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Outline of Master's Thesis

Topic: Design and development of software application for text and/or voice communication between two users

Cover sheet

First page with title and names

Second page with declaration

Table of contents

I. Introduction to the problem.
   A. Give background information how such existent applications work and mention concrete examples.
      1. Explain client-server applications. Give pros and cons.
      2. Explain peer-to-peer applications and define the term „pure peer-to-peer applicaton". Give pros and cons.
      3. Explain the mixed type peer-to-peer applications with servers.
   B. Define the main problems which peer-to-peer applications face.
      1. Peers do not know other peers' addresses and connection can hardly be made.
      2. Users should be able to use the application from (almost) any computer, so at least the contact list should be shared somewhere in Internet.
      3. Previous 2 parts described the need of server part but now this leads to other problems: logging in securely to the server, storing possibly sensitive data.
      4. Explain the NAT Traversal problem and give the possible solutions
         a. UPnP
         b. Hole Punching: STUN and STUNT
         c. Data Relay
   C. Explain how the most popular application for communication – Skype – works. Try to reveal the proprietary protocol and say how Skype deals with the already mentioned problems. Give other examples.
II. State the goals of the current work
   A. Summarize the disadvantages of existing products
      1. Too much dependance on servers
      2. Unstable behaviour when working behind NAT
   B. Current project should deal with those problems.
   C. Shortly explain all the features of the new application
      1. Users should be able to carry on instant text messaging communication as they expect and as they are used to with other applications
      2. Users should be able to carry on voice talks with reasonable quality not worse than existing applications
      3. The application should be able to work with or without server, with connection to Internet or without, e.g. in a company's network not connected to the other world
III. Design and implementation
   A. Define the target machines and users for the application
   B. Choose the technologies which will be used and argue why they are the best choice
   C. Choose needed algorithms to solve non trivial problems. Explain the choice and their principle

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D. Design the software system
E. Develop the software system

IV. Test the application with different users under different conditions, state and interprete results
   A. Test the instant messaging part when users are far away one from another. Observe the delay. Observe stability under unexpected events: slow connection, interuption, delay.
   B. Test the voice part when users are far away one from another. Observe stability under unexpected events: slow connection, interuption, delay. Observe the sound quality, the level of noise and delay. Meassure the needed bandwith. Compare to other products.

V. Conclusion

References