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| University of Waterloo  Faculty of Engineering  Department of Electrical and Computer Engineering |
| Distributed Messaging |
| Project Progress Report |

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# Overview of Project

## 1.1 Revised Project Abstract

Instant messaging systems of today simply cannot adequately safeguard the privacy of their users. Users’ contacts lists, profile data, and even message histories are always logged and stored on centralized servers fully-controlled by the messaging system’s service providers. There is simply no guarantee that users’ data won’t be searched and abused by these companies. Even if we put aside the trust issue between customer and service provider, data breaches by malicious third-parties are dangerous, ever-present possibilities on any centralized server exposed to the internet. Furthermore, recent leaks provided by Edward Snowden on NSA’s overreach in its information collection practices has highlighted the fact that governments can easily and legally force service providers to hand over any and all user data available to them. We have designed an instant messaging system that protects the privacy of its users as an utmost priority. Our system implements a truly decentralized peer-to-peer architecture with no centrally controlled servers of any kind. Unlike existing centralized messaging systems, messages in our distributed system will thus travel directly from the sender to the recipient, through a completely encrypted channel, giving no opportunity for any third-party to access message contents.

## 1.2 Original Project Timeline

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| Start Date | End Date | Description |
| July 3, 2014 | July 4, 2014 | Compare, contrast and finalize type of cloud storage to use (Dropbox API, Google Drive SDK,SkyDrive API etc) |
| July 4, 2014 | July 7, 2014 | Implement cloud storage layer to work similar as local storage |
| July 4, 2014 | July 7, 2014 | Finish contact list implementation, including displaying availability and adding other users to contact list |
| July 7, 2014 | July 11, 2014 | Implement sign on screen to choose cloud/local storage |
| July 7, 2014 | July 10, 2014 | Implement working P2P communication between any 2 users |
| July 7, 2014 | July 11, 2014 | Use sjcl.js to encrypt user profile information (local and cloud) |
| July 10, 2014 | July 14, 2014 | Implement simultaneous conversations between users |
| July 12, 2014 | July 16, 2014 | Investigate and Implement real time component using Operational Transforms |
| July 19, 2014 | July 22, 2014 | Perform system testing and unit testing, fix and verify bugs |
| July 23, 2014 | July 23, 2014 | Demonstrate initial prototype and progress |
| Sept 01, 2014 | Jan 30, 2015 | Investigate and implement any remaining essential and non-essential features |
| Sept 01, 2014 | Jan 30, 2015 | Work on the aesthetic components and the GUI |
| Jan 01, 2014 | Jan 12, 2015 | Write and evaluate stress tests for the application |
| Feb 06, 2015 | Feb 14, 2015 | Prepare the Final Report |
| Feb 15, 2015 | Mar 01, 2015 | Finalize prototype, make sure a final stable build is live on an appropriate server |
| Mar 01, 2015 | Mar 08, 2015 | Prepare for the design symposium |
| Mar 19, 2015 | Mar 19, 2015 | Demonstrate final prototype |

# Current Status

## 2.1 Prototype Completion

Currently, all of our essential functional specifications has been completed. From the perspective of the developers, the entire backend and skeleton has been developed and successfully functioning. Some of the portion of the backend may need to be refactored to enforce the reliability aspect of our product. Nonetheless, we can conclude that our prototype is more than 50% completed. The remaining incomplete portion of our prototype is mostly comprised of the user interface polish, additional chat messaging features, settings and option panel, and most importantly the synchronization of the user’s profile and contact list. These remaining incomplete features are classified as non-essential features that encompass more than 30% of the project which being incomplete. From our estimation we can state that our project is 70% completed which verifies our consultant feedback stating that it is 50-75% completed.

## Student Hours

Our members estimate that they have invested the following number of hours individually into the project:

Qi Liu: 165 hours

SangHoon: 98.5 hours

Danny Yan: 103.5 hours

Asif Arman: 101.5 hours

The total number of hours our team has put in is approximately 468.5 hours. For detailed logs of each individual member, please see Appendix B.

As you can see, asides from Qi Liu, our members invested close to the expected 120 hours into the project, but did not quite reach 120 hours in the end. This is due to the fact that our other courses also required a significant time investment in terms of term-long projects, labs and assignments, in addition to the time required for preparing for job search and interviews for the upcoming coop term. Qi Liu ended up investing a significant amount of individual effort into the project because the jobs he interviewed for happen to coincide with the technologies we’re using for the project, and thus he ended up working on the project individually to prepare for his interviews.

# Discussion

As mentioned before our prototype is over 50% and our project is on schedule. Even though our essential features are mostly finished there a number of non-essential features that we believe we can implement in our final prototype. We are very confident that the prototype will be 100% complete by the March symposium. This is because we have already implemented all of our essential features, what remains are the non-essential features, additional GUI modifications and polishing up the code. The entire codebase is set up on GitHub as the version control and it is designed to make it simple for individuals to add to it. Meaning we have the option to work on it individually during our work term.