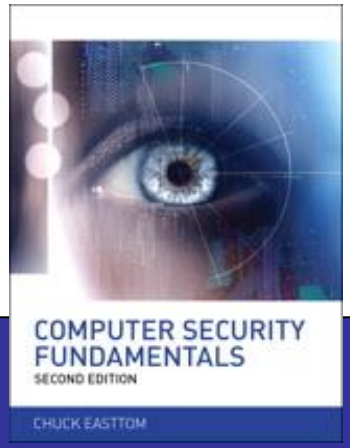
Computer Security Fundamentals

by Chuck Easttom



Chapter 5 Objectives

- Understand viruses and how they propagate
- Have a working knowledge of several specific viruses
- Understand virus scanners
- Understand what a Trojan horse is

Chapter 5 Objectives (cont.)

- Have a working knowledge of several specific Trojan horse attacks
- Understand the buffer overflow attack
- Understand spyware
- Defend against these attacks

Introduction

- Virus outbreaks
  - How they work
  - Why they work
  - How they are deployed
- Buffer overflow attacks
- Spyware
- Other malware

Difference between IDS, IPS and Firewals

- Lets compare an enterprise network to a financial institution.
- The security guards checking your ID and verifying your visit are the firewall.
- The cameras that alert the security guards that an unknown person is loitering near the vault room are the IDS.
- The automatic Gatling guns that open fire on an unauthorized person loitering near the vault room are the IPS.

Viruses

- A computer virus
  - Self-replicates
  - Spreads rapidly
  - May or may not have a malicious payload

I love you virus

Viruses (cont.)

How a virus spreads

- Finds a network connection; copies itself to other hosts on the network
  - Requires programming skill

OR

- Mails itself to everyone in host's address book
  - Requires less programming skill

How does malware spread?

Free software

Suspicious popup ads

Spam email attachments

P2P sharing files

Malicious websites

Viruses (cont.)

- E-mail propagation
  - More common for one major reason;
    - Microsoft Outlook is easy to work with.
    - Five lines of code can cause Outlook to send e-mails covertly.
  - Other viruses spread using their own e-mail engine.

Viruses (cont.)

- Network propagation.
  - Less frequent, but just as effective
- Web site delivery.
  - Relies on end-user negligence
  - End user negligence

Recent virus examples

- www.f-secure.com/virus-info/virus-news/
- http://securityresponse.symantec.com/
- www.cert.org/nav/index_red.html
- http://vil.nai.com/vil/

Recent virus examples

- **W32/Netsky-P**
  - Primarily spread through email
  - Copies itself to various directories and shared folders
  - Attempts to copy itself to C:\WINDOWS\FVProtect.exe. The name would make many people think this program was actually part of some antivirus utility.
  - It also copies itself to C:\WINDOWS\userconfig9x.dll. Again, it would appear to be a system file, thus making people less likely to delete it.

Recent virus examples

- **Troj/Invo-Zip**
  - A zip file attached to an email
  - Email claimed zip file contains data related to an invoice, tax issue, or similar urgent paperwork
  - Business people
  - Steal financial data
- **MacDefender**
  - Embedded in some web pages and when a user visits those web pages, he or she is given a fake virus scan that tells the user that they have a virus and it needs to be fixed. The “fix” is actually downloading a virus.
  - Macintosh Computers

Recent virus examples

- **The Sobig Virus**
  - It would copy itself to any shared drives on your network and it would email itself out to everyone in your address book
- **Mimail Virus**
  - This virus not only collected email addresses from your address book, but also from other documents on your machine
  - If you had a Word document on your hard drive and an email address was in that document
  - Built in email engine

