Corporate Cybersecurity: A Serious Game

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Introduction

The heavy cost of cyber crime and its exponential increase, year to year, are a source of grave and costly concern to the corporate world.

Not only is the frequency of cyber attacks getting more and more alarming every year, the attacks themselves are scaling new heights of sophistication and stealth.

A combination of these two factors is putting businesses at a serious disadvantage. As they are finding it more and more difficult to respond quickly to these security breaches. Research indicates that in 2012 it took a business 24 to 40 days to identify an attack and completely resolve it. Each cleanup is said to have cost $592,000. This cleanup cost shows a 42% increase from the average reported 2011 cleanup cost of $416,000.

Cyber crime cost U.S. business $8.9 million in 2012. The cost showed an increase of 6% from 2011 and 38% from 2010. (2012 Cost of Cyber Crime Study).

Cybersecurity Landscape in 2013
Top Security Threats to Businesses in 2013

Insider Threat

70% of cyber security breaches occur due to the human factor or the "insider threat." Research shows that nearly half of the employers worldwide rely on their trusting the employees not to access confidential data. However, the significant problem is unintentional and careless mistakes made by employees, owing to lack of awareness.

Social Media

Given its growing influence, especailly in online revenue oriented activities, social media will be the biggest source of cyber crime in the year to come. In 2013, social media sites will be the most targetted sites by cyber criminals looking for all kinds of personal, financial, and social security data. Socail networks like Facebook and LinkedIn can be misused for manipulating people into performing actions or divulging confidential information.

Attackers are also increasing their use of social engineering, which has now moved to social networks such as Facebook and LinkedIn.

BYOD

The increasing trend of BYOD at work places is the trojan horse of the virtual world. All kinds of smart devices, including phones, are making their way into the workplace. With these devices having access to an organization's networks, each one is virtually acting as a possoible gateway for attackers. In view of the physical proximity of these devices to secured data sources, Near Field Communication capabilities will be used in 2013 for combatting cyber crimes.

Other threats that will concern businesses in the near future include the following:

Cloud Computing

The increasing trend of cloud computing, wherein more companies put more information in public cloud services, is a big risk. These services can represent a single point of failure for the enterprise. For businesses, this means that security must continue to be an important part of the conversation they have with cloud providers, and the needs of the business should be made clear.

HTML5

HTML5's cross-platform support and integration of various technologies renders it vulnerable to attack. The newness of it means that attackers will be lying in wait for developers to make mistakes as they use it, and take advantage of the mistakes.

Types of Attacks in 2013

APTs

» Advanced Persistent Threat (APT) hacking attacks that use illegal means to get continuing and persistent access to exfiltration of data.
» These high end attacks breach the organizational walls.
» The newer versions of APTs are not only difficult to detect but also challeging to prevent with the help of standard practices. hence they need constantly innovating security systems.

Ransomware

» Ransomware is a type of malware. It is used for extortion. The attacker distributes malware that either encrypts the contents of a system or locks it. The attacker then demands money from the victim in exchange for releasing the data and/or unlocking the system.
» There is no gurantee that the attacker wil release data or unlock the sysem once the payment is made. The integrity of the data remains a concern if access is restored. It is expected that 2013 will see such type of malware and delivery mechanisms become more sophisticated.

Hactivism

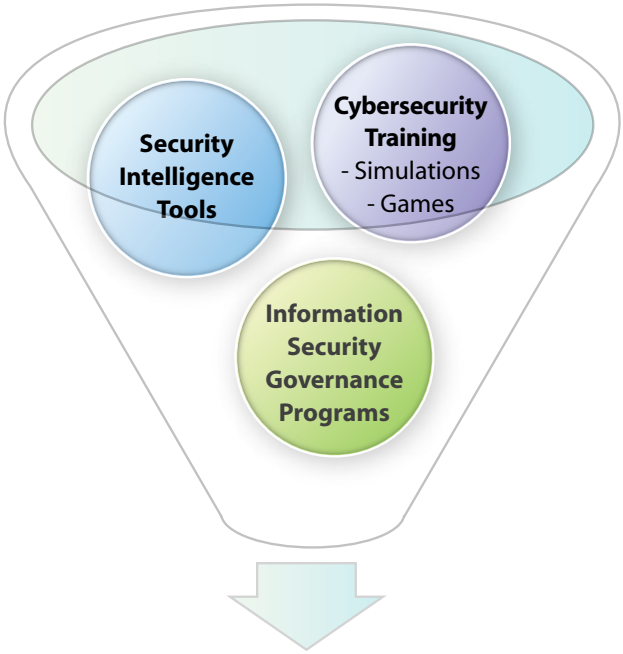
» Attacks carried out as cyber protests for politically or socially motivated purposes, or "just because they can" have increased, and are expected to continue in 2013. Common strategies used by hactivist groups include denial of service attacks and web-based attacks, such as SQL Injections.
» Once a system is compromised, the attacker will harvest data, such as user credentials, to gain access to additional data, emails, credentials, credit card data and other sensitive information.

