

SC 546 Fall 2002 Projects

Project Description and Suggested List of Topics

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Goal

The main goal of the project is to get exposure to state-of-the-art R&D areas in networking, and gain valuable hands-on experience.

Summary

- The project will be an independent study of an advanced topic in networking and is worth 10% of the final grade.
- Projects should be done in groups of two students.
- The main approaches to perform the project are either simulation (using NS, C, Matlab or any other programming language) or through the implementation of Java applets. However, projects based on hardware or software implementations and real experiments are highly encouraged as well.

The scale and scope of the network is flexible. One can examine the behavior of a small network in great detail, or one can model much larger networks (such as the Internet itself).

Also, depending on the type of projects, one may wish to focus on detailed behavior such as collisions and packet transmission times, or rather focus on higher level behavior like file transfer times or aggregate throughput of large networks.

Requirements and Grading

- A brief mid-term report (20%)
- A 20-minutes presentation, scheduled during the second half of the semester (40% of the grade).
- A web page summarizing the main goals and results of the projects (40% of the grade).
- The groups and project titles are due by Monday, September 23rd 2002
- The mid-term report is due by Wednesday, October 23th 2002
- The web page is due by Wednesday, December 4th 2002

Evaluation

The evaluation will be based on:

- Technical merits: correctness, completeness, and thoroughness.
- Originality and effort.
- Presentation quality: clarity, conciseness, and documentation of tools and references.
- Whether the group/title was submitted on time.

Mid-term Report

The mid-term report should include

- A description of what network(s) or protocol(s) is modeled and why it is an important system to model,
- A description of the simulations/implementation/analysis design assumptions
- A clear timeline for the completion of the project.
- Expected results from the simulations/implementation/analysis

The Presentation

Here are a few tips on how to make a successful presentation:

- Clarity, simplicity, and conciseness (for instance, expressing the main ideas using bullets and keywords).
- Using pictures instead of text.
- Focusing on general concepts, rather than technicalities.
- Clearly highlighting what are the project's goals.
- Providing some implementation/simulation results, if available.

The Web Page

- The web page should summarize the main goals and results of the projects
- A description of what network(s) or protocol(s) has been modeled and why it is an important system to model
- Analyze and discuss the results
- Provide an appropriate documentation
- Point to other relevant URLs

The web pages will be published on the course web site, and on the web site of Prof. Starobinski.

Suggestions of Project Titles

- Java applet of the Aloha and CSMA MAC protocols
- Java applet of the Token Ring MAC protocol
- Java applet of the OSPF routing protocol
- Java applet of the RIP routing protocol
- Java applet of the spanning tree protocol for Ethernet Bridges
- Java applet of the IEEE 802.11 MAC protocol for wireless LANs
- Java applet of Bluetooth
- Java applet of DNS
- A simulation of overlay networks
- Comparison and implementation of sliding-window protocols
- Simulation of Gnutella/Freenet or other peer-to-peer computing protocols
- A comparative study of routing protocols for mobile ad-hoc networks (MANET)
- Wireless 802.11 MAC Performance
- Anycasting: theory and practice
- Design and evaluation of algorithms for Web caching