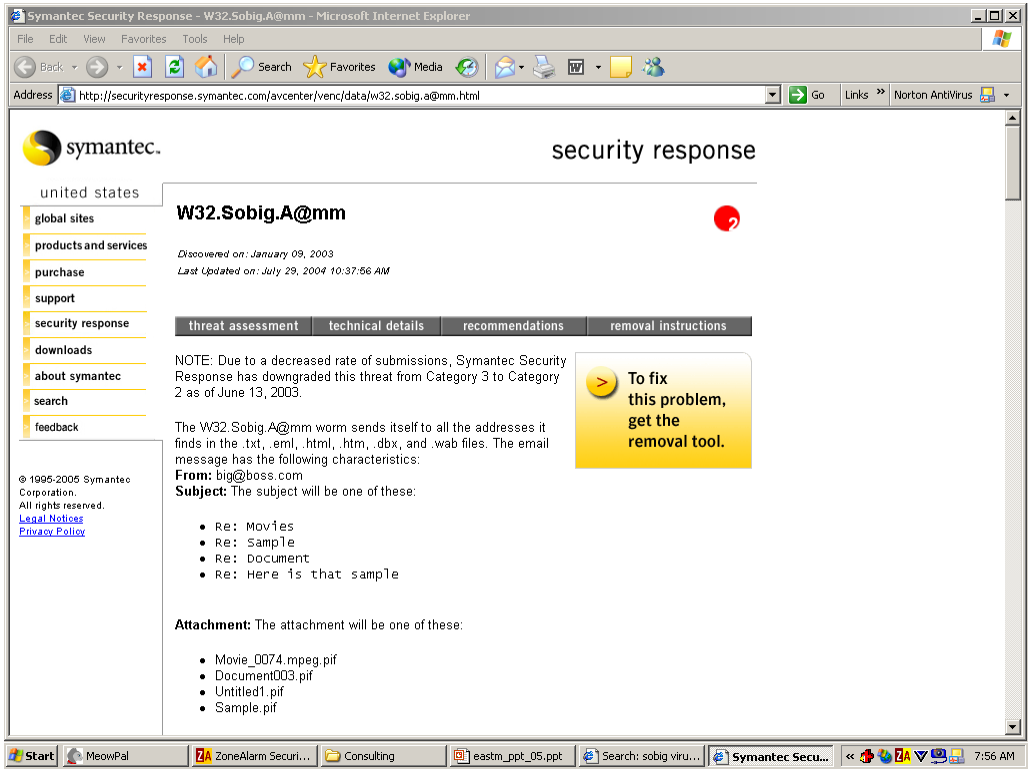
Recent virus examples

- **The Bagle Virus**
- The email it sent claimed to be from your system administrator. It would tell you that your email account had been infected by a virus and that you should open the attached file to get instructions
- This virus was particularly interesting for several reasons. To begin with, it spread both through email and copying itself to shared folders. Second, it could also scan files on your PC looking for email addresses. Finally, it would disable processes used by antivirus scanners

