2015	Live Event
SANS Gulf Region 2015	Dubai, AE	Oct 17, 2015 - Oct 29, 2015	Live Event
SANS Tokyo Autumn 2015	Tokyo, JP	Oct 19, 2015 - Oct 31, 2015	Live Event
SANS Cyber Defense San Diego 2015	San Diego, CAUS	Oct 19, 2015 - Oct 24, 2015	Live Event
SANS Sydney 2015	Sydney, AU	Nov 09, 2015 - Nov 21, 2015	Live Event
SANS South Florida 2015	Fort Lauderdale, FLUS	Nov 09, 2015 - Nov 14, 2015	Live Event
SANS London 2015	London, GB	Nov 14, 2015 - Nov 23, 2015	Live Event
Pen Test Hackfest Summit & Training	Alexandria, VAUS	Nov 16, 2015 - Nov 23, 2015	Live Event
SANS Hyderabad 2015	Hyderabad, IN	Nov 24, 2015 - Dec 04, 2015	Live Event
SANS Cape Town 2015	Cape Town, ZA	Nov 30, 2015 - Dec 05, 2015	Live Event
SANS San Francisco 2015	San Francisco, CAUS	Nov 30, 2015 - Dec 05, 2015	Live Event
Security Leadership Summit & Training	Dallas, TXUS	Dec 03, 2015 - Dec 10, 2015	Live Event
SANS Milan 2015	OnlineIT	Sep 07, 2015 - Sep 12, 2015	Live Event
SANS OnDemand	Books & MP3s OnlyUS	Anytime	Self Paced