

CS 525: Advanced Topics in Distributed Systems Spring 2009

Indranil Gupta
Structuring Project Code:
“The 1 Line Solution”
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Background

Discussion – Studying Your Protocol

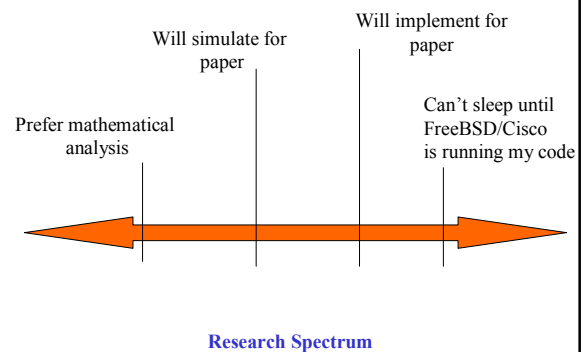
- How accurate are mathematical analyses?
 - Often simplistic, so we resort to simulations, often trace-based...
- Simulations easy to do – implement, and run on your machine (or a small cluster)
- How accurately can simulations model real-world stresses?
- How do we know that we’re accounting for all possible kinds of failure?
- All possible kinds of stresses? All possible kinds of traces?

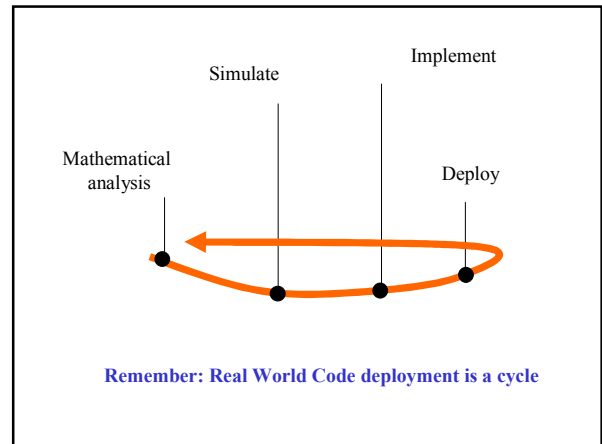
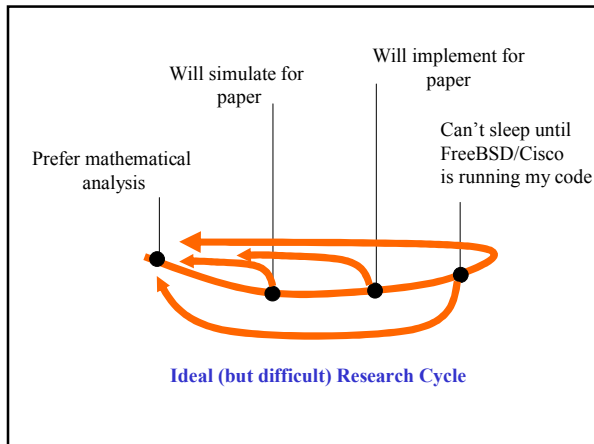
Discussion – Studying Your Protocol

- *Can* simulations ever model reality accurately?
- Is deployment the ultimate test?
- Have you seen any papers that match simulation and real-world running experimental numbers?
- Why?
- Unfortunately, often “The paper is the system” in research

As a Result

- Rare for someone else to pick up your idea, implement it and run it in the real world (although it does happen, there are too many ideas out there...)





- ### Presumption
- Assumption: Rare for someone else to pick up your idea, implement it and run it in the real world (although it does happen, there are too many ideas out there...)
 - Deployment is mostly your responsibility
 - **Problem:** Design your simulation code so that you can convert your code from simulation → deployable version by changing a single line of code
 - “1 Line Solution”

For Your Project

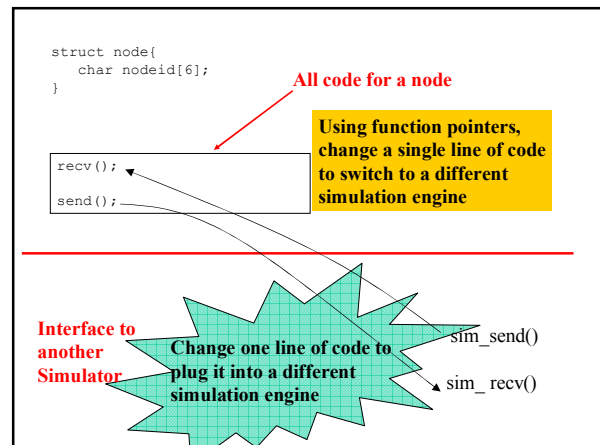
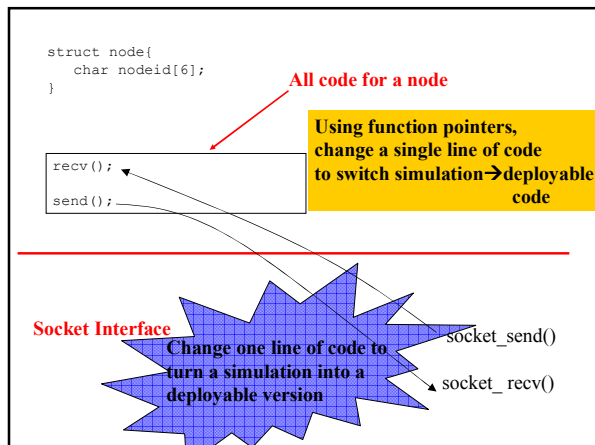
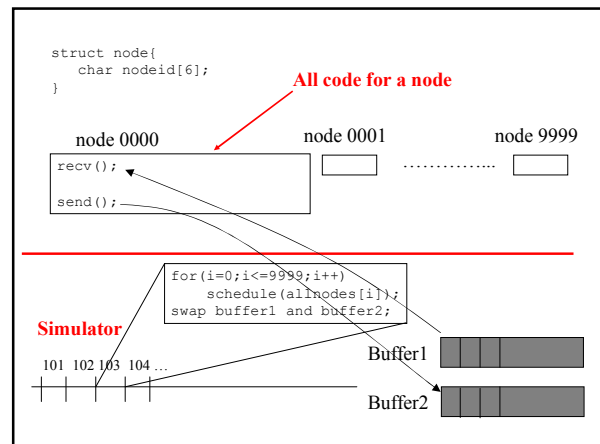
“How do I write code for my Distributed Protocol XYZ so that I can evaluate it with 100, 000 nodes?”

The 1 Line Solution

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- ### Writing The Code
-
- Simulation engines (ns2, glomosim) etc. are one option
 - A required standard in some research communities (e.g., ad-hoc networking)
 - Not so in the p2p or (largely) the sensor net communities (yet)

The advantage of such an elaborate spread?

- Layering gives clean separation of implementation from simulation
- Easy debugging (No global variables for the implementation, please!)
- And...



- Easier to do above with C or Java or C++
- Can put an “Application” layer on top of the “Real Code” layer
- Of course, you are free to structure your code in a different way should you so wish...

Questions