Recent virus examples

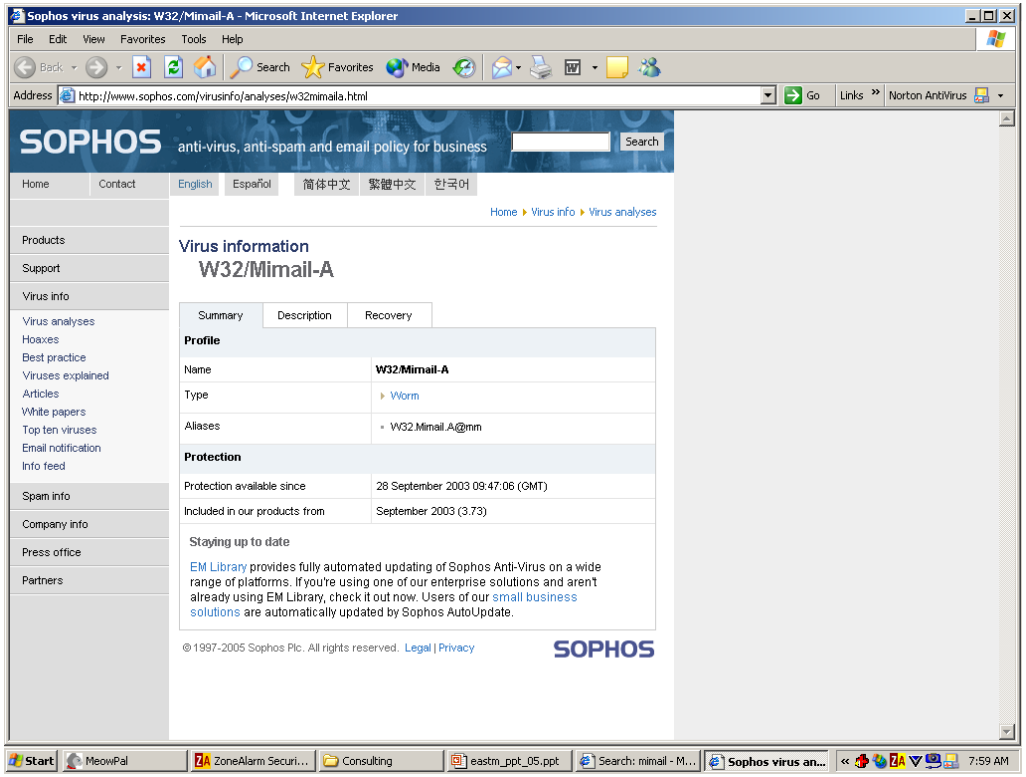
- **A Nonvirus Virus**
  - A hacker sends an email to every address he has. The email claims to be from some well-known antivirus center and warns of a new virus that is circulating. The email instructs people to delete some file from their computer to get rid of the virus.

Viruses (cont.)



Symantic site information on the Sobig virus

Viruses (cont.)

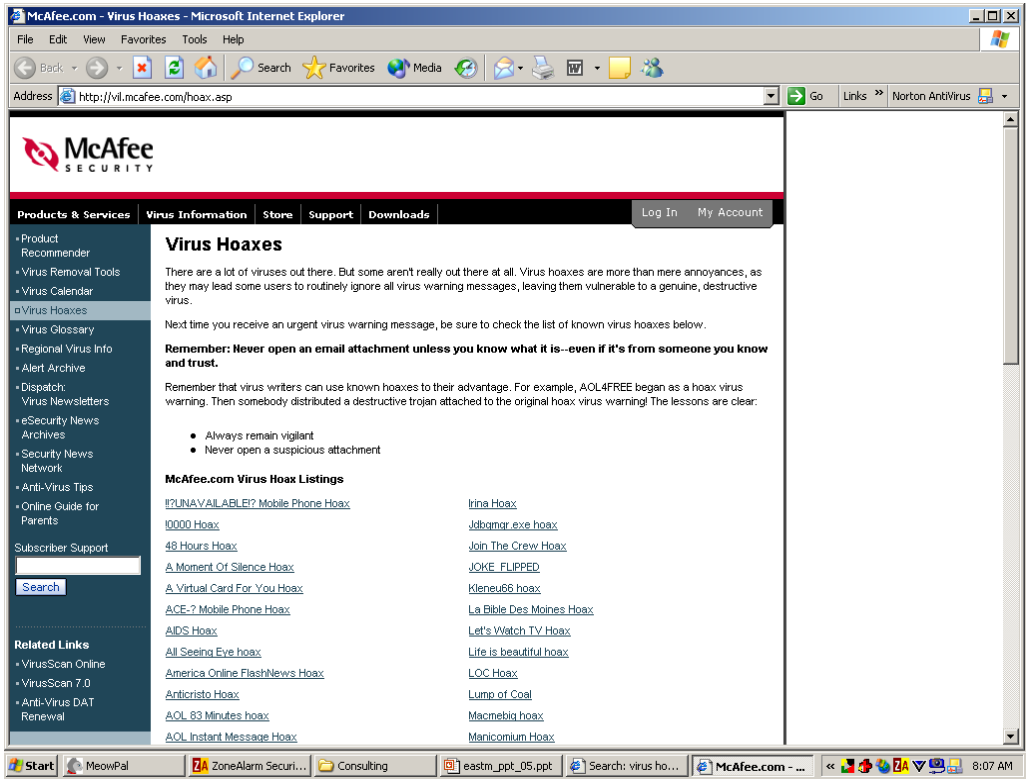


Information on the Minmail virus from the Sophos site

Viruses (cont.)

