CIS 610 - Advanced Research Topics in Network Security

Introduction

January 5, 2004

Description of the Class

- Topics to be covered
- Prerequisites
- Class format
- Projects
- Grading
- Office hours and web page

Topics to Be Covered

- Problems and solutions in network security
- Focus on state-of-the-art research
  - Many are unsolved problems
- Mostly wide area/infrastructure problems

In More Detail

- Security alert systems
- IP spoofing
- Routing and DNS security
- Worm defense
- DDoS
- Distributed intrusion detection
- Multicast security
- Security issues of overlay and p2p networks
- Security for wireless environments

Prerequisites

- Familiar with CIS 532/632 materials
- Familiar with CIS 510 computer security materials
- Familiar with CIS 510 network security materials
- If you have no enough familiarity with those materials, it's up to you to catch up on your own

Grading Policy

- Project
  - 50%
- Class participation and presentation
  - 40%
    - 20% from presentation
- Take-home exam
  - 10%

Class Format

- Seminar style
  - No formal lectures
- Each session, a student(s) presents an existing research topic
- Remainder of the class spent discussing the topic
- Class intended for those with serious research interests in network security

Class Schedule

- Week 1 (1/6, 1/8): Introduction, security alert system
- Week 2 (1/13, 1/15): IP spoofing
- Week 3 (1/20, 1/22): Routing and DNS security
- Week 4 (1/27, 1/29): Worm defense
- Week 5 (2/3, 2/5): DDoS
- Week 6 (2/10, 2/12): Distributed intrusion detection
- Week 7 (2/17, 2/19): Multicast security
- Week 8 (2/24, 2/26): Security of overlay and p2p
- Week 9 (3/2, 3/4): Security for wireless
- Week 10 (3/9, 3/11): Project presentations and demos

Reading Materials

- No textbooks
- 2-3 papers assigned to each topic
- Student in charge of a session may assign another 1-2 papers
- If you haven't read the papers before the class, you probably won't be participate well in the class discussion

Class Discussions

- Should be focuses on:
  - Analysis of the problems
  - Critique of existing solutions
  - Suggestions of improvements
    - Or new solutions!
- Think it as being part of a research team looking at a particular problem within a larger context

Projects

- 1-3 people per team
- Identify a security problem to solve by yourself
  - Related to what's covered in the class
  - But talk to me before decided
  - Typically you should get your hands dirty
- Be ambitious:
  - A good work can be *publishable*
- Be down-to-earth
  - Make sure you make solid progress day by day

Choosing Your Project Topic

- Submit a one-page proposal
  - By 1/20
  - Email submissions OK
- I will approve/disapprove them and offer suggestions

What Makes a Good Project?

- Something you are interested in
- Something new
- Maybe can turn into a paper for you
- Feasible to demonstrate something interesting at the end of the term

Progress Report

- Due 2/10
  - Email submissions OK
- 2 page report on the progress of your project team
  - What has/hasn't been achieved
  - What have you learned

Project Presentation and Demos

- At 10th week (3/9, 3/11), every team presents and demonstrates their work
  - In the format you choose
- Must show a working version of your project
  - Otherwise the team will face serious critique
- Every team schedule time slots with me after choosing project topic

Project Final Report

- Due 3/16, 11:59 p.m.
- Email submissions in PDF format
  - Imagine you are publishing a paper
    - 10-15 pages on letter-sized paper, 1" margin on all sides, single space, 11 Times New Roman font
    - At most 5 graphs, each smaller than 3.5"x3.5"

Project Report Contents

- A final report MUST contain:
  - Title
  - Author name
  - Introduction
    - Problem statement
    - Motivation
    - Prior work (if none or little, then say so)
    - Overview of your approach
  - Design
  - Implementation
  - Evaluation
    - Analysis
    - Measurement or simulation results
  - Conclusions
  - Acknowledgment
  - References

How Would I Grade Projects?

- Is the idea interesting?
- Positive attitude: proactive, good teamwork, lots of discussion
- Are your hands dirty?
- Are project proposal, progress report and presentation well done?
  - A good project web page also helps
- A well-presented final report

A Take-Home Exam

- Will announce the time later
- Basically needs 3 hours work at home
- 1-2 essay questions

Office Hours

- Wednesdays, 2-3 p.m., Des. 334
- Or through prior arrangement

Class Webpage

- http://www.cs.uoregon.edu/classes/04W/cis610
- Papers will be posted there
- Also student presentations
  - Depends on when you send me your presentation slides