MICHIGAN STATE UNIVERSITY Project Plan Syncing Mobile Data Without Internet Connectivity The Capstone Experience

Team Yello

Kiera Wheatley Tanner Stewart Danielle Scherr Kevin Miller Min Weng

Department of Computer Science and Engineering Michigan State University

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From Students... ...to Professionals

Functional Specifications

- Collect and store ambiguous data models on mobile devices
- Create iOS & Android frameworks to transfer data between devices
- Use Wi-Fi direct and Multipeer Connectivity to connect devices without an intermediate access point

Design Specifications

- Sync frameworks
- Sample application
 - Creating a Wi-Fi Direct network
 - Inviting peers to network
 - Candidate list
 - Adding & editing candidates
 - Synchronizing data

Screen Mockup: Welcome Page

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Screen Mockup: Join Session

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Screen Mockup: Create Session

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Screen Mockup: Candidate View

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Screen Mockup: Add Candidate

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Screen Mockup: Candidate Profile

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Technical Specifications

- Storing ambiguous data models in JSON format
- Establishing peer-to-peer connection
- iOS Multipeer Connectivity
 - Discovery phase
 - Session phase
- Android Wi-Fi Direct
 - Group formation
 - Sockets for data transfer

System Architecture



System Components

- Hardware Platforms
 - Android 4.0 (API 14 or higher)

iOS

- Wi-Fi peer-to-peer hardware installed
- Software Platforms / Technologies
 - Development on Windows 7, Windows 10, and OSX El Capitan
 - Java/Swift
 - JSON format for data

Testing

- Obtain at least three Android and three iOS devices
- Create basic application to submit form
- Store form data in JSON format
- Upon successful synchronization on basic application, attempt with a minimum of five devices
- Refine frameworks alongside client to ensure functionality

The Capstone Experience

Risks

- Risk 1: Establishing groups/sessions using Wi-Fi peer-to-peer (P2P)
 - Successfully connect devices and sync them them using P2P
 - Mitigation: Start with creating a small application to connect two devices and transfer a one-byte message
- Risk 2: Ensuring stable network for each client
 - Unauthorized devices are not allowed to connect to another client's Wi-Fi direct network
 - Mitigation: Send an invitation to selected device and create a private Wi-Fi network
- Risk 3: Frameworks should be easy to integrate into existing application
 - The public API of the libraries should be simple enough that it could be dropped into existing apps without having to make significant architecture changes.
 - Mitigation: Communicate with client to confirm framework is compatible with existing architectures
- Risk 4: Must allow for any type of data model to be synchronized
 - Data models will have various complexity between devices
 - Mitigation: Research data transfer of ambiguous data models in JSON format using Wi-Fi P2P