Senior Project Proposal

Demonstrating Scalability of the Dissent Anonymous Communications Protocol via a “Town Hall”-Style iOS Application

Mimi Chen
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Advisor: Bryan Ford

Motivation

Despite technological advances over the years, truly anonymous communication has been difficult to achieve. Even relatively strong anonymous communication protocols face unique challenges when it comes to scaling to a much larger user base, such as that of the World Wide Web. The Dissent communication protocol is a promising anonymous communications protocol developed at Yale. Dissent has many features designed with scalability in mind, and in theory, should be able to scale beyond the realm of several hundred users. However, heretofore there has been no application built to verify these assumptions.

Project Description

This project seeks to build a “Town Hall”-style iOS application to demonstrate Dissent’s ability to scale. As in a real world Town Hall meeting, the application would allow a vast number of anonymous users to participate in a single meeting. Users would have access to a roving “microphone,” allowing them to speak one at a time.

The implementation of such an application falls into three parts:

1. **Protocol Adjustment** – currently Dissent is built such that in each round of communication, all clients can send messages to their respective destinations. To achieve a Town Hall style meeting, only one client can be allowed to transmit a message at a time. Changes must be made to the protocol in order to determine which client gets to transmit at what time and for how long, while maintaining as much fairness as possible.

2. **Application building** – The actual development of the Town Hall application and APIs allowing it to communicate to the updated Dissent protocol.

3. **Voice integration** – Real Town Hall meetings are not structured messaging forums, but verbal discussions. Modifications must be made both to the Dissent protocol and the application to enable voice communication.
This project’s focus is the building of the Town Hall application. The application will be built on Apple’s iOS (CocoaTouch) platform, and from the user’s perspective, include the following features:

- Selecting a Town Hall meeting to join – this will begin as a public list of Town Hall meetings, but meetings will eventually require a password to join.
- Starting a new Town Hall meeting with a specified title and password.
- Interfacing with a Town Hall meeting, initially via text
  - Seeing meeting messages
  - Being able to request the microphone
  - Being able to post messages only when having access to the microphone
- A possible additional feature would be adding a polling option, where the user with the microphone could ask the audience a question and receive responses in the form of preselected answers, individual answers (for the asker to then process), or a yes or no vote. Dissent would default back to the established protocol for this sort of feature.
- When the voice integration project has progressed significantly, the ability to speak and listen to messages will also be implemented.

Behind the scenes, the application must also handle:

- Reliable microphone requests – due to the nature of being a mobile application, the app must ensure that requests for the microphone are transmitted reliably.
- No local storage – In order to protect a user’s anonymity, no evidence of their participation in any meeting should be stored locally by the application.
- Accessing older messages – it is likely that users will join the meeting halfway through, or miss some rounds of communication due to unreliable data connections.
  - For text based messages, it is simple to have the user see each message in order.
  - For voice messages, users must be able to click and play each message.

For interfacing with the Dissent engine, this application plans to, at least initially, incorporate a Dissent framework implemented in a previous Dissent iOS application AnonTalk. This framework provides necessary API’s to interface with the Dissent protocol from iOS. It is likely that due to the Dissent engine changes required by the Town Hall protocol, some if not all of the API’s will eventually need modification, but to initially have the application run on a Town Hall system the existing APIs will be utilized.

**Deliverables**
The final deliverables for this project include:

- The application source code
- Modified Dissent APIs for a Town Hall communication protocol
- Final report detailing application structure

**Milestones**

1. **Application Design** – designing and implementing the basic structure of the application, including all GUI elements and essential logic. **Target completion date: End of February**

2. **Dissent Integration and API Modification** – the application should utilize the Dissent framework and be able to send messages using Dissent, initially without following the Town Hall protocol, and then conforming to the Town Hall protocol. Necessary API modifications will be made so the application can be told when the user has received the microphone and can allow transmission. **Target Completion Date: End of March/Early April**

3. **Voice Integration/Application Stabilization/Scalability testing** – The last stage of the project will depend in part on the progress of the other pieces of the project. When the protocol changes made to the Dissent engine have been implemented, tests of how scalable Dissent is can be performed. When a Dissent protocol for audio transmission has been created, the application can proceed to implement voice transmission.