CIS 610 - Advanced Research Topics in Network Security

Introduction

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 and 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
- Each session, a student 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 : Introduction, security alert system
- Week 2 : Distributed intrusion detection (Robert)
- Week 3 : *Project proposal presentation discussion*
- Week 4 : Routing and DNS security (Toby)
- Week 5 : IP spoofing and traceback (Kushal)
- Week 6 : Worm defense (Shad)
- Week 7 : DDoS (Smita?)
- Week 8 : Security of multicast, overlay and p2p (Keith)
- Week 9 : *Project presentations and demos*
- Week 10: Class wrap up on 5/31. no class on 6/2.

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 focus 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

- 1-2 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 creative
  - The problem should be interesting
- Be down-to-earth
  - Make sure you make solid progress day by day

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

"This is what I wanna do" Presentation

- At week 3 (4/12, 14), every team presents what they want to do
- To receive the feedback; hopefully you then can decide better on what to do
  - And what specific issues to address

Choosing Your Project Topic

- Submit a one-page proposal
  - By 4/16
  - Email submissions OK
- I will approve/disapprove them and offer suggestions

Progress Report

- Two reports
- Due 4/26, 5/17
  - Email submissions OK
- 1-2 page each on the progress of your team
  - What has/hasn't been achieved
  - What have you learned

Project Presentation and Demos

- At 9th week (5/24, 5/26), 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 6/4, 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 10 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, 3:30-4:30 p.m., Des. 334
- Or through prior arrangement

Class Webpage

- http://www.cs.uoregon.edu/classes/05S/cis610
- Papers will be posted there
- Also student presentations
  - Depends on when you send me your presentation slides