

KU EECS 800

Survivable, Resilient, and Disruption Tolerant Networking

James P.G. Sterbenz

The University of Kansas Department of Electrical Engineering and Computer Science

jpgs@eecs.ku.edu

3036 Eaton

++1 785 864 8846

<http://www.ittc.ku.edu/~jpgs/courses/eecs800>

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Description

This seminar will begin with a series of lectures and readings from the literature to introduce the emerging field of survivable, resilient, and disruption-tolerant networks, which aim to remain operational and provide an acceptable level of service in the face of a number of challenges including: natural faults of network components; failures due to mis-configuration or operational errors; attacks against the network hardware, software, or protocol infrastructure; large-scale natural disasters; unpredictably long delay paths either due to length (e.g. satellite and interplanetary) or as a result of episodic connectivity; weak and episodic connectivity and asymmetry of wireless channels; high-mobility of nodes and subnetworks; unusual traffic load (e.g. flash crowds). New approaches, protocols, and algorithms are required at all layers (physical, MAC, link, network, transport, session, application) and at all planes (data, control, management).

With guidance from the instructor and a goal of broad coverage of the field, students will choose an area of interest to pursue in significantly more depth. Papers will be read with findings presented orally to the class and summarised in written form, leading to a project that investigates novel solutions in the chosen area. Simulation is a likely means to execute the project, but other approaches may be considered. Many potential thesis topics lie in this field, and exceptional projects will be encouraged for conference publication.

Prerequisite: EECS 663

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Introduction

- Instructor: James Sterbenz
 - 1974–1980 BSEE, BSCS, AB Washington University
 - 1980–1981 NCR
 - 1981–1984 IBM
 - 1984–1991 D.Sc. 1991 Washington University in St. Louis
 - 1991-1994 IBM HPPC
 - 1994–1997 GTE Laboratories
 - 1997–2002 BBN Technologies
 - 2002–2005 UMass – Amherst
 - 2003– Lancaster University
 - 2005– KU EECS/ITTC
- full CV online

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Fall 2005 Logistics₁

- Time and location
 - 09:30 – 10:45 Tue, Thu
 - 2002a Eaton
- Some classes must be rescheduled
 - bleeding-edge research \Rightarrow travel to conferences & PI mtgs.
 - I'll try to minimise disruptions, but some are inevitable
 - negotiate day/time
 - need to reschedule Thu. Aug. 25 and Tue. Aug. 30

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Fall 2005 Logistics₂

- Mobile phones and PDAs
 - off or vibrate
- Prerequisite
 - EECS 663 or
 - equivalent introductory networking course
 - e.g. Kurose, Stallings, Peterson, Tanenbaum, etc.
 - basic networking and Internet concepts needed for this class

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Fall 2005 Logistics₃

- Office hours
 - negotiated day/time
 - call EECS or ITTC office or email *before* dropping in
 - email with *meaningful* subject lines
 - bad
 - Subject: Hi!
 - Subject: regarding class
 - good
 - Subject: EECS800 - need help understanding DTN bundle layer
 - mobile phone *only* for *emergency* use
- Lecture notes will go online
 - generally within one day of class

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Course Structure

1. Introductory lectures and general readings
2. Focused readings
3. Project

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Course Structure₁

1. Introductory lectures and general readings
 - introduction and survey to the field
 - definitions
 - sub-areas
 - begin thinking about your interest area
 - for course
 - potential thesis topics
 - students present past failures and scenarios
2. Focused readings
3. Project

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Course Structure₂

1. Introductory lectures and general readings
2. Focused readings
 - each student chooses area of interest
 - one page proposal due 16 Sep.
 - class-wide partitioning of space to ensure broad coverage
 - presents papers to class (~2 per class period)
 - email foils 1 week before class
 - “EECS800” must begin subject line
 - written summary of papers due one week later
 - will go on class web page
3. Project

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Course Structure₃

1. Introductory lectures and general readings
2. Focused readings
3. Project
 - each student does project in chosen area
 - proposal due 20 Oct.
 - report due 8 Dec.
 - presentations during last week and final exam period
 - simulation, implementation or *comprehensive* survey
 - latter is not as easy as you think!
 - *outstanding* projects
 - will receive A grade
 - will be encouraged for publication

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Grading

- Grade weights
 - 25% midterm exam (closed book, essay style)
 - 20% class participation (other than leading discussions)
 - 20% paper presentation and discussion leadership
 - 35% final project and report
- Invalid reasons to raise grade or receive incomplete
 - employer reimbursement
 - academic probation status
 - visa status
 - poor planning (talk to me *early* if you are in trouble)

