

# Student Paper Submission: Promoting an Information Security Program via a Student Organization

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January 29, 2002

## **Abstract**

This paper discusses promoting the information security program at an academic institution through a student organization dedicated to information security. It first gives an overview of the benefits associated with having such a student organization. It then details the components required for the organization to be successful. Emphasis is placed on describing various types of popular and beneficial activities.

# 1 Benefits to the Academic Institution

A student organization dedicated to computer information security can help to promote the information security program a university in many different ways.

## 1.1 Shaping Interests

Especially for undergraduate students, student organizations help shape their future interests. Getting students involved with and excited about information security is an integral part of promoting their interest in information security. If students become interested in information security and have good experiences working with it, they will be more likely to pursue information security in the future. If there is a larger number of students interested in information security, not only will there be a larger number of information security graduate students in the future, but there will also be a larger pool of students to consider for research assistantships. If utilized, high quality research assistants can help improve the the overall research efforts of the academic institution.

Student organizations are often good places to draw research assistants from. Often students that are active in academic student organizations are of a higher caliber than those who are not. This is partly due to the fact that they pursue academic interests outside of class for fun, and therefore typically learn much more than they could if they only pursued academic interests by taking courses. Students involved with an information security organization also have a demonstrated interest in network security.

## 1.2 Prestige for the Institution

The more visible an information security program is, the more likely it is to get funding, support of projects, prospective faculty members, and interested students. An active student organization can make its associated academic institution and information security program very visible to the public. Student organizations frequently organize and participate in public events such as lectures, contests, and service projects. Their presence at these events helps to publicize themselves and their institutions. By combining students with similar interests, the creation of projects and research papers by students is greatly promoted. Often times interesting project and paper ideas are informally thought up by people talking with other people who have similar interests. These sort of projects, even those organized informally by students, can bring a large amount of prestige and visibility to the academic institution of the students. For example, the eXperimental Computing Facility<sup>1</sup> and its related projects have brought a large amount of publicity to Berkeley's computer science program.<sup>2</sup>

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<sup>1</sup><http://www.xcf.berkeley.edu/>

<sup>2</sup>Frauenheim, Ed. "Free Photoshop for the people". *Salon*. December 4, 2000. <http://www.salon.com/tech/feature/2000/12/04/xcf/print.html>

## **2 Components of a Successful Security Organization**

There are several core components that are at the heart of most successful student organizations. Among these essential components are a core group of dedicated members, a presence at their institution, well-organized events, and ongoing projects.

### **2.1 Officers**

The people in any organization that really make it go are the people who organize things. In most student organizations, a group of student officers run the organization on a day to day basis. They are typically responsible for setting goals, planning events, and supervising the activities of the organization. It is important that the officers work well together and communicate frequently. Periodic officer meetings are an integral part of the communication process. Officer meetings are a good way of ensuring that all the officers are aware of what is happening with the organization and what needs to happen in the future.

In addition to student officers, many schools require that all registered student organizations have a faculty sponsor or advisor. Faculty and staff advisors can be quite useful to an organization. They can act as liaisons between the student organization and other faculty and staff members. Often they can also help persuade the school to provide extra facilities and support for the student organization. As the name implies, an advisor should also monitor the organization's activities and provide advice when needed. However, it is important to remember that the organization should ultimately be run by the students and not the advisors.

### **2.2 Presence at the Institution**

Although perhaps a product of many factors, an organization's presence on campus is a vital part of getting a large number of people involved in its activities. On even a short walk across a college campus, it's hard not to notice the multitude of posters and flyers for different organization's activities. Putting up lots of flyers about events is one of the best ways to publicize it and ensure a large turnout. Publicity is such a vital component that it is often a good idea to have an officer position dedicated to it.

Most large student organizations have an office for their members. Having a prominently placed office not only lets everyone know that the organization exists, but also provides a place for its members to socialize. Friendship with other members is perhaps the main reason that students get involved with and stay active in an organization. One of the best ways to promote friendship is to simply have a comfortable office that students want to spend time in. Amenities such as a couch, computers, tables, a television, and a refrigerator can encourage students to spend a lot of time in the office. Having members in the office is also important so that people interested in the organization can stop by and talk to someone about the organization. Many organizations require that its officers hold certain office hours in order to

help ensure that the office is open and occupied as much as possible.

With the prevalence of technology, especially among science and engineering students, having a presence on the Internet can be almost as important as having a physical presence. Creating a website is one of the easiest and most common ways to have a presence on the Internet. A website for a student organization should provide information on the organization itself, upcoming activities, and a way to contact someone for more information on the organization. It is essential that the site is updated frequently so that it describes the current events of the organization. An out of date website can make an organization appear inactive and dissuade new members from getting involved. Mailing lists are also an essential tool. Sending out email about upcoming events is one of the best ways to easily let a large number of people know what's going on with an organization. Bulletin boards, newsgroups, and chat rooms are possible methods of letting members interact with each other.

