Week #2
Paper Summary #2
Paper: End-to-End Argument in System Design
Student: Shuo Yang

1   First Pass

Carefully read abstract, intro, main design, and conclusions. Skim analysis/evaluation section.

1.1   What is the goal?

The paper proposes a design principle called *end-to-end argument* for distributed computer systems, articulates the argument explicitly, so as to examine its nature and to see how general it really is.

1.2   What is the specific problem?

Choosing the proper boundaries between functions is the key for computer system design.

1.3   What is the context (background, previous work, assumption)?

Background: a class of function placement argument has been used for many years with neither explicit recognition nor much conviction;the emergence of the computer networks.
Assumptions: The function in question can completely and correctly be implemented only with the knowledge and help of the application standing at the end points of the communication system.

1.4   What is the main idea of the paper?

The argument appeals to application requirements, and provides a rationale for moving function upward in a layered system, closer to the application that uses the function. The lower levels need not provide "perfect" reliability.

2   Second Pass

Start with the assumption that the main point is wrong, even if you agree with it. Focus on analysis/evaluation sections and the details of the design. (How do the results prove otherwise?) What are the weak points?

2.1   How do the results prove otherwise?

How do the results prove that my assumption (that the main point is wrong) is wrong?
    Start with an example of "reliable file transfer", the authors argues even if the communication system provides low-level reliable data transmission, it still cannot guarantee the reliability since correct file transmission is assured by the end-to-end checksum and retry whether or not the data transmission system is especially reliable.
    Based on this example, the authors argue that "in order to achieve careful file transfer, the application program that performs the transfer must supply a file-transfer-specific, end-to-end reliability guarantee".
    Then from performance aspects, the authors argue that the lower levels need not provide "perfect" reliability. Thus the amount of effort to put into reliability measures within the data communication system

is seen to be an engineering tradeoff based on performance, rather than a requirement for correctness. But authors raise the concern of justifying the placing of functions in low-level subsystem using performance, that is: 1) the lower level subsystem is common to many applications, those applications that do not need the function will pay for it anyway; 2) the low-level subsystem may not have as much information as the higher levels, so it cannot do the job as efficiently.

Then the authors use serveral other examples to justify their point.

2.2   What are the weak points?

1. Most arguments are based on file transfer example.

2. Did not draw the scope of network applications.

3.