MICHIGAN STATE UNIVERSITY

Project Plan

Syncing Mobile Data Without Internet Connectivity

The Capstone Experience

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From Students…
…to Professionals

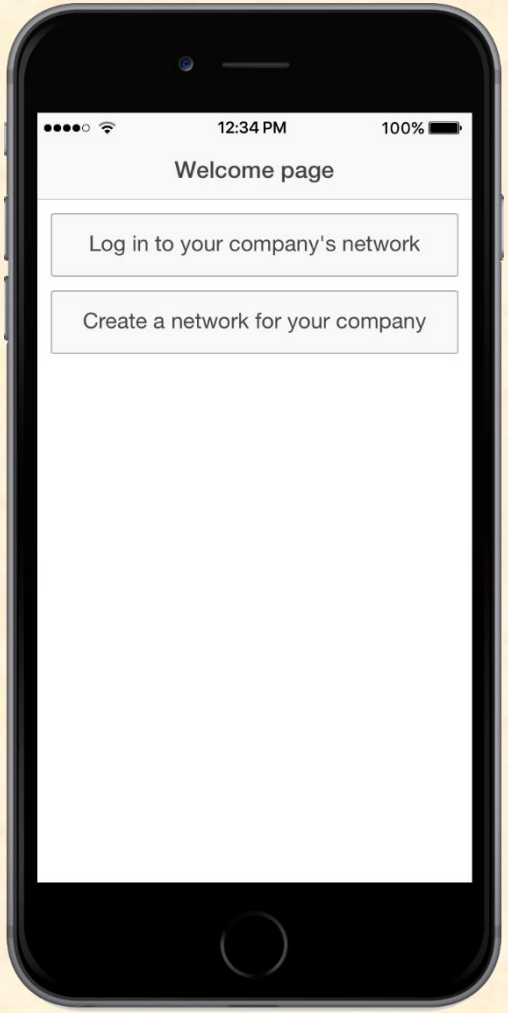
Functional Specifications

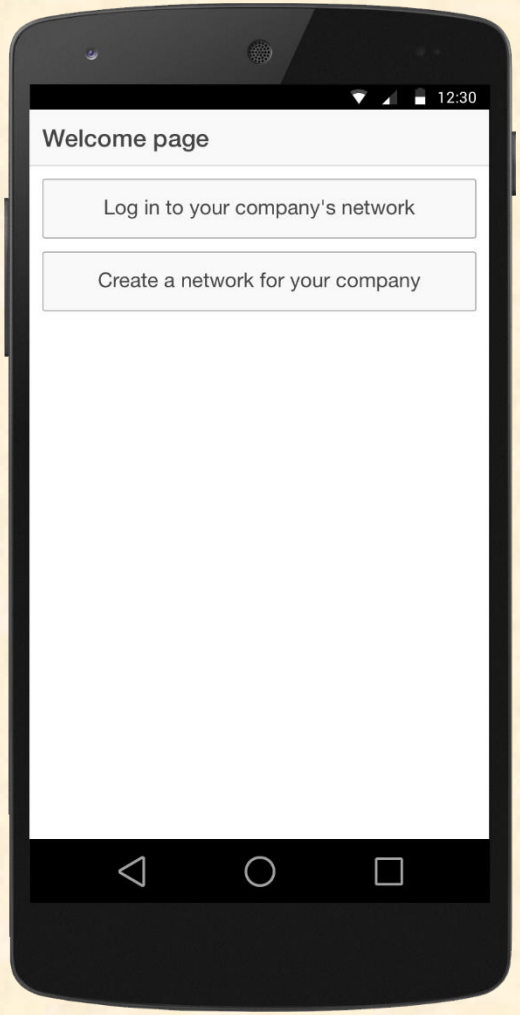
- Collect and store ambiguous data models on mobile devices
- Create iOS & Android frameworks to transfer data between devices
- Use Wi-Fi direct and Multipeer Connectivity to connect devices without an intermediate access point