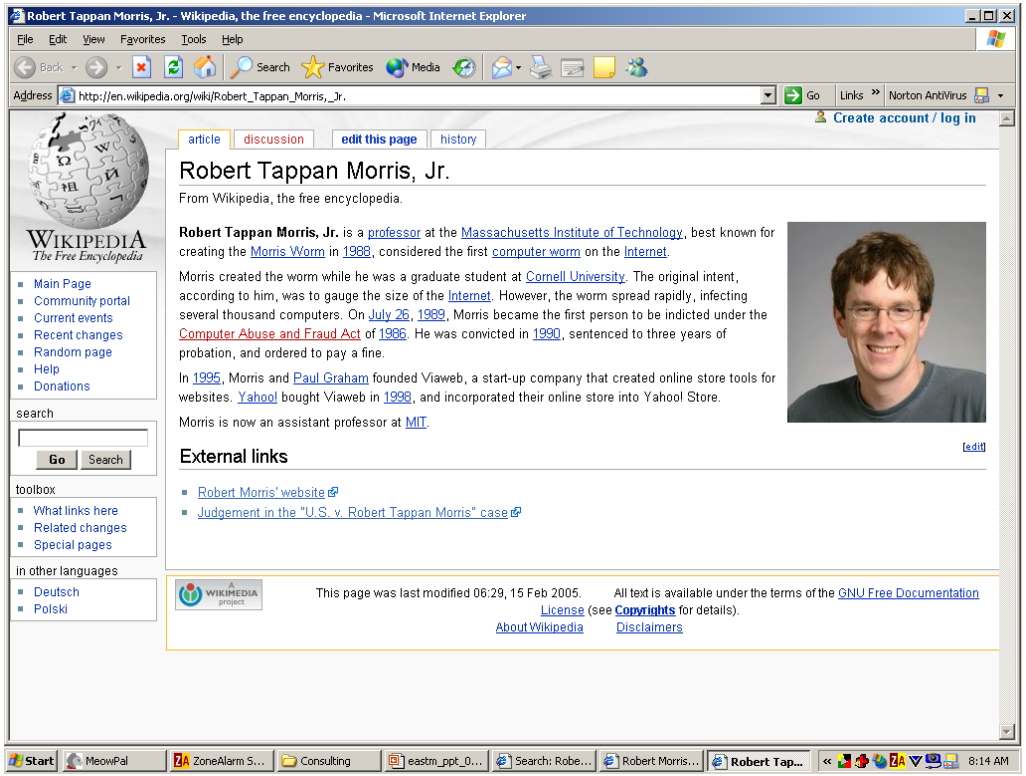
Information on the Bagle virus from the internet.com site

Viruses (cont.)



Virus hoaxes from the McAfee site

Viruses (cont.)



Wikipedia information on Robert Tappan Morris, Jr.

Viruses (cont.)

- Rules for avoiding viruses:
  - Use a virus scanner.
  - DO NOT open questionable attachments.
    - Use a code word for safe attachments from friends.
  - Do not believe “Security Alerts.”
  - Do not believe on email altert