Spear Phishing Attacks

» Spear phishing is a deceptive communication, seeking to obtain unauthorized access to personal or sensitive data. It includes e-mail, text or tweet, targeting a specific individual. Spear phishing attempts are usually motivated by financial gain, trade secrets or sensitive information.

What Options do Businesses Have?

How can businesses lower their cyber crime-related costs?



Research by Interactive software training solution experts reveals that training can reduce employee's susceptibility to security attacks by over 70%.

In the United States, businesses with the lowest relative cyber crime costs tend to have good information security governance programs, use some type of security intelligence and include training and education on cybersecurity for their employees. Cutting edge cybersecurity training, especially simulations and games, is slated to play the biggest and most effective role in stalling cyber crimes and minimizing its costs to businesses.

Training to Change the Game

The strongest cyber security systems cannot provide effective protection against cyber attacks because 70% of cyber security breaches occur due to the human factor or the 'insider threat'. Employees represent the key to reducing the human error factor and improving general organizational cyber security. More than half of the reported breaches are caused by unintentional mistakes made by the employees.

This is leading to a growing consensus – in government and in the private sector - that more training and education are needed as these lead to more responsible behavior.

Visionary companies are moving from a reactive, defensive mode to a more pro-active approach, linking information security back to business strategy and putting in place mechanisms to ensure it.

The TIS Promise

TIS' bouquet of offerings in this area include the following:

- TIS Cybersecurity Training Needs Consulting
- TIS Cybersecurity Training Curriculum
- TIS Cybersecurity Training Measurement

Phase 1:
Training Needs Consultancy

Individualized, fact-gathering process that maps the systems, needs, and vulnerabilities of an organization to determine training requirements.

Phase 2:
Curriculum & Portal Development

Training requirements are mapped to the various components of our umbrella-training curriculum to develop a customized training solution.

Phase 3:
Training Measurement

As training rolls out, a measuring training & learning effectiveness consultancy is conducted to evaluate, analyze, and revisit the design.

TIS Cybersecurity Training Needs Consulting

Entails:

- Understanding key challenges associated with the specific infrastructure
- Gathering analytics on an organization's weaknesses
- Identifying vulnerabilities that can be addressed through training
- Interviews with multiple personnel related to the training including stakeholders, learners, and management

Output:

- A report or matrix, outlining training required, preferred/recommended and prioritization
- A recommended mix of delivery modes like eLearning, ILT, and blends
- A roadmap with milestones and expected dates for implementation of the curriculum and portal development phase

TIS Cybersecurity Training Curriculum

A comprehensive cyber security-training program in an organization needs to be multi-tiered and nuanced to be effective. It needs to take into account the types of users, their skill levels, work profiles and roles, and the security and IT infrastructure of the company. Besides developing a training curriculum, this phase also entails development of a portal for performance tracking.

Entails:

- Pedagogy Design and Assessment Strategy
- Curriculum Outline
- Prototype Development
- Development of Storyboards and Assets
- Development of Integrated Products
- Portal Design and Integration

Output:

- WBTs and Learning Nuggets
- Simulations and Games
- ARGs and Virtual Labs
- Mobile Apps
- Portal and Performance Tracking

Types of Solutions

Our cybersecurity training curriculum leverages games and simulations to improve the cybersecurity profile of a business and move it away from a punitive and "check the box" mentality that unfortunately seems to inform most cybersecurity training initiatives at present. Traditional training has its limitations. When it comes to cyber security training these limitations become more pronounced.

The varied user base, motivation levels of users but above all the dynamic and rapidly changing nature of the threats themselves demand an innovative and hands on approach to training.

The pedagogy and design of our solutions delivers fun and engaging learning that allows the learner to be in control.

Our cybersecurity curriculum includes the following:

- Serious Games
- Simulations
- Gamification
- Virtual Labs
- Apps
- Tournaments

Serious Games & Simulations

Games are powerful tools – of fun and learning. Cybersecurity training lends itself to this concept due to the nature of the subject matter. The average person will ignore or forget content from emails with security warnings or company lectures when it comes time to actually applying that knowledge.

Serious games ensure a hands-on, non-scripted experience inside a realistic environment that fosters situational awareness, complex decision-making and attention to detail. Learner motivation and therefore the effectiveness of any training program soar if one is able to immerse learners in a game in which they play a critical role. Games are part of our curriculum for awareness, Compliance and Specialized training.

Simulations

Simulations are the most effective training format for cybersecurity training. The USP of a simulation is that it presents scenarios that challenge learners at just the right level and then pushes them to the kind of expertise they need to attain.

Simulations are part of our curriculum for Compliance, Specialized and Policy training.

Gamification

Gamification is an excellent tool for cybersecurity awareness training as engaging security awareness training needs to be done in a non-threatening and non-challenging environment so that end-users feel less threatened to ask questions, are able to have open dialogue and increase their knowledge of how to protect online identities, as well as corporate information. Gamification is the

use of mechanics of gaming to nongame activities to change people's behavior. It is an important and powerful new strategy for influencing and motivating groups of people.

