Project 1: Comparison of Various Distributed Techniques

The principal objective of this project is to gain understanding of a number of distributed system techniques. The performances of the techniques will be compared and contrasted using a simple example problem. Consider a client-server application where the client programs create fifteen (15) double arrays. The server receives the arrays (each array with 15,000 numbers) from the clients and returns the array with the maximum average. The server should be threaded so that it can handle requests from multiple clients. The load on the network is a variant, and you do not have to consider that. As the locally created arrays are sent from the clients and the resulting array is returned from the server, the performance (response time) of the following seven technologies will be evaluated and discussed under the same environment using a variable number of concurrent clients.

- Socket
- RPC (Remote Procedure Call)
- RMI (Remote Method Invocation)
- SOAP (Simple Object Access Protocol)
- REST (REpresentational State Transfer)
- Apache Thrift
- Google Protocol Buffer

Two cases will be considered to evaluate the performance of the above seven technologies:

1) A client will send one call to the server. It will be done repeatedly (30 times) to calculate the average time for performing the task once.
2) A variable number of clients will send multiple calls (15 calls) simultaneously to the server. Calculate average response time for each case.

Deliverables

- Implementation
  - The complete code must be submitted with an appropriate documentation electronically.
  - Electronic submissions must be accompanied by a README file containing student names and instructions for running the program.
- Report
  - A general comparative description of the seven techniques.
  - Comparison among the techniques based on the experimental results using tables and graphs.
  - Assumptions and project experience discussions.
  - Group member responsibilities – who did what?

Marking Scheme (30)

- Program Demonstration 20
- Project Report 10