Trojan Horses

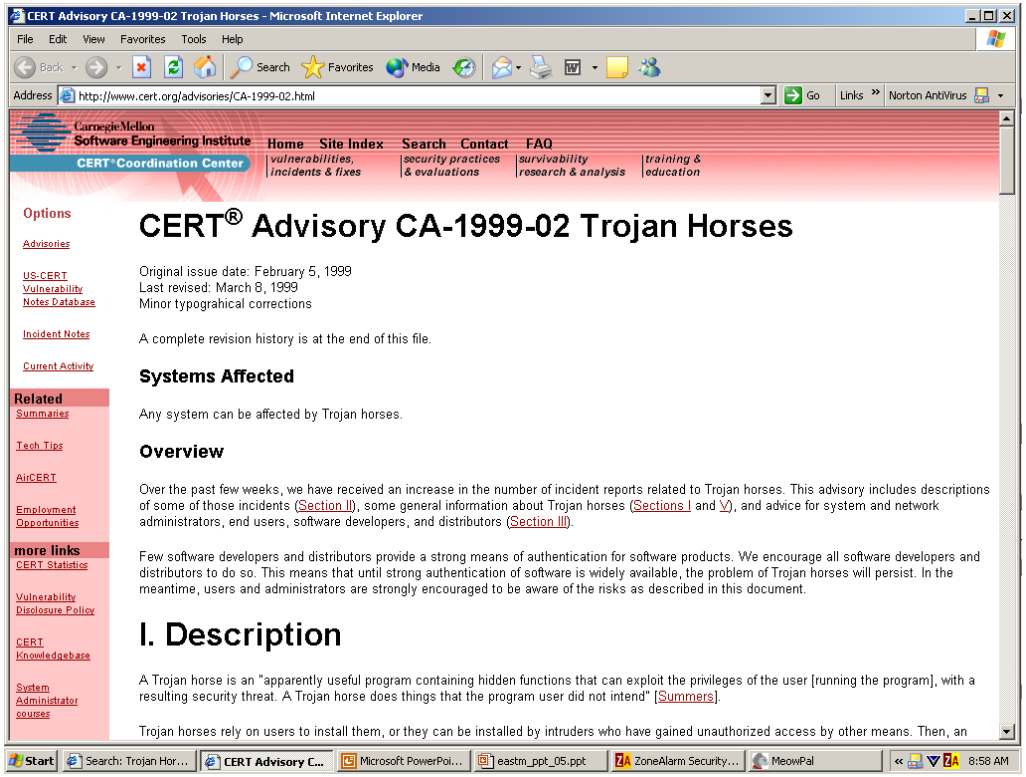
A program that looks benign, but is not

- A cute screen saver or apparently useful login box can
  - Download harmful software.
  - Install a key logger .
  - Open a back door for hackers.

Trojan Horses (cont.)

- Competent programmers can craft a Trojan horse:
  - To appeal to a certain person
- Company policy should prohibit unauthorized downloads.

Trojan Horses (cont.)

