

CSE 291K: Topics in **Mobile Networking**

Alex C. Snoeren

Presentations

- We will present papers in class for discussion
 - Roughly 2 papers per 1.5 hour class (sometimes 3)
- Everyone presents (including me)
 - How many depends on # students registered
 - I will present papers that are left unassigned
- Signup sheet will be passed around and available on my office door.

Administrivia

- Topics in Mobile Networking is a *seminar*
- Class is for 4 credit hours, letter grading
 - Participate in class discussion (15%)
 - Write daily evaluations (15%)
 - Present a couple of papers (25%)
 - Complete a term project (60%)
 - *No problem sets or exams*
- Instructor: Alex C. Snoeren
 - snoeren@cs.ucsd.edu, (858) 822-2289
 - Office hour: Thursday 2-3pm, APM 5230

Evaluations

- Read the papers!
- You must submit evaluations of papers
 - Email them to me by *6am* on day of class
 - No written evaluation if you are presenting
- Brief (.5-1 page)
 - Summary of paper (research problem, conclusions)
 - What you learned
 - Any ideas that occurred to you
 - Your frank opinion of topic and/or work

Class mechanics

- The presentations are for fostering discussion
 - ...so I expect you to participate in discussions
- Presenters
 - Give a brief overview of the paper and your evaluation
 - Come prepared with discussion questions
- Everyone else
 - Use your evaluations as a basis for discussion

Project

- Work in pairs / triples -- groups due next week
- Full schedule is on the Web
- Start thinking about what you might want to work on, who you might want to work with
- I'll post some topics, but I encourage you to use your own
- Your final will be a class presentation on your project during the last class and exam period

Free Loader Policy

- Sign up for exactly 1 credit hour
- Pass / fail grading
- You do not have to do the project
- You must do the evaluations and presentation(s)
- If you have a special concern, see me

Topics to be Covered

- Network connectivity
- Handoff performance
- Ad hoc routing
- Disconnected operation
- Adaptation
- Migratory Applications
- Portable Virtual Machines (VMs)

Network Connectivity

- [Per98] Charles E. Perkins, "Mobile Networking through Mobile IP."
- [CB96] Stuart Cheshire and Mary Baker, "Internet mobility 4x4."
- [BB95] Ajay Bakre and B. R. Badrinath, "I-TCP: Indirect TCP for Mobile Hosts,"
- [MB98] David A. Maltz and Pravin Bhagwat, "MSOCKS: An Architecture for Transport Layer Mobility."
- [SB00] Alex C. Snoeren and Hari Balakrishnan, "An End-to-End Approach to Host Mobility."
- [ZM02] Victor C. Zandy and Barton P. Miller, "Reliable Network Connections."
- [GC01] Mark Gritter and David Cheriton, "TRIAD: A Scalable Deployable NAT-Based Internet Architecture."
- [MB97] Jayanth Mysore and Vaduvur Bharghavan, "A New Multicasting-Based Architecture for Internet Host Mobility."

Handoff Performance

- [CI95] Ramon Caceres and Liviu Iftode, "Improving the Performance of Reliable Transport Protocols in Mobile Computing Environments."
- [BSK95] Hari Balakrishnan, Srinivasan Seshan, and Randy H. Katz, "Improving Reliable Transport and Handoff Performance in Cellular Wireless Networks."

Ad Hoc Routing

- [JMB01] David B. Johnson, David A. Maltz, and Josh Broch, "DSR: The Dynamic Source Routing Protocol for Multi-Hop Wireless Ad Hoc Networks."
- [PB94] Charles E. Perkins and Pravin Bhagwat, "Highly Dynamic Destination-Sequenced Distance-Vector Routing (DSDV) for Mobile Computers."
- [Li+00] Jinyang Li, John Jannotti, Douglas S. J. De Couto, David R. Karger, and Robert Morris, "A Scalable Location Service for Geographic Ad Hoc Routing."
- [KK00] Brad Karp and H. T. Kung, "GPSR: Greedy Perimeter Stateless Routing for Wireless Networks."
- [Bro+98] Josh Broch, David A. Maltz, David B. Johnson, Yih-Chun Hu, and Jorjeta Jetcheva, "A Performance Comparison of Multi-Hop Wireless Ad Hoc Network Routing Protocols."
- [Li+01] Jinyang Li, Charles Blake, Douglas S. J. De Couto, Hu Imm Lee, and Robert Morris, "Capacity of Ad Hoc Wireless Networks."