## **2.3 Events**

One of the largest components of an organization is the events that it organizes. Public events are often where prospective members are first exposed to an organization. A large number of well planned, interesting events can help a student organization to become more active, popular, and visible.

### **2.3.1 Meetings**

Regular general meetings provide a solid foundation for an organization. They provide a way to inform the membership of upcoming events and ongoing activities. General meetings are also a great place for members to meet other members. Meetings should be regularly scheduled so that members can form a habit of attending. However, having meetings too often can discourage people from attending. It is a good idea to have general meetings either every other week or once a month, depending on the activity level of the organization.

Although informing members of upcoming activities is often the primary purpose of general meetings, often times presentations are also given at meetings. Presentations can provide an interesting venue for discussion among members and can also help to inform them about topics not normally discussed in a classroom. Interesting presentation topics can help draw prospective members to a meeting and provide an enticing reason to attend the meeting. Ideally presentations should be understandable by everyone in the organization and should appeal to a wide audience. However, of course not everyone will be interested in every presentation that is given, so it is a good practice to have the organization's business portion of the meeting before the presentation so that uninterested members do not have to sit through the presentation.

In order to provide an extra incentive to attend meetings, organizations often provide free food, such as pizza, at meetings. The free food helps to draw a larger number of people to

meetings. However, many people come to such meetings only for the food and have little interest in the organization and its activities. Also, in order to pay for the food, organizations often have a company sponsor the meeting. Because the companies are paying the organization money, they nearly always feel that they should get something out of the meeting. This expectation often shifts the purpose of the meetings, and even the organization in general, to satisfying the needs of companies, rather than the needs of the students. If the corporate interests become too dominant, meetings can seem to become corporate information sessions. This is a pitfall that many student organizations fall into and should be avoided.

### 2.3.2 Tutorials

In order to help its members learn about topics that they might not normally be exposed to, organizations often organize tutorials. Tutorials are usually a few hours long and involve hands-on learning. Having tutorials on computer security topics is especially important to institutions that don't yet have a strong security program. This is because most of the students probably haven't been exposed to security education. The following are a few ideas for possible security-related tutorials:

**Secure Programming Practices** It is important that all programmers, even those not particularly interested in information security, are aware of the security issues relating to the programs that they write. Giving students even a brief tutorial on secure programming practices will help them write more reliable and secure programs. Topics that can be covered include user input verification, prevention of buffer overflows, and proper use of encryption and authentication protocols.

**Securing a Certain System** A tutorial could give an overview of how to secure a given operating system. For example, a tutorial on securing Linux could detail things such as how to turn off unneeded services, run daemons as non-root users, setup a simple local firewall, and install and monitor Tripwire<sup>3</sup>.

**Buffer Overflows** Explaining the information in Aleph One's "Smashing the Stack for Fun and Profit"<sup>4</sup> would provide a good introduction to buffer overflows. It would be very beneficial to provide computers for participants to actually practice exploiting buffer overflow conditions. A follow-up tutorial could detail how to write shell code and use ADMutate<sup>5</sup> to obfuscate it.

**Creating NASLs** Nessus Attack Scripting Language (NASL) is the scripting language used by Nessus<sup>6</sup>, a popular, free, open-source vulnerability scanner. Each NASL file de-

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<sup>3</sup><http://www.tripwire.org/>

<sup>4</sup>Aleph One. "Smashing The Stack For Fun And Profit". Phrack volume 7, issue 49. <http://www.phrack.org/phrack/49/P49-14>

<sup>5</sup><http://www.ktwo.ca/security.html>

<sup>6</sup><http://www.nessus.org/>

scribes a single computer security vulnerability. For people already familiar with a programming language, NASL is rather simple to learn.<sup>7</sup> After getting a quick overview of the NASL language and analyzing a sample NASL, attendees could write a NASL for a simple vulnerability which does not yet have a NASL written for it. After finishing the NASL and testing it, the students could then submit the NASL to the community. By doing this the attendees will have not only learned something, but will have also contributed to the computer security community.

**Other Topics** The above are only a few of the many possible tutorial topics. Other ideas for tutorials include the basics of using encryption, setting up a firewall, attacking and defending against a group of vulnerabilities, and setting up and monitoring an intrusion detection system (IDS).

### 2.3.3 Technical Events

Some of the most enjoyable events are those where every participant can take an active role in what happens. Hands-on technical events enable participants to have fun, show off their knowledge, and even learn a thing or two. Two of the most popular and interesting events are Capture the Flag and SecureFest.