General Information

Sources of Literature

- The Library
 - big building with hardcopy books and journals: use it!
- The Web
 - source for journal papers
 - ACM Digital Library, IEEE Xplore (subscription through library)
 - individual and project Web pages
 - source for information on research projects
 - source for other information
 - non-refereed reports and information
 - compare to a street corner bulletin board: *use with care*
 - use *very* judiciously
 - reports with many URL refs unlikely to receive acceptable grade

Academic Integrity and Plagiarism

Referencing

- All sources *must* be properly referenced
 - authors, “paper name”, *journal*, date, publisher, page range
 - also URL if from obscure source (e.g. university tech reports)
 - see course Web page or for examples
- James P.G. Sterbenz, Rajesh Krishnan, *et al.*,
“Survivable Mobile Wireless Networks: Issues, Challenges, and Research Directions”,
Proceedings of the ACM Wireless Security Workshop (WiSE) 2002 at MobiCom,
Atlanta GA, Sep. 2002, pp. 31–40.
- Cite whenever work related or ideas are used
 - Plagiarism will result in F for *course*
 - and possible further sanctions
 - it is highly unlikely that you will get away with it!
 - but students still try every semester

Academic Integrity and Plagiarism

Quoting and Paraphrasing

- Quoting text or paraphrasing
 - “quotation marks” for sentence or less
 - blockquote for multiple sentences
- Beware of read-and-write in two windows
 - take intermediate notes from which you write
- Quoting rarely needed
 - example: quoting or paraphrasing definition of principle
 - sequence of quotes does *not* demonstrate understanding
 - not a way around English writing skills
 - better to be in your *own* imperfect English
 - unlikely to receive acceptable grade

Academic Integrity and Plagiarism

Class Disruption

- University does not tolerate

Presentations

Purpose

- Presentation is a sequence of
 - {slides | foils [IBM] | vu-graphs [Bell Labs]}
- Purpose
 - reminder of what to say and when
 - visual assist for attendees, but *not a distraction*
 - permanent record of talk for presenter and attendees

Presentations

Structure

- Structure
 - title foil: title, name, affiliation, email, URL
 - abstract for printing; may have 12 or 14 point font
 - outline (repeat at for each high-level section)
 - content
 - summary
 - acknowledgements
 - any imported content
 - anyone who helped with presentation content
 - references

Presentations

Style₁

- Header/footer
 - name, title summary, page number, date, affiliation logo
 - should not take significant fraction of area
- Title
 - meaningful summary of major point on foil
 - subtitle when groups of foils
- Text
- Background

Presentations

Style₂

- Text
 - clear non-distracting font
 - e.g. Tahoma, Arial, **Comic**, Times
 - use symbols, italics, sub/superscript for math
 - avoid fancy animations (e.g. fly-in)
 - bells-&-whistles sell product; don't make good presentations!
 - but appear or dissolve-in can be useful to not reveal next point
 - use reasonable font size (e.g. 24pt / 20pt / 18pt)
 - turn off PowerPoint shrink to fit!
 - manually decrease spacing only if absolutely necessary
 - use consistent style for *emphasis* and de-emphasis
 - your style may evolve over time; refine as necessary

Presentations

Style₃

- Diagrams
 - use when beneficial to explain concept
 - use animation *only* when needed to clarify
 - manual animation steps can be easier to edit and print
 - e.g. packet flow
- Plots and graphs
 - try to match foil style
 - foreground/background
 - fonts

Presentations

Style₄

- Background
 - wallpapers are very distracting: *avoid them*
 - some PowerPoint templates are very bad
 - e.g. ocean, clouds, cascade
 - use contrasting background/text
 - light on dark best for projection
 - cool background colors are soothing (green, cyan, blue, violet)
 - dark on light best for printing
 - use color judiciously to allow black/white printing
 - can be difficult to maintain both light/dark and dark/light
 - avoid gaudy combinations
 - e.g. blue/red, red/green, blue/orange

Presentations

Semantics

- 1 major idea / foil
 - meaningful titles
 - use structure with sub-titles when necessary
- Structure bullet items into *meaningful* hierarchy
 - fit most bullet items on a single line
 - they *summarise* your spoken points
 - if you must wrap...
 - ...use linebreak or remove bullet and set indent

Presentations

Presentation Style

- Rate
 - 1 foil / 2 min. average guideline for most presenters
 - plan ahead!
 - do dry run practice in front of mirror or colleague
- Talk “to” the foils
 - don’t *read* the bullet items
 - reminder to presenter of what to say
- Use pointer judiciously
 - don’t randomly wave about
 - laser pointers are cheap – get one

Area Proposal Summary

- Format
 - 1 or 2 pages
 - reasonable font (10, 11, or 12 point)
 - single column single spaced
 - reasonable margins
- Content
 - 1 to 3 areas of interest
 - we'll pick one
 - what interests you and why
 - how this may lead to a project (and perhaps thesis)
 - several overview papers to present in class

End of Foils