

Network Centric Computing (CS-382) Assignment 1

Multi-Threaded Communication Application

Deadline : Saturday February 17th

Important Note:

You can do this assignment in pairs. You can either write code in python or java.

If there are questions ask the course staff; they are there to help you. Other than your partner you are not allowed to discuss your code with anyone. Vivas will be individual and those who will not give the viva will get no marks for the assignment.

Also DO NOT plagiarize as any such act will be reported to the DC.

Some Facts about Whatsapp

1. WhatsApp founded in 2009 by former Yahoo! employees Brian Acton and Jan Koum
2. Sequoia Capital invested \$8 million in 2011
3. 70% of users are active on a daily basis
4. WhatsApp says they are adding 1 million users everyday.
5. They currently employ 50 people
6. 32 engineers working on WhatsApp, i.e. one engineer is responsible for 14 million active users!!
7. 400 million active users in December
8. Rising to 450 million active users according to Facebook's press release
9. The app is the 5th most downloaded app on Android
10. WhatsApp doesn't sell ads and zero have appeared on the app
11. Twitter and Facebook had the chance to hire founder Brian Acton but didn't!
12. The total value of the deal: \$19 Billion (\$4 billion in cash, \$12 billion in stock, and \$3 billion in restricted stock)
13. \$1 Billion Break-up fee should the deal not go through.
14. Jan Koum keeps a note from Brian taped to his desk that reads "No Ads! No Games! No Gimmicks!" To keep them focused on building a pure messaging experience.
15. WhatsApp spent ZERO cash on marketing, PR and user acquisition
16. WhatsApp's messaging volume is approaching the entire global telecom SMS volume
17. On Dec 31st 2013 users sent a total 54 billion messages during the day (3x increase from 2012)



Problem:

The purpose of this assignment is to give you an idea about how a popular app like whatsapp works. We have divided the implementation into five parts. This assignment will test your socket programming and problem solving skills.

Part 1 (20 marks):

You must write a file named `app.py/app.java` which would act as a client and would have the ability to communicate with the application server named `server.py/server.java` which would work at the backend. The client should be able to connect to the server using TCP connection. Every client should have a unique name which would be used for communication. Whenever a client connects with the server it should send in this unique name to the server and the server should keep track of who is online and who is offline. In this part two clients should be able to connect to the server and should be able to send and receive messages based on the name they specify.

Part 2 (10 marks):

Now the clients should be able to send in any type of file to fellow client and not just text messages. The client should be able to send in txt files, pdf files and even mp4 files.

Part 3 (30 marks):

In this part the client should be able to make a unique group and the server should be notified of the group name and its members. The client which made the group should be admin by default and should have the ability to add more clients into the group. The admin of the group should also have the ability to make any other client as admin. Moreover any client in the group should have the option to leave a particular group. Any message/file sent in the group should be sent to all members of the group concurrently. This should be achieved by using multi-threading at the server end.

Part 4 (30 marks):

In this part a status feature should be added for each of the client. Firstly, the client should know which of his/her friends are online i.e. connected to the server. Moreover the state of the server and client should also be maintained. If a client is offline and a message is sent to him/her, it should be received by the client when he/she gets online. Similarly, any message in the group should also be received by the client when he gets online.

Part 5 (10 marks):

These 10 marks are reserved for a good interface, displaying all the stuff neatly and have an option/menu system. Let's see how creative you all can get. Also I am not looking for a GUI here.

Reading Material

- To learn the basics of socket programming the following two books are a good read.
Python Networking Guide: http://faculty.salina.k-state.edu/tim/NPstudy_guide/index.html
Java Networking Guide: <http://www.baeldung.com/a-guide-to-java-sockets>
- Tutorials will be held on socket programming and how to crack this assignment. But before the tutorial please go over the manual
- Also look up for socket programming tutorials

Submission Instructions

- Submit all your code in a zip file with the roll number of both your teammates e.g. 18100206_19100206.zip
- Also submit a txt file explaining your approach and implementation. Also add individual partners' contribution in the assignment.
- Also you MUST submit all your stuff before the deadline