Micro-games with a cyber security awareness twist designed around key security threats like social engineering, password protection, phishing, malware etc., are an effective way to demystify cybersecurity and ensure performance improvements in responding to attacks and thereby reducing an organizations susceptibility to attack.

Virtual Labs

The application of virtualization technologies to the study of computer security has had the most significant impact through the development of specialized laboratories utilizing workstation or server based virtualization. Virtual labs support cybersecurity research and education, training, and awareness. The labs are characterized by innovation and variety.

Virtual Labs are part of our curriculum for Specialized training.

APPS

Apps are addictive and ubiquitous. The 'engagement quotient' of Apps is very high. Almost every smartphone user uses some or the other App in their day-to-day life. They ensure appealing interactivity, heightened usability and user engagement. In the field of education and training too Apps are making a significant impact. Our App for cybersecurity training uses these features to its advantage.

Apps are part of each component in our cybersecurity curriculum. They provide performance support and ongoing refresher learning support.

TIS Cybersecurity Training Measurement Consultancy

Entails:

- Analyzing and examining Level 1 effectiveness reports and data from portal and checking the levels of participant satisfaction
- Analyzing and utilizing Level 2 effectiveness reports and data, including performance reports from the LMS to check the levels of effectiveness in post-training phase
- Identifying potential courses and sample sizes for piloting effectiveness cycles for Levels 1 through 5

Output:

- A consistent and uniform approach to learning effectiveness through implementation of level 1-5 measures.
- Set of scorecards that would contain the key data from levels 1-3 (eventually Levels 4 and 5 as well) showing critical data from the detailed program level to the L&D summary level
- Responsibility matrix for database, ensuring data & scorecard integrity &integration, tracking progress against the goals
- Survey and data collection instruments that would assist in implementing the 5 levels of learning effectiveness

TIS Case Study
UMUC: Master of Science in Cybersecurity

Day in the Life: A Dynamic Cybersecurity Simulation Solution

Test Drive your Workday Today

The Client

Founded in 1947, University of Maryland University College (UMUC) is one of 11 accredited, degree-granting institutions in the University System of Maryland (USM). Offering a broad range of cutting-edge classes, UMUC has earned a global reputation for excellence as a comprehensive virtual university and for focusing on the unique educational and professional development needs of adult students. Headquartered in Adelphi, Maryland, UMUC has classroom locations in the Washington, D.C., metropolitan area, Europe, and Asia, and provides award-winning online classes to students worldwide.

> "At the University of Maryland University College, we engaged TIS to assist us with the development of media and learning objects in support of a very large and strategically important online program in cybersecurity. We have been very pleased with TIS's work on this project. The synergies between their team and our faculty and staff have been excellent. Their technical expertise and ability to scale are impressive. They have delivered high-end course development of which we are very proud, and they have accomplished this on time and within budget."
>
> **Greg von Lehmen**, Ph.D
> Provost
> UMUC

Training Need

The Day in the Life module was developed as part of a larger training program for UMUC.

UMUC offers Bachelor's and Master's degrees in Cybersecurity, through a course that is completely online. Students who are currently working full-time can thus take this course while keeping their jobs, enabling them to apply for cybersecurity job roles.

UMUC felt that while the standard web-based training approach was of merit, learners also needed to relate their cybersecurity learning to the real world. With this in mind, UMUC desired a simulation-based approach that learners could play towards the end of the course.

Figure 1: Welcome: The learner is introduced to the simulation.

Learning Gaps/Problems

To identify any shortcomings and gaps in learning, the TIS team engaged in a discussion with the stakeholders at UMUC to identify learning gaps of students.

The issues that came across were:

- Inability to map cybersecurity issues learnt online to actual issues in the real-life job
- Managing people is part of good cybersecurity; handling them correctly is difficult to learn from web-based training alone
- Lack of a 'fun' aspect to learning cybersecurity; learners needed a break from a rigorous online course schedule

Figure 2: Colleague Profiles: The learner is introduced to the people that they'll work with.

Design Thinking

TIS professionals then used these findings to drive the design thinking, with the following objectives being used to design the solution:

1. **Ground** the students in the day-to-day responsibilities of a cybersecurity professional.
2. **Test** their ability to make decisions related to cybersecurity.
3. **Engage** them in the solution for better learning by introducing elements of prioritization, time pressure, and immediate real-life feedback through e-mails, phone calls, and face-to-face conversations.
4. **Apprise** them of the consequences of botched decisions through the use of appropriately delivered feedback

Figure 3: A Scenario-related Call: Learners are asked to navigate scenarios based on e-mails, calls, or face-to-face conversations

Sources

References:

http://www.forbes.com

2012 Cost of Cyber Crime Study

http://www.ponemon.org/library/2012-cost-of-cyber-crime-study