Design Specifications

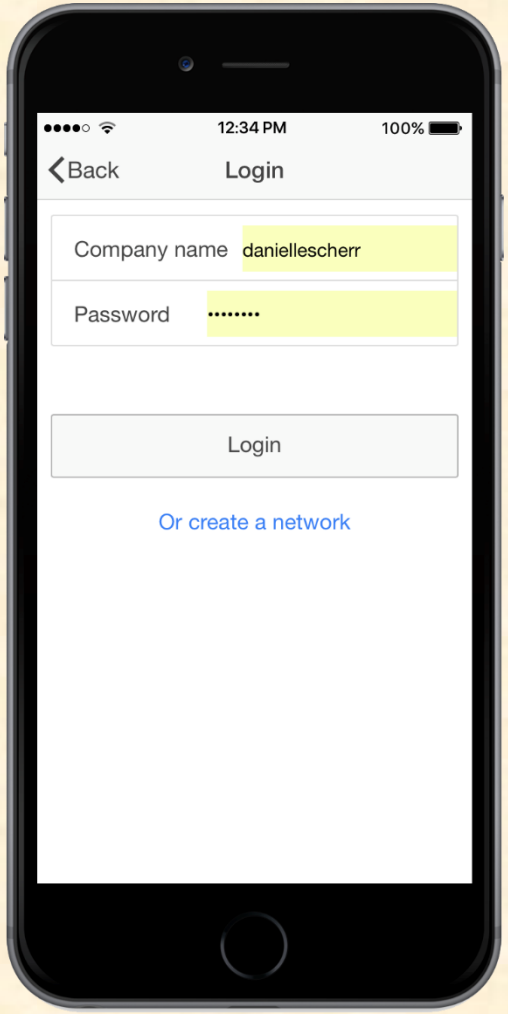
- Sync frameworks
- Sample application
  - Creating a Wi-Fi Direct network
    - Inviting peers to network
  - Candidate list
  - Adding & editing candidates
  - Synchronizing data

