CptS/EE 555
Fall 2001
Extra Credit Assignment
Due: In Class Dec 3

This is an Extra Credit assignment – it is entirely optional. If you decide to do it, it is worth up to 40 exam points. Since it is potentially worth about a full letter grade in your final grade, I expect commensurate effort and results to achieve those 40 points.

The assignment has two options:

1. a paper comparing two RPC systems
2. a paper surveying the application of control theory to network congestion control.

Option 1: Comparing RPC systems

For this option you are to write a paper describing and contrasting two RPC systems. Examples of RPC systems are: SunRPC, DCE RPC, Microsoft RPC, Java RMI, XML-RPC, SOAP (Simple Object Access Protocol), CORBA RPC, ILU (Interlanguage Unification – Xerox PARC). I rule out the pair (SunRPC, DCE RPC) since these are both discussed in the textbook.

Your paper should address the methods the RPC system designers chose for addressing several important problems in RPC such as at-most-once semantics, reliability, handling "large" calls and results, argument and result marshaling, demultiplexing, exception handling, distributed garbage collection. Of particular interest to me is the context in which these choices were made – why did they choose the way they did? You should provide analysis that would be helpful in choosing between the your two RPC mechanisms for different purposes.

I expect that you will read (and cite) the specification documents for the systems that you choose, as well as other historical documentation that provides context for why the systems were developed and the particular choices made.

Although there are no hard length requirements, I expect that such a paper would require around 8 to 15 pages. Much less and I don't think you'll be able to get to the meaty issues, much more and the meaty issues will be lost in less-important details.

Option 2: Application of control theory to network congestion control – literature survey

While preparing for the discussion of congestion control I've run across a few tantalizing comments that suggest at least some current practice in network congestion control is rooted in more conventional control theory. However, the presentation in our textbook and in every other text I've encountered seems to address the issue by presenting a collection of ad hoc algorithms, without any firm theoretical underpinnings. For this assignment you will need to do a literature search and come up with 3 to 6 papers or books that address the issues in network congestion control from a control theoretical perspective. I would like you to provide a one to two page summary of each paper or book, and then analyze the state of the art in control theoretic modeling of network congestion control mechanisms such as those we have looked at in Chapter 6.

Resources for both options

http://citeseer.nj.nec.com has many computer science papers available for download as postscript or pdf. Also, the ACM digital library is available from the WSU libraries home page: http://www.wsulibs.wsu.edu. If you need help with using this, talk to the reference librarian in Owen Science Library. I also find that often just doing a search from http://google.com for key terms turns up enough references to get started on a project like this.

I'm interested in hearing what you are planning for your project. If you stop by during office hours in the next couple of weeks (I'll be in for office hours on Tuesday, Nov. 21) we can discuss your plans and maybe I'll have some additional ideas about how to get started on your particular project.