Disconnected Operation

- [KS91] James J. Kistler and M. Satyanarayanan, "Disconnected Operation in the Coda File System."
- [MES95] Lily B. Mummert, Maria R. Ebling and M. Satyanarayanan, "Exploiting Weak Connectivity for Mobile File Access."
- [Ter+94] Douglas B. Terry, Alan J. Demers, Karin Petersen, Mike J. Spreitzer, Marvin M. Theimer and Brent B. Welch. "Session Guarantees for Weakly Consistent Replicated Data."
- *[Ter+95] Douglas B. Terry, Marvin M. Theimer, Karin Petersen, Alan J. Demers, Mike J. Spreitzer, and Claus H. Hauser, "Managing Update Conflicts in Bayou, A Weakly Connected Replicated Storage System."*
- [Pet+97] Karin Petersen, Mike J. Spreitzer, Douglas B. Terry, Marvin M. Theimer and Alan J. Demers, "Flexible Update Propagation for Weakly Consistent Replication."

Adaptation

- [Wei+94] Mark Weiser, Brent B. Welch, Alan J. Demers and Scott Shenker, "Scheduling for Reduced CPU Energy."
- [IBW97] Jon Inouye, Jim Binkley and Jonathan Walpole, "Dynamic network reconfiguration support for mobile computers."
- [Nob+97] Brian D. Noble, M. Satyanarayanan, Dushyanth Narayanan, James E. Tilton, Jason Flinn and Kevin R. Walker, "Agile application-aware adaptation for mobility."
- [FS99] Jason Flinn and M. Satyanarayanan, "Energy-aware adaptation for mobile applications."
- [Fox+96] Armando Fox, Steven D. Gribble, Eric A. Brewer, and Elan Amir, "Adapting to Network and Client Variability via On-Demand Dynamic Distillation."
- [ZD97] Bruce Zenel and Dan Duchamp, "A General Purpose Proxy Filtering Mechanism Applied to the Mobile Environment."
- [Fox+98] Armando Fox, Steven D. Gribble, Yatin Chawathe, and Eric A. Brewer, "Adapting to Network and Client Variation using Infrastructural Proxies: Lessons and Perspectives."

Migratory Applications

- [Jos+95] Anthony D. Joseph, A. F. de Lespinasse, Joshua A. Tauber, David K. Gifford, and M. Frans Kaashoek, "Rover: A toolkit for Mobile Information Access."
- [Gri+02] Robert Grimm, Janet Davis, Eric Lemar, and Brian Bershad, "Migration for pervasive applications."
- [SBK01] Alex C. Snoeren, Hari Balakrishnan, and M. Frans Kaashoek, "Reconsidering Internet Mobility."
- TBA

Portable Virtual Machines

- *[Dou90] Frederic Douglass, "Transparent Process Migration in the Sprite Operating System."*
- *[LLM88] Michael Litzkow, Miron Livny, and Matt Mutka, "Condor - A Hunter of Idle Workstations."*
- *[KS02] Michael Kozuch and M. Satyanarayanan, "Internet Suspend/Resume."*
- *[Sap+02] Constantine P. Sapuntzakis, Ramesh Chandra, Ben Pfaff, Jim Chow, Monica S. Lam, and Mendel Rosenblum, "Optimizing the Migration of Virtual Computers."*
- *[Osm+02] Steven Osman, Dinesh Subhraveti, Gong Su, and Jason Nieh, "The Design and Implementation of Zap: A System for Migration Computing Environments."*
- *[Ric+98] Tristan Richardson, Quentin Stafford-Fraser, Kenneth R. Wood, and Andy Hopper, "Virtual Network Computing."*