CS 218
Advanced Computer Networks
Quarter: Fall 2003
Course ID: CS218
Class hour: MW 8:00 - 10:00 pm
Classroom: BH 5273
Course Admin Details

- Prof Mario Gerla: BH 3732 F gerla@cs.ucla.edu
- Office Hrs: MW 10-12AM; or by appt
- TA: Kaixin Xu  BH 3803 {xkx@cs.ucla.edu}
- Prerequisites: CS 118 or equivalent
- Course grading
  - Class participation: 5%
  - Homework: 10%
  - Midterm: 35%
  - Term project/presentation: 50%
Course objectives

• Expose students to active research areas in the field of networking
• This year, we target wireless networks (W-LANs, ad hoc nets and 3G) and the Internet protocols (QoS routing, multicasting, TCP congestion control and P2P).
• Student teams will study a specific topic in more depth via a term project involving analysis, simulation, implementation, measurements
Course Outline

A. Wireless Networks
   i. Wireless LANs (802.11, Bluetooth); MAC layer protocols
   ii. Ad hoc wireless networks (routing, clustering, multicast, QoS support, ad hoc TCP)
   iii. Cellular systems (GSM, GPRS, UMTS)

B. Internet protocols
   i. Congestion control, TCP, streaming
   ii. Routing; QoS routing
   iii. Multicast
   iv. P2P
Recommended Textbooks

This is a partial list of projects proposed by my own PhD students.

- Audio Streaming over Bluetooth Scatternets using Adaptive Link Layer
- Enhancing Bluetooth TCP Performance with Bursty Errors
- ODMRP - ASYM (with asymmetric links) for Linux
- Split traffic multipath ODMRP (Protocol Design and Linux Implementation)
Cs 218 Fall 2003 Project topics (cont)

- Infrastructure and ad-hoc ODMRP implementation using Click modular router
- Towards interoperability between 802.11 modes and ad hoc modes
- Simulation of ANODR and ANODV (security)
- MOBI-GLOBUS: A mobile grid computing toolkit for mobile nodes
CS 218 previous years Project Topics

- Mobility Management based on Mobile IP in Mobile Backbone Networks
- Evaluation of convergence of wireless technologies (eg, W-LAN and UMTS)
- Enforcing End-to-end Security in Wireless Networks
- PARO implementation in QualNet: Power Aware Routing
- QoS Provisioning in Intradomain Networks: Practical System Development
CS 218 previous years Projects

- Fault Tolerance for Multicast with Bi-directional Tree
- Aggregated Multicast Support in NS2
- TCP Westwood Interaction With Network Layer Active Queue Management Schemes (e.g. RED)
- Efficient retransmission scheme in lossy environment (based on TCP Westwood)
CS 218 Project grading criteria:

Class presentation style, clarity, organization, conciseness 15

Research value (say, if judged as a research paper to be published at some conference) 0-20

Tutorial value (for papers with predominantly tutorial value, as opposed to research value); clarity of the presentation of the various approaches; classification; comparison etc 0 – 20

References. How careful is the review of prior work; i.e., how complete and consistent is the set of references? How appropriate are the citations? 5

Report (max 15 pg double spaced, including figures and tables); writing style; clarity; organization 10

Total: 50
CS 218 Fall 2003 Schedule

- Sept 29, Oct 1: Wireless LANs, MAC layer HW #1; Note: by Oct 1st projects are finalized and posted
- Oct 6, 8: Wireless Ad hoc net intro; routing, multicast; HW #2
- Oct 20-22 Bluetooth scatternets; wireless cellular (GSM, CDMA, GPRS, UMTS); vertical handoff HW #4
CS 218 Fall 2003 Schedule (cont)

• Oct 27, 29 Internet congestion control; TCP; streaming HW #5
• Nov 3,5 Internet routing; QoS routing (QOSPF); multicast Hw #6
• Nov 10-12 Holiday; Peer to peer protocols HW #7
• Nov 17-19 Guest lecture and/or class material review; Midterm (19) covering all material up to Nov 12
• Nov 24, 26 Student class presentations
• Dec 1,3,4 Student class presentations (overflow to Dec 2-7PM)
• Dec 12 Final Project Report due (No Final Exam)
Classes to be rescheduled

- Oct 13 & 15 (Milcom conference)
- Proposed:
  - Tuesday Oct 7 (7:30 – 9:20 AM)
  - Thu or Fri Oct 16-17 (8-10 AM)