Comp 8005 Computer Systems Technology February 2018

Network and Security Applications Development

Assignment #2

Due: February 26, 1200 hrs. You may work in groups of two.

Objective: To compare the scalability and performance of the select-, multi-threaded-, and epoll-based client-server implementations.

Assignment:

Design and implement three separate servers:

1. A multi-threaded, traditional server
2. A select (level-triggered) multiplexed server
3. An epoll (edge-triggered) asynchronous server

All the servers must be designed to handle multiple connections and transfer a specified amount of data to the connected client. To simplify things you may want to simply implement an extended (or more sophisticated) echo server.

You will also design and implement a client that really is no more complex in this case then an echo client. However each client will have the ability to send variable-length text strings to the server and the number of times to send the strings will be a user-specified value.

Note that you will need to have the client maintain the connection for varying time durations (depending on how much data and iterations). The idea is to keep increasing the load on the server until its performance degrades quite significantly. In other words we want to measure how many (scalability) connections the server can handle, and how fast (performance) it can deliver the data back to the clients.

To that end you will have to maintain statistics on both the server and the clients.

In order to have a meaningful test you will need to generate client requests from multiple machines but each machine can have many instances of the client as well.

Constraints:

- The server will maintain a list of all connected clients (host names) and store the list together with the number of requests generated by each client and the amount of data transferred to each client.
- Each client will also maintain a record of how many requests it made to the server, the amount of data sent to server, and the amount of time it took for the server to respond (i.e., echo the data back).
- You are required to summarize all your data and findings in a properly formatted technical report. Make extensive use of tables and graphs to support your findings and conclusions.

To Be Submitted:

- Hand in complete and well-documented **design work, source,** and an **executable**.
- You are also required to demonstrate your working programs during the lab the day the assignment is due.
- Ensure that you clearly explain the testing procedures for your programs and provide test data as necessary.
- Submit a **zip** file containing all the code and documents as described below in the sharein folder for this course under "**Assignment #2**".
- Your report must follow the standard technical format.

Assignment #2 Evaluation

(1). **Design Work/Experiment Design**:	/ 15
(2). **Testing/Documentation/Help:**	/ 25
(3). **Functionality**:	/ 60
Total:	/ 100