**Capture the Flag** In the network security version of Capture the Flag, teams try to defend their own computers and compromise other teams' computers. The penetrating of actual computer systems, in a safe and legal real-world environment, can provide a great learning experience for everyone involved. Capture the Flag has been a very successful and popular event at security conferences such as DEF CON. However, often computers that people bring to the event are very well secured and therefore there are very few actual penetrations. Setting up a few computers that are not well secured can help to provide extra activity and excitement. Watching different teams battle over these insecure computers can provide endless amusement and learning experiences. Details on how Capture the Flag has been organized at past DEF CON conferences are available at the DEF CON website<sup>8</sup>.

**SecureFest** The purpose of a SecureFest is to secure the participants' computers and to teach them the basics of securing their computers. Each participant brings their computer to the SecureFest and connects it to a central network. There are several main components of a SecureFest: checking for network vulnerabilities, conducting a password audit, and looking for malicious programs.

In order to check for vulnerabilities in network programs, the organizers should run a vulnerability scanner, such as Nessus, on every computer at the SecureFest. A list of

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<sup>7</sup>Deraison, Renaud. *The Nessus Attack Scripting Language Reference Guide*. April 16, 2000. <http://www.nessus.org/doc/nasl.html>

<sup>8</sup><http://www.defcon.org/html/defcon-8-post.html#CTF>

the vulnerabilities that the scanner finds for each particular computer should be given to that computer's owner. The organizers should then help each participant fix the problems found by the vulnerability scanner. After a participant thinks that they have fixed all of the vulnerabilities found by the scanner, then the scanner should be run again to verify that everything has been fixed.

There are two main parts to a password audit. The first part consists of teaching the participants how to choose strong passwords. In order to illustrate how strong passwords need to be, a demonstration of John the Ripper<sup>9</sup>, a password cracker, could be given. The demonstration could show John cracking passwords that some people consider to be strong. If time permits, participants could even run password crackers on their own passwords to verify that they can't be easily cracked. The second part of a password audit is verifying that the participants don't use programs which transmit unencrypted passwords. In order to do this, the organizers should explain to the participants the dangers of transmitting unencrypted passwords and what type of programs and protocols commonly transmit unencrypted passwords. Then if time permits, the participants should be instructed to check their email and perform any other tasks that they might do on a frequent basis. While the participants are using the network as they normally would, the organizers should be monitoring the network for the transmission of unencrypted passwords.

Each of the participant's computers should be checked to make sure that they do not have any malicious programs on them, such as backdoors, worms, viruses, or spyware. In order to check for backdoors and viruses on a computer running Windows, a virus checker, such as McAfee's VirusScan<sup>10</sup> should be run. However, most Windows virus checking programs are not free, so it is important to make sure that you do not violate any licensing agreements. Spyware is a term that refers to programs that spy on a user and collect information on their habits, often for marketing purposes. There are several free Windows programs that check for and eliminate spyware, such as Ad-aware<sup>11</sup>. There are also many free backdoor and rootkit detectors for Unix systems, such as chkrootkit<sup>12</sup>.

### 2.3.4 Social Events

Even though an organization's members may have a lot of fun learning about and using computers, everyone occasionally likes to have some good, old-fashioned fun. Getting people together to watch a movie is one of the easiest social events to organize. All that is needed is a way to play the movie, the movie itself, and some publicity. Classic geek movies, such

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<sup>9</sup><http://www.openwall.com/john/>

<sup>10</sup><http://www.mcafee.com/anti-virus/>

<sup>11</sup><http://www.lsfilters.com/aaw.html>

<sup>12</sup><http://www.chkrootkit.org/>

as Wargames, Pi, and The Matrix, are always safe bets among technology students. Perhaps one of the most popular social events is getting everyone together to eat and drink. By inviting faculty to these events, students can meet and talk to their professors in a very informal setting and learn about them outside of the classroom. Although people involved with computers stereotypically might not be interested in athletic activities, participating in an intramural sports league can be a great way for members to build teamwork and get some exercise.

## 2.4 Ongoing Projects

One of the best ways to keep a core group of people actively involved in an organization is to have them regularly work on a long term project. The field of computers lends itself particularly well to student-run projects. This is because often the only tools that are required to work on a project are a computer and a connection to the Internet. There are many different security-related projects that can be worked on by a group of students. The following are a few example projects: setting up and monitoring a honeynet<sup>13</sup>, doing a security audit of the school's computers, working on or starting a software project, and auditing existing code for security issues. If there is already a security research program at the organization's institution, it may even be possible to integrate an organization's project with research being done by faculty members.

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<sup>13</sup><http://project.honeynet.org/>