

**T-110.557 Fall 2004**  
**Research Seminar on**  
**Telecommunications Software**

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# Today's schedule

- Introductions (20 min)
  - Who we are, why we are here
- Introduction to the seminar (15 min)
  - Goals
  - Working methods and grading
- Paper assignments and schedule (10 min)
- Grad student topics (30 min)
- Everything else (the rest of time, as needed)

# Introductions (20 min)

- Goal: To learn **who** we are and **why** are we here
- Method:
  - Discussion in pairs, groups of 4, groups of 8
  - Summary of the discussion
- Questions to answer:
  - **Who** am I?
  - **Why** am I here, what are my goals?
  - **What** do I want to learn?

# Step 1: Pair discussion (4 min)

- Pair with a person next to you
  - Pick someone whom you **don't** know
  - Move around if needed
- Tell your pair, in **one** minute
  - **who** you are
  - **why** do you want to take this course
  - **what** do you plan to learn

## Step 2: Groups of four (4 min)

- Form a group of 4 with a pair next to you
  - Try to pick people who you don't know, but it is not that important this time
- Summarise, in one minute, to the other pair
  - **Who** you are
  - **What** are your expectations for the course

# Step 3: Groups of eight (4 min)

- Join with another group next to you
- Summarise, in one minute, to the other group
  - **Who** you are (just names)
  - **What** are your expectations
- Together, decide what are the dominant (most often expressed) **expectations** within the group
- Prepare to present the expectations
  - Select one person to present them

# Step 4: Expectations (5 min)

- Background on HIP from implementation/standardization etc, but not id/loc split or DHTs from research point of view
- Scalability doubts, broken connectivity
- Locator/ID split, how it effects the network
- Understanding DHTs
- Applying HIP for B3G, 4G etc future networks
- Deeper understanding on HIP
- Understanding the architecture of the Internet

# Introduction to the seminar

- Goals
- Content
  - Introduction to ID/loc split
  - Introduction to DHTs
- Working methods and grading

# Goals

- Foster understanding of the future **architecture** for the global Internet
- Based on two assumptions
  - More indirection (new layer(s)) is needed
  - Flat name spaces will dominate
- Critical approach
  - Perhaps the assumptions are dubious?
- For grad students: learn to write papers

# Content

- Papers on architecture, ID/loc split and DHTs
  - Everyone reads the papers at home
  - Introduction by undergraduate (15-20 min)
  - Followed with discussion (20-30min)
- Papers produced by graduate students
  - Topic decided with Andrei or Pekka
  - Written, with supervision from Andrei/Pekka
  - Presented at a full day workshop

# ID/loc split

- IP addresses serve the dual role of being
  - **End-point Identifiers**
    - Names of network interfaces on hosts
  - **Locators**
    - Names of naming topological locations
- This duality makes many things hard
- Hence, maybe we should split these roles

# Background for the split

- Mobile hosts
  - Need to change IP address dynamically
- Multi-interface hosts
  - Have multiple independent addresses
- Mobile, multi-interface hosts most challenging
  - Multiple, dynamically changing addresses
- More complex environment
  - e.g. local-only connectivity

# Distributed Hash Tables

- Distributed directory for flat data
- Several different ways to implement
- Each server maintains a partial map
- Overlay addresses to direct to the right server
- Resilience through parallel, unrelated mappings
- Used to create **overlay networks**

# Working methods and grading

- Weekly seminar meetings on Wednesdays
  - Brief introductions to papers + discussion
- Full day workshop, tentatively on Dec 1st
- Emphasis on **research**
  - Your own critical thinking
  - Discussion!!!

# Passing requirements for undergraduate students

- Two paper introductions, 15-20 min each
  - send the slides to the t-1 10.557@tml.hut.fi
  - latest on the Friday before their presentation
- 70% participation to the weekly meetings
  - read the papers before the meeting
  - prepare to ask questions and discuss
- Participation to the full day meeting
- Grading based on presentations + activity

# Passing requirements for graduate students

- 60% participation to the weekly meetings
  - a brief write up of the missed papers, sent to the assistants
- Writing a paper of an own topic, 8-12 pages
  - May be a literature survey (grade 1-4)
  - May represent original work (grade 2-5)
- Presenting the paper at the full day meeting
- Grading based on paper (70%) + presentation