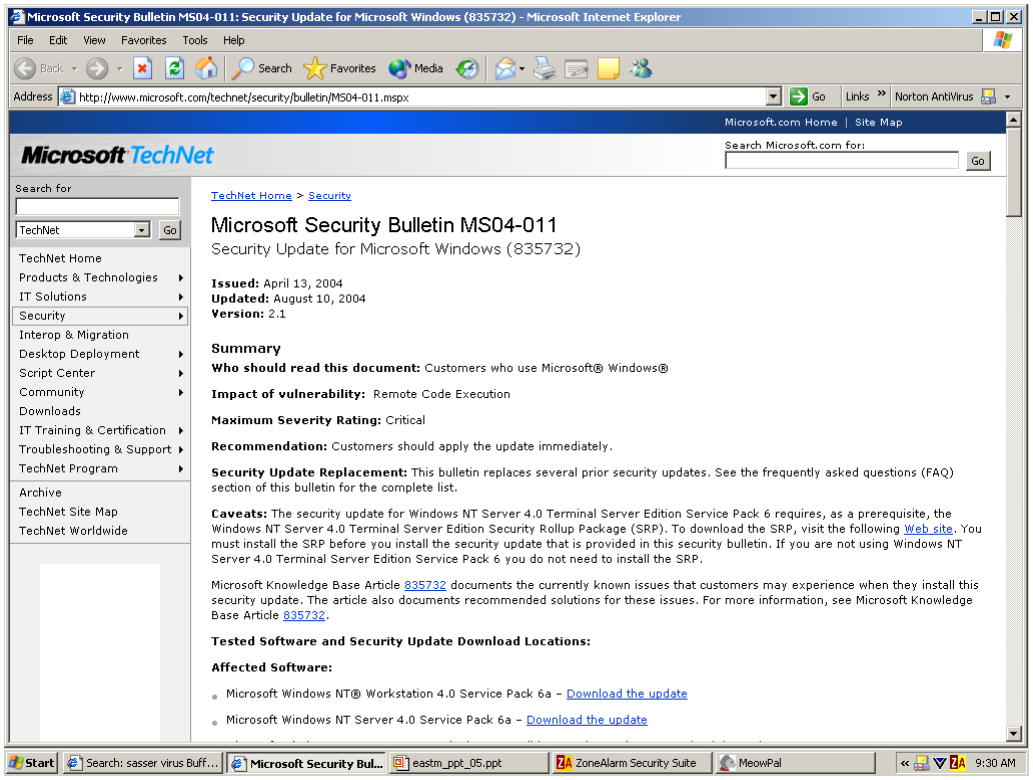


Still-valid CERT advisory on Trojan horses

The Buffer Overflow Attack

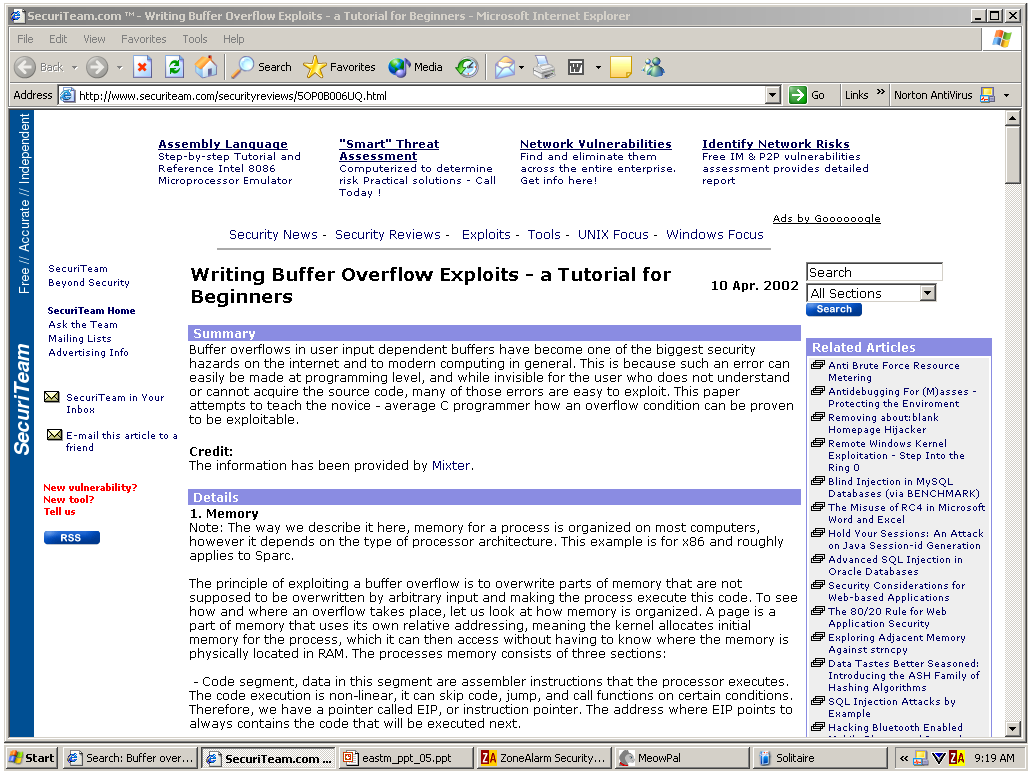
- Program writes data beyond the allocated end of a buffer.

The Buffer Overflow Attack (cont.)



A Microsoft Security Bulletin on a buffer overflow attack

The Buffer Overflow Attack (cont.)