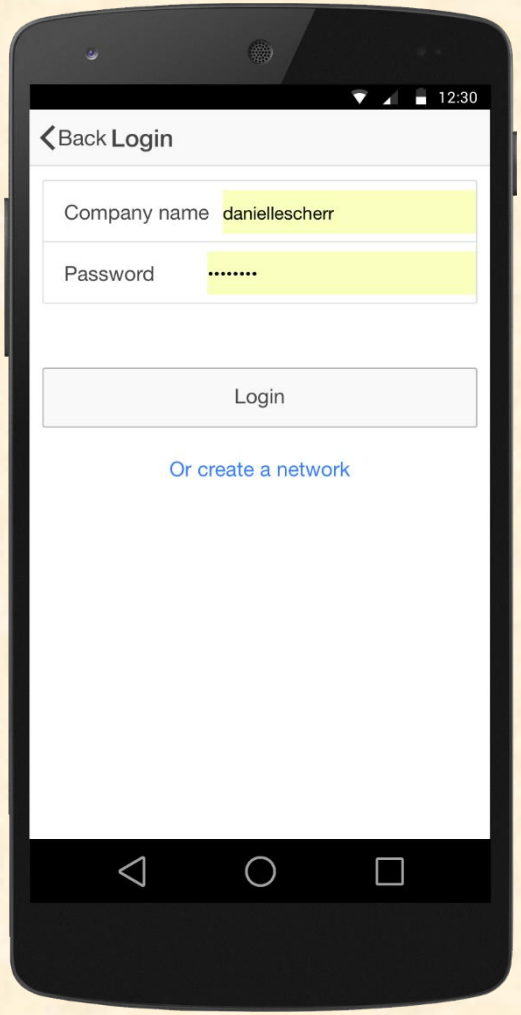
Screen Mockup: Welcome Page



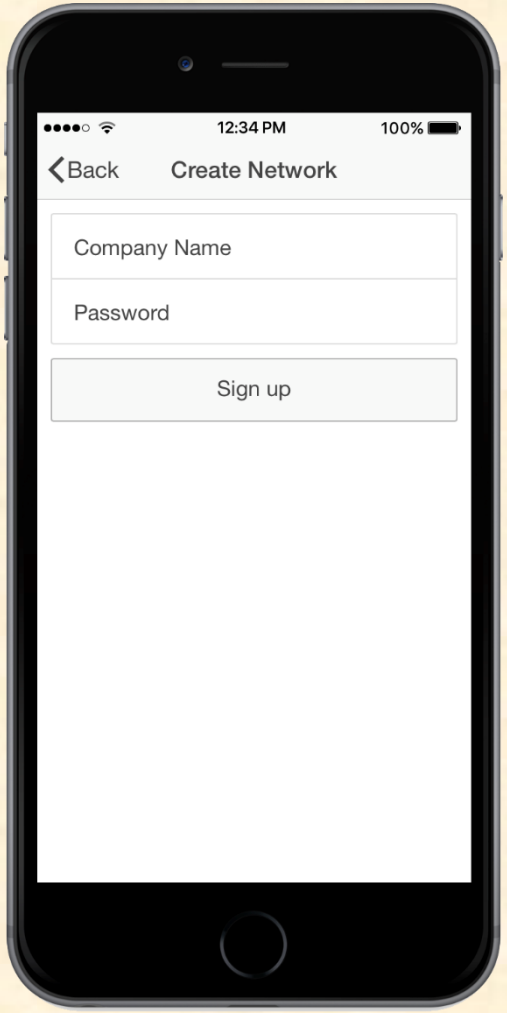


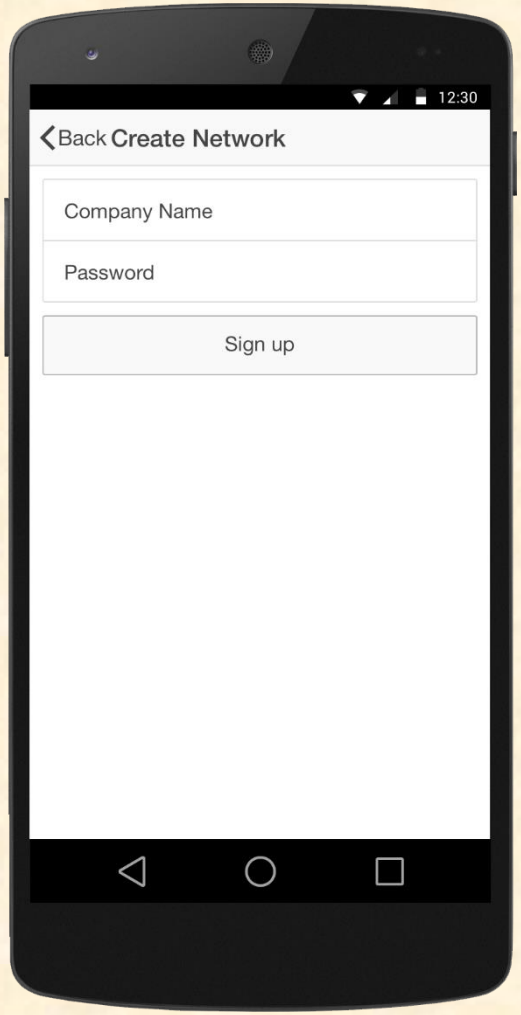
Screen Mockup: Join Session



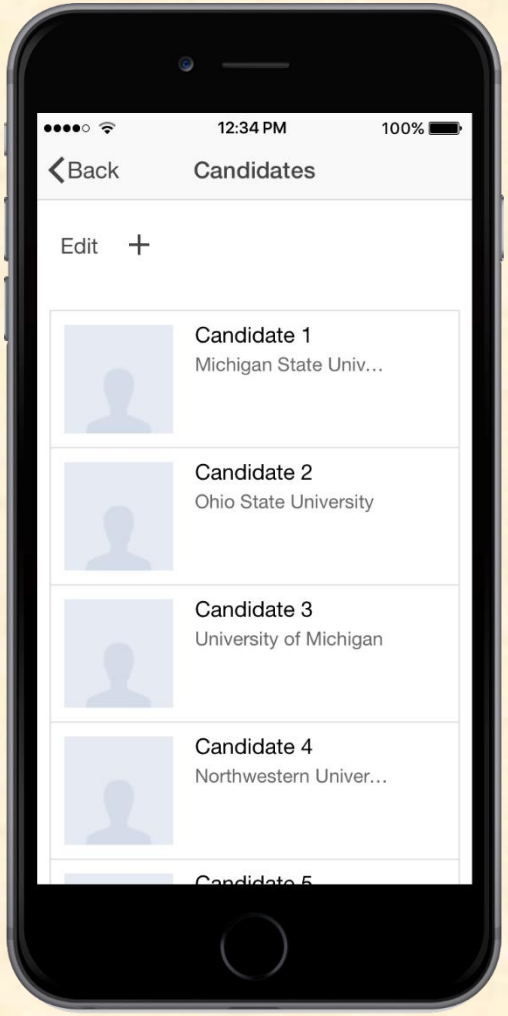


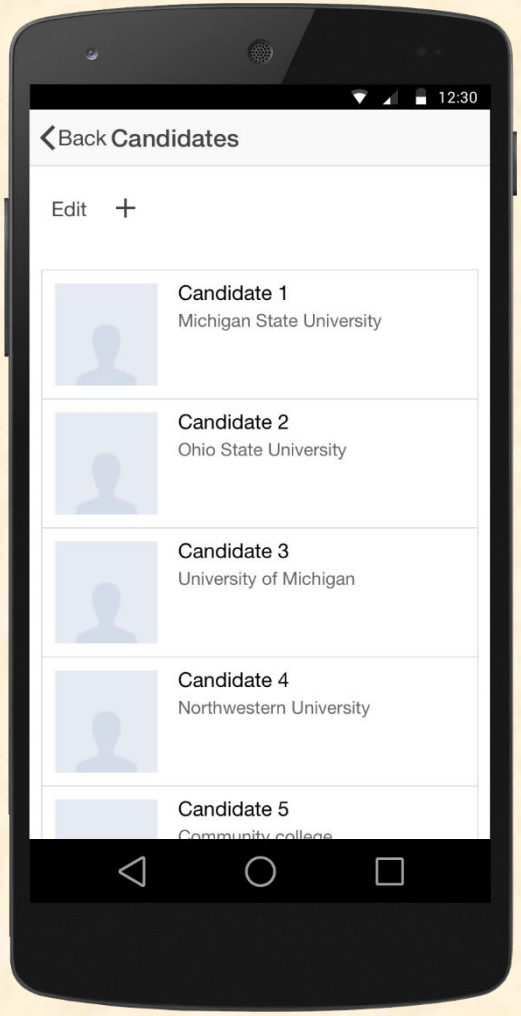
Screen Mockup: Create Session



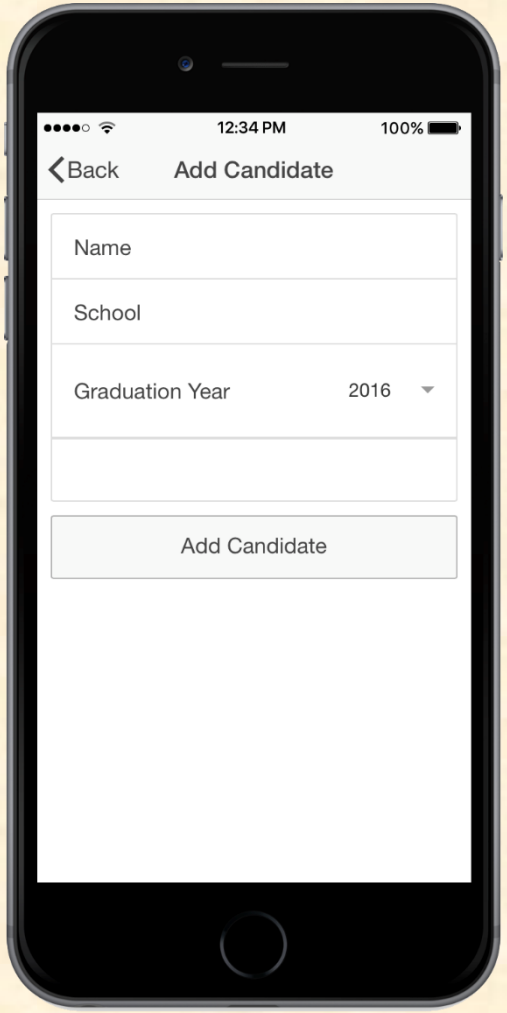


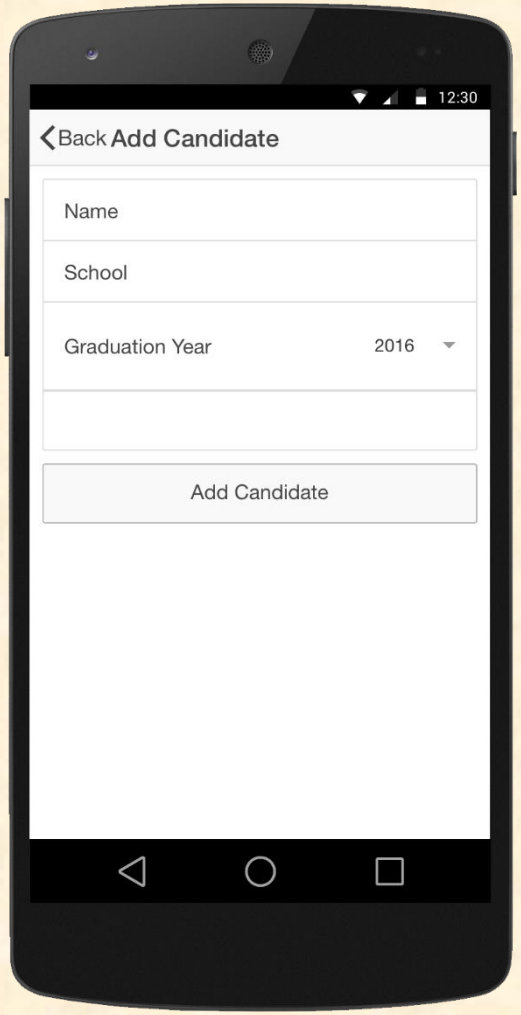
Screen Mockup: Candidate View



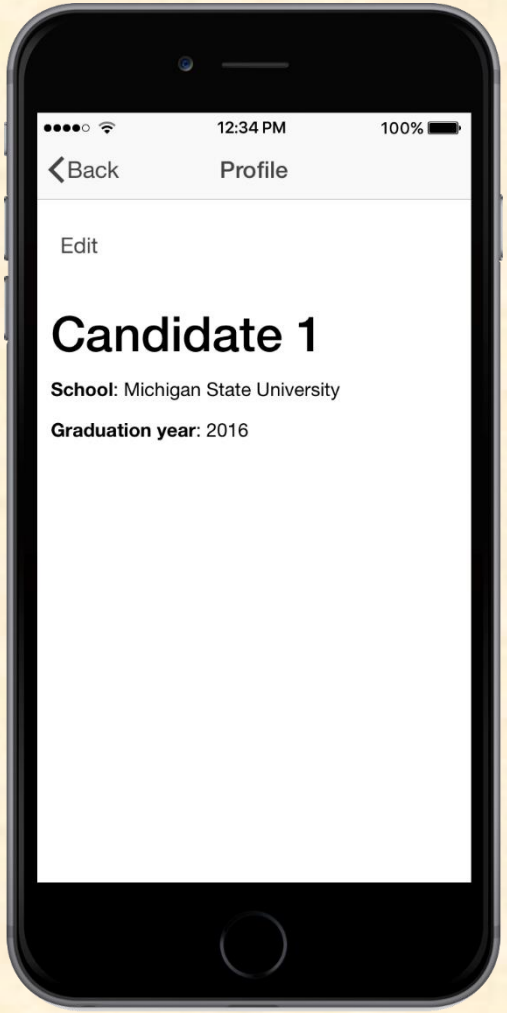


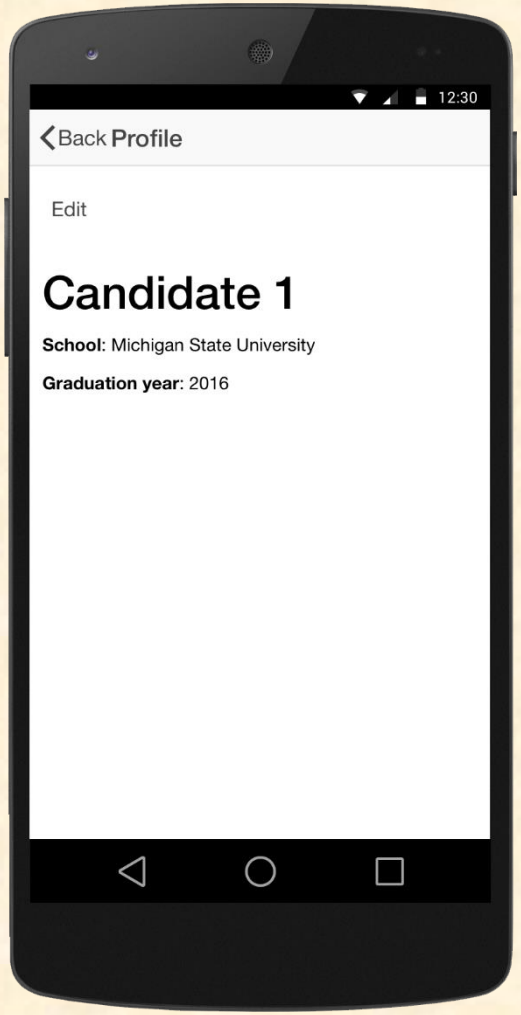
Screen Mockup: Add Candidate





Screen Mockup: Candidate Profile

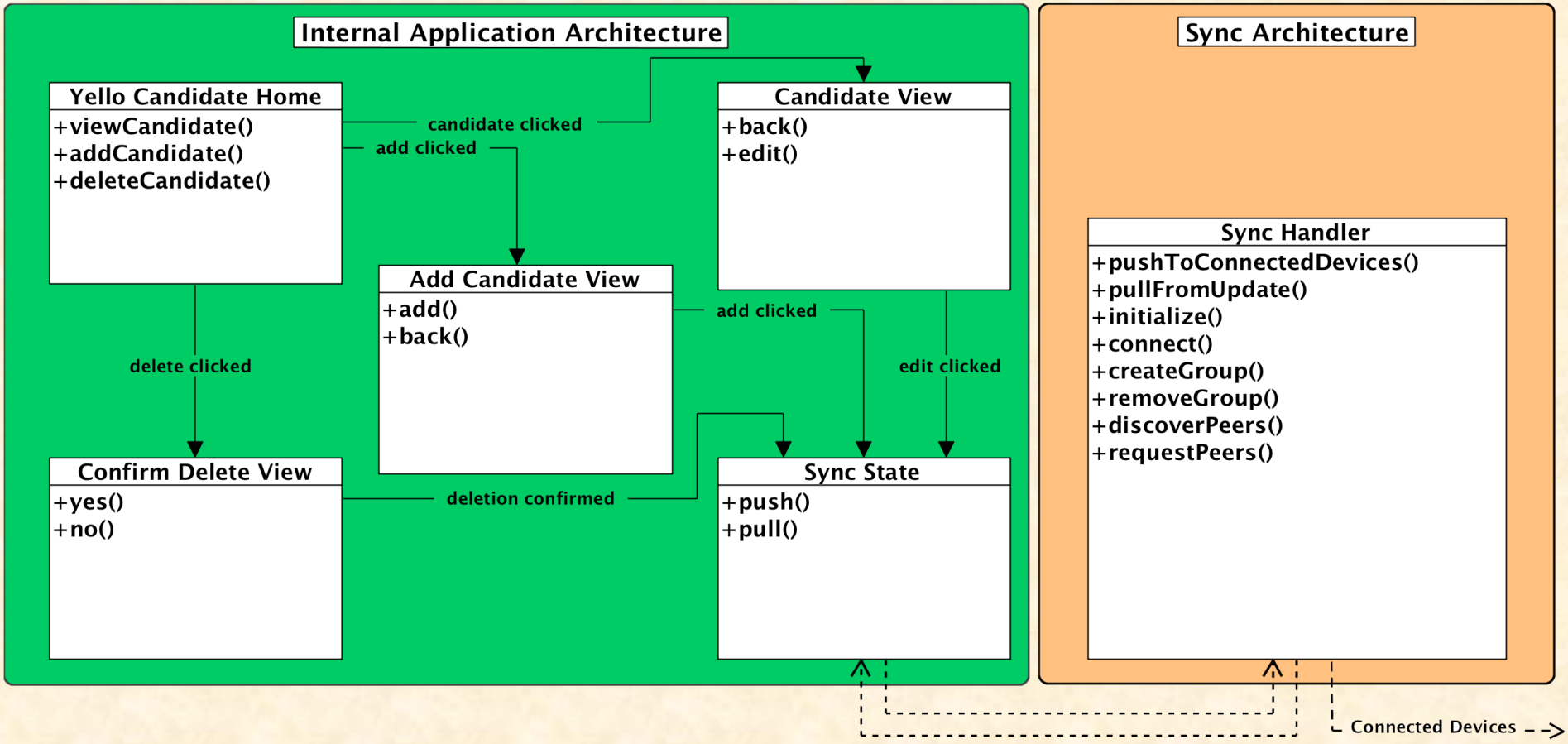




Technical Specifications

- 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

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