# Grading summary

- Undergraduates
  - Minimum participation: pass/fail
  - Quality of presentations: 1-5
  - Activity during meetings:  $\pm$  1 grades
- Graduates
  - Minimum participation + write-ups: pass/fail
  - Quality of paper: 70% of 1-5
  - Quality of presentation: 30% of 1-5

# Instructions for the weekly presentations

- 15-20 minutes (at most 10 slides)
- If you haven't made presentations in English beforehand, practise in the front of a mirror and measure the time spent
- Focus on
  - what is **important** in the paper
  - what is **difficult** in the paper
- Own thoughts and provocative questions a plus

# Advisory time budget for undergrads

- Weekly meetings:  $70\% * 11 * 1.5 = 12$  hours
- Reading papers:  $20 * 2 = 40$  hours
- Preparing presentation:  $2 * 10 = 20$  hours
- Full day workshop: 8 hours
- Total: 80 hours

# Advisory time budget for grads

- Weekly meetings / write ups:  $11 * 1.5 = 17$  h
- Reading papers:  $20 * 2 = 40$  h
- Writing paper, pre-workshop work: 80 h
- Preparing workshop presentation: 8 h
- Full day workshop: 8 h
- Revising paper after workshop: 7 h
- Total: 160 h

# Paper assignment (tentative)

Name	Topic 1	Date	Topic 2	Date
Autero (JA)	13	Nov 17	8	Oct 6
Chairs (PN/AG)	1	Sep 22	2	Sep 22
Ding (LD)	16	Oct 6	17	Oct 13
Honkanen (RH)	4	Sep 29	6	Oct 20
Honkola (JH)	10	Oct 20	15	Oct 13
Kekkonen (MK)	5	Oct 27	19	Nov 24
Koskela (JK)	14	Nov 17	12	Nov 10
Semenov (AS)?	3	Oct 27	18	Sep 29
Vehmersalo (EV)	7	Nov 3	20	Nov 24
Westerholm (OW)	9	Nov 2	11	Nov 10

# Paper assignment (by date)

Date	Topic 1		Topic 2	
Sep 22	2. Salzer, Reed et al	PN*	1. Kleinrock & Kamoun	AG*
Sep 29	4. Francis & Gummadi	RH	18. Francis	AS?
Oct 6	8. Clack et al	JA	16. Braden, Clark et al	LD
Oct 13	15. Crowcroft et al	JH	17. Ford	LD
Oct 20	6. Arkko & Nikander	RH	10. Henderson et al	JH
Oct 27	3. Stoica et al	AS?	5. Sit and Morris	MK
Nov 3	7. Stoica et al	EV	9. Eriksson et al	OW
Nov 10	11. Gummadi et al	OW	12. Zhao et al	JK
Nov 17	13. Dabek et al	JA	14. Rhea et al	JK
Nov 24	19. Balakrishnan et al	MK	20. Zhuang et al	EV

# Writing papers

- Schedule
- Format and publication
- Suggested topics

# Schedule for paper writing

- Sep 22: Topic selected
- Oct 6: Abstract and initial reference list
- Oct 20: Outline and revised reference list
- Nov 3: Almost complete version of paper
- Nov 17: Paper complete
- Nov 24: Revised for pre-proceedings
- Dec 7: Final DL for revised papers
  - Missing a deadline: -0.5 grades

# Format for the papers

- About 8–12 pages
- May be a literature survey or original work
- Intermediate versions as plain text or PDF
- Final version in LaTeX and PDF
  - Use TML course specific LaTeX template
  - A link will be provided by the assistants
- Will be published as a TML technical report
- Submission to elsewhere encouraged

# Topics for grad students

Comparison of HIP, CGA, HBA etc.

Applying HIP to IPv6 neighbour discovery

Addressing privacy in HIP

Channel binding in HIP

Group communication and id/loc split

Privacy vs. identity on different layers

Autoconfiguration in small networks

Id/loc split and multicast

Integrating HIP with legacy authentication

Host routing policy in multi-homing

DHT performance

DHT security

Optimising DHT topology

DHTs and privacy

Using overlay routing for DoS protection

One-to-many and content filtering in overlay networks

Multipath congestion control

Internet economics and id/loc split

Micro-economic models for DHT hosting

Overlay networks on top of DHT

# Everything else

- Questions?
- Comments?
- Disagreements?