Web tutorial for writing buffer overflows

Spyware

- Requires more technical knowledge
- Usually used for targets of choice

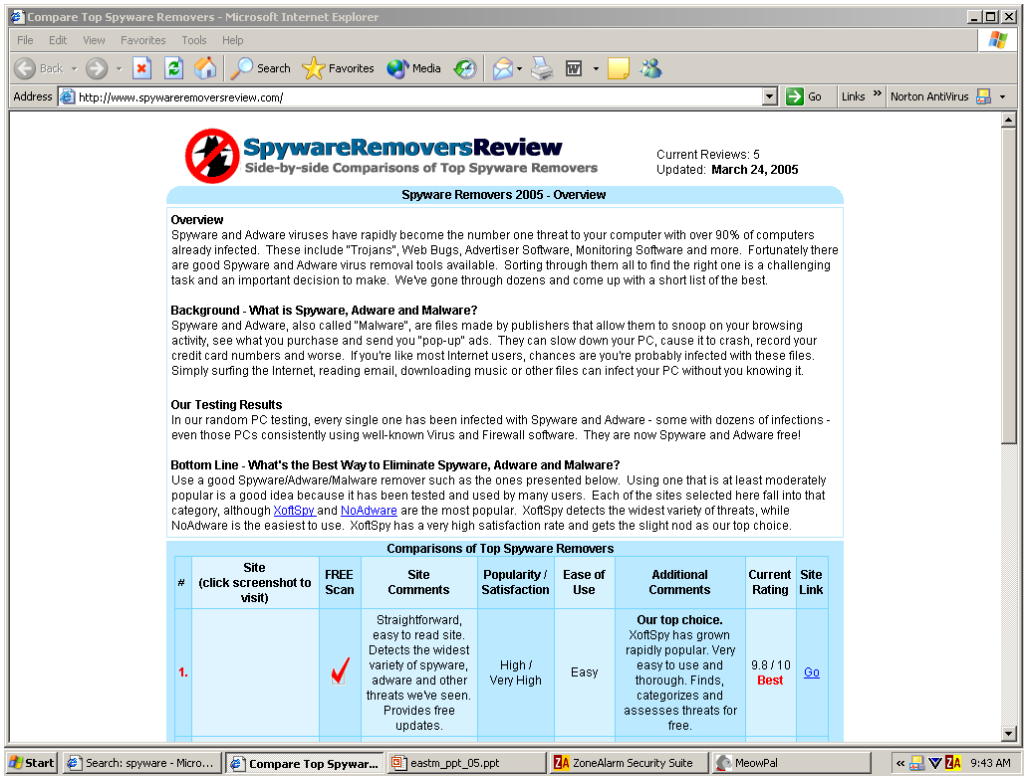
Spyware (cont.)

- Forms of spyware
  - Web cookies
  - Key loggers

Spyware (cont.)

- Legal Uses
  - Monitoring children's computer use
  - Monitoring employees
- Illegal Uses
  - Deployment will be covert

Spyware (cont.)



Example of free spyware removal software

How Is Spyware Delivered to a Target System?

- Website
- Trojan Horse
- An employer (or parent) is installing the spyware, it can then be installed non-covertly

