OMiN - Opportunistic Microblogging Network

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Abstract

Declaration

I declare that the material submitted for assessment is my own work except where credit is explicitly given to others by citation or acknowledgement. This work was performed during the current academic year except where otherwise stated.

The main text of this project report is NN,NNN* words long, including project specification and plan.

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Introduction

Objectives

Primary objectives

- design and implement a protocol for discovering nodes in close proximity and passing messages and necessary metadata between them.
- Create a core library to manage message storage and routing.
- Implement a simple epidemic routing algorithm to send messages to all available nodes.
- Design a routing algorithm using user metadata to route messages while disguising message content and metadata.

Secondary objectives

- Create a smartphone UI.
- Implement a more advanced routing algorithm.
- Design and implement a mechanism to decide whether a node is trustworthy or not.
- Evaluate the performance of the implemented routing algorithms.

Tertiary objectives

- Compare the real world vs simulated performance of the routing algorithms.

Context survey

Requirements specification

User Requirements

Non-Functional Requirements

- High: The user shall be able to create a unique identity.
- High: The user shall be able to send text messages to all others who follow the user or a hashtag in the message.
- High: The user shall be able to ‘follow’ any user and receive messages sent by that user.
- Low: The user shall be able to ‘follow’ any hashtag and receive messages containing that hashtag.
- Low: The user shall be able to send encrypted direct messages to a single user.
- Low: The user shall be able to send multimedia messages to all others who follow the user or a hashtag in the message.

Functional Requirements

None

System Requirements

Non-Functional Requirements

- High: The system shall work on smartphones or tablets capable of connecting to a wifi network.
- High: The system shall allow creation of user identities with a unique cryptographic identity.
- High: The system shall automatically connect to nearby nodes and pass on relevant information such as messages.
- Medium: The system shall provide a mechanism for securely distributing the cryptographic identity of a user.
- Medium: The system shall protect user metadata such as location and friends list from all other nodes.
- Medium: The system shall ensure that messages cannot be modified in transit or that such modifications can be detected.
- Medium: The system shall ensure that nodes cannot send a message that appears to be from another user.
- Medium: The system shall be robust and able to continue functioning when it encounters an unexpected state such as a malfunctioning or untrustworthy node.
- Medium: The system shall ensure that encrypted direct messages cannot be read by third parties.
- Low: The system shall be able to support multiple user identities on a single node.

Functional Requirements

- High: The system shall collect anonymous logging data for debugging and profiling purposes.
- Medium: The system shall ensure that a reasonable number of messages reach their intended recipients.
- Medium: The system shall restrict the size of the message buffer by evicting messages.
- Medium: The system shall use a minimal amount of the available power.

Software engineering process

Ethics

In order to test the real world performance of the network, we may ask people to use the application. In this case, some metadata will be collected on users, with their consent. This may include:

- An anonymous user ID.
- Anonymised 'Friends list' (or equivalent) of users.
- Times and locations of encounters between anonymous users.
- Metadata of messages passed during encounters, including message ID and origin ID, but NOT message contents.

Design

Implementation

Evaluation and critical appraisal

Conclusions

Appendices

Appendix A - Testing summary
Appendix B - Status report
Appendix C - User manual
Appendix D - Maintenance document