

033 526 Business Informatics
033 532 Media informatics and Visual Computing
033 533 Medical Informatics
033 534 Software & Information Engineering
066 933 Information & Knowledge Management

Int. Secure Systems Lab
Technical University Vienna

Internet Security [1]

VU 188.366

Introduction

Christian Platzer, Gilbert Wondracek,
Martin Mulazzani and Edgar Weippl

inetsec@iseclab.org

Welcome to InetSec [1]

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- For those who are lost: You currently in the preparation lecture to the Internet Security VU (188.366)
 - This is an introductory course that aims to make you “security-aware”
- So far, as a computer scientist, you have learned to write code and build applications...
 - we show you how to **break** them
- Goals:
 - Learn what can go wrong
 - Learn what a vulnerability is
 - Exploit those vulnerabilities
- Remember: Breaking into other people's computer systems is illegal

OK, but why learn security?

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- (Your) Computer education so far
 - Design and implementation of program code
 - Security education falls short
 - Today, failing to protect yourself and not being security-aware can be very costly
- All programmers need to be aware of security
 - Simple programming mistakes lead to serious security problems
 - Number of security-related incidents on the Internet increasing fast
 - identity theft (social networks)
 - Various “anonymous” incidents
 - Stuxnet (targets Siemens SCADA Systems)
- Even as an end-user, understanding security and privacy issues is useful

Number of Reported Incidents

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Year	1988	1989
Incidents	6	132

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Incidents	252	406	773	1,334	2,340	2,412	2,573	2,134	3,734	9,859

Year	2000	2001	2002	2003
Incidents	21,756	52,658	82,094	137,529

- Statistics from www.cert.org
 - Given the widespread use of automated attack tools, attacks against Internet-connected systems have become so commonplace that counts of the number of incidents reported provide little information with regard to assessing the scope and impact of attacks. Therefore, we stopped providing this statistic at the end of 2003.

Some Interesting Numbers

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- Malware industry is worth 100 billion dollars per year
- 80-90% of the e-mail traffic out there is spam
- 50%-80% of computers connected to Internet infected with spyware
- A 26 year-old made 20 million dollars with spam before being caught
- Phishing sites hosted by the RBN (Russian business network) made an estimated 150 million dollars with stolen bank credentials in 2006
 - source: Symantec Report on the Underground Economy (2008)
- Top rogue AV "affiliates" made over 300000\$ a month
 - source: Symantec Report on Rogue Security Software (2009)

What we expect from you

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- Technical interest for security issues
- Some programming knowledge and experience
 - HTML
 - simple Javascript
 - SQL
 - Java, C...)
- Patience (security exercises aren't like Hollywood scenes)
- **Copying code** and solutions, or hacking the lab system is **not** allowed
 - do not "help" your colleagues by giving them your solution (or posting your solution online!)

Administrative Issues

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- Mode : VU
 - Lectures (in English) until mid-June
- Regular security challenges (e.g., cracking web applications, security tools, stack-based buffer overflows)
 - each challenge is open for 1 or 2 weeks
 - **no deadline extensions**
- written final exam (28.06.2012)
- When and Where:
 - Thursdays 12:00. Lecture lasts 1h 30.
 - FH HS 6
- Slides and News (please visit regularly!)
 - <http://www.seclab.tuwien.ac.at/inetsec/>



Lecture Dates

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Topics

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- Networking Basics
- TCP/IP Security (e.g., ARP spoofing, seq. number guessing,...)
- Web security and vulnerabilities (e.g., SQL injections, XSS,...)
- Internet Application security (e.g., DNS cache poisoning,...)
- Software testing (i.e., finding vulnerabilities)
- **Basic** cryptography
- Language security (e.g: Java security)
- Stack-based buffer overflows

InetSec Lab

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- Assignments
 - Lab starts on 22.03.2012
 - 6 challenges
 - 20% per challenge solved (plus 10% if you solve all 6)
 - **no points** for "partially solved" challenges
- Environment
 - assignments should be mostly solved at home / any computer with Internet connection
 - small "hacking" network, which is remotely accessible via ssh (Linux)
 - accounts can be obtained over the web (registration continues until 22.03.2012)
 - check home page for details
- Submission
 - hard deadlines (with sufficient time)
 - automatic checking with immediate feedback

Grading

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- Each challenge (assignment) gives you 20 %
- The written exam has n possible points (100%)
- To pass you need
 - ≥ 50 % on the challenges (3 or more solved)
 - ≥ 50 % on the written exam
- Your total percentage
 - $(\text{Challenge \%} + 2 \times \text{Exam \%}) / 3$
- Example: 5 Challenges solved (100%), 76% on the written exam \rightarrow
 $(76 + 76 + 100) / 3 = 84\%$ total (that's a solid 2).
- The less you solve, the more you lose

Challenges (tentative list)

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- Network security tools (e.g., nmap, tcpdump)
- Web security (SQL injection, XSS...)
- Security-related programming assignment (java?)
- Cryptography
- Stack-based buffer overflow (advanced in comparison to other challenges)

InetSec 1 and InetSec 2

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	InetSec 1	InetSec 2
Unix Security	x	✓
Windows Security	x	✓
Buffer Overflows	✓	✓
Internet Application Security	✓	x
Cryptography	✓	x
Race Conditions	x	✓
Reverse Engineering	x	✓
Viruses and Worms	x	✓
Web security	✓	✓

Who should do InetSec 2

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- People who would like to become “security gurus”.
 - We take part in a Capture the Flag hacking contest against other universities – lots of fun. (1st place in 2011 and 2007, 2nd place in 2005 and 2009)
- People who are hard-core technical (i.e., C and Linux should not be a problem for you)
- You should be interested in solving technical problems
- People who have time
 - You get the chance to solve security challenges such as writing a virus, reverse engineering applications

Your Roadmap to Enlightenment

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Requirement

Rating

InetSec 1, candidate

Nobody

InetSec 1, pass

Apprentice

InetSec 2, 4 solved challenges

Stackmaster

InetSec 2, 5 solved challenges

exploit Warlock

InetSec 2, 6 solved challenges

Guru

InetSec 2, 6 solved challenges, CTF

Master Guru

Inetsec Team

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Christian Platzer
Gilbert Wondracek

Lecturers



Martin Mulazzani
Edgar Weippl

Tutors: Bernhard Miller, Eduard Thamm
Will be handling issues with the lab environment and
challenges and answering questions

inetsec@iseclab.org

Any Questions?