Other Forms of Malware

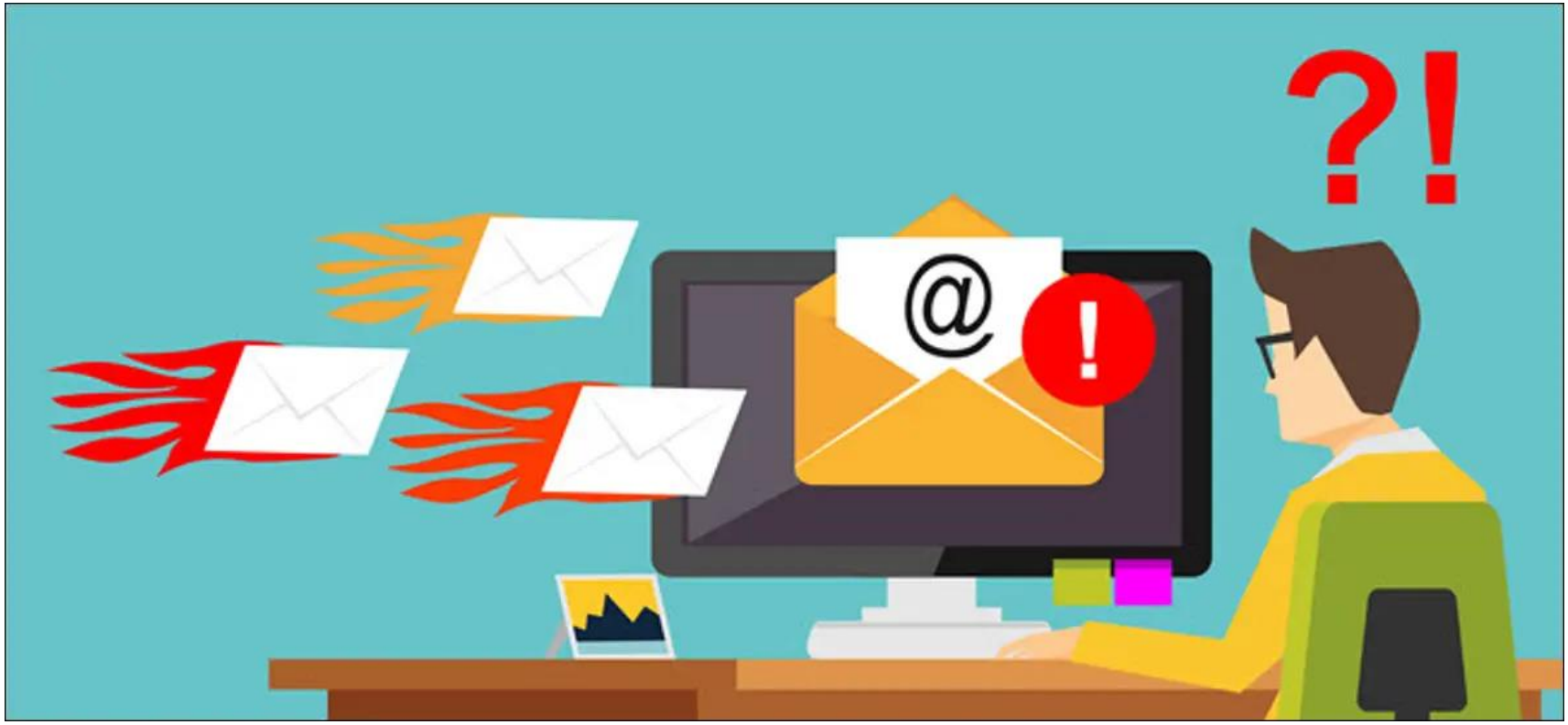
- Rootkit
  - A collection of hacking tools that can
    - Monitor traffic and keystrokes
    - Create a backdoor
    - Alter log files and existing tools to avoid detection
    - Attack other machines on the network

Malicious Web-Based Code

- Web-Based mobile code
  - Code that is portable on all operating systems
  - Spreads quickly on the web

Logic Bombs

Spam



Detecting and Eliminating Viruses and Spyware

- Antivirus software operates in two ways:
  - Scans for virus signatures
    - Keeps the signature file updated
  - Watches the behavior of executables
    - Attempts to access e-mail address book
    - Attempts to change Registry settings
    - Attempting to copy itself

Detecting and Eliminating Viruses and Spyware (cont.)

- Anti-spyware software
  - www.webroot.com
  - www.spykiller.com
  - www.zerospy.com
  - www.spectorsoft.com

Summary

- There are a wide variety of attacks.
- Computer security is essential to the protection of personal information and your company's intellectual property.
- Most attacks are preventable.
- Defend against attacks with sound practices plus antivirus and antispyware software.