Why Grad School

(and research topics in systems)

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Why

- Jobs at the end (PhD)
  - Faculty
  - Research labs

- Knowledge (Master’s)
  - Learn from (with) smart friends
  - Learn advanced material
  - Learn new stuff

- Not the document or the Dr., regardless of how much your parents want to frame it.
What it takes

- Resolve, bullheadedness
- Desire, drive
- Writing and speaking skills
- Time management

**Smart people get no pass**; if you’ve never studied before, prepare.
Whither motivation?

- Teaching, students (mine)
  - Organize information
  - Entertain
  - Altruism

- Research (a common statement)
  - Never reinvent
  - Endless challenges
  - Contribute new knowledge

- Autonomy (typical of older students)
  - I’ve seen my “boss” maybe three times?
  - People may take your ideas more seriously
Remember your goals

- TA’ing contributes little (unless for a class you haven’t taken, or for faculty you want to know).

- Manage your advisor – do not expect to be directed from above.

- Excel... at something.
Three large areas:

1. Networks: reinventing the Internet with security, qos, accountability…

2. Peer-to-peer: building systems that need no central server,

3. Virtualization: vmware-like tricks for many vm’s; moving boundaries between operating system and application
Systems (2/3) – problems

Four canonical problems:

1. Scale: easy to make solutions for two, hard for two million. easy to make code that runs on desktops, hard to add cell phones.

2. Security: easy when people cooperate, hard to defend against evil.

3. Management: troubleshooting, configuration, etc.

Four basic methods:

1. Measurement: understand today’s artifact
2. Simulation: a future system completely in software
3. Emulation: hardware/software mix
4. Overlay deployment: run on PlanetLab – ã300 sites worldwide
Why systems?

- Often better funded than theory
- Often easier to predict success
- Uses your Perl skillz
- Often large groups
Summary

- Grad school teaches you more stuff.
- Grad school develops non-technical skills.
- Grad school is personal.
- Systems research is fun. And sometimes funded.