Cothority Mobile: a mobile application to perform distributed tasks using the cothority-framework

Bachelor Project – Spring 2017

Romerio Lucio

Index

- Project Overview and Motivation
- Introduction
- Architecture
- Implementation
- Results Analysis
- Future work
- Demo

Project Overview

- Develop a Mobile Application using a cross-platform framework
- Implement a ProtoBuf library
- Implement a Cryptographic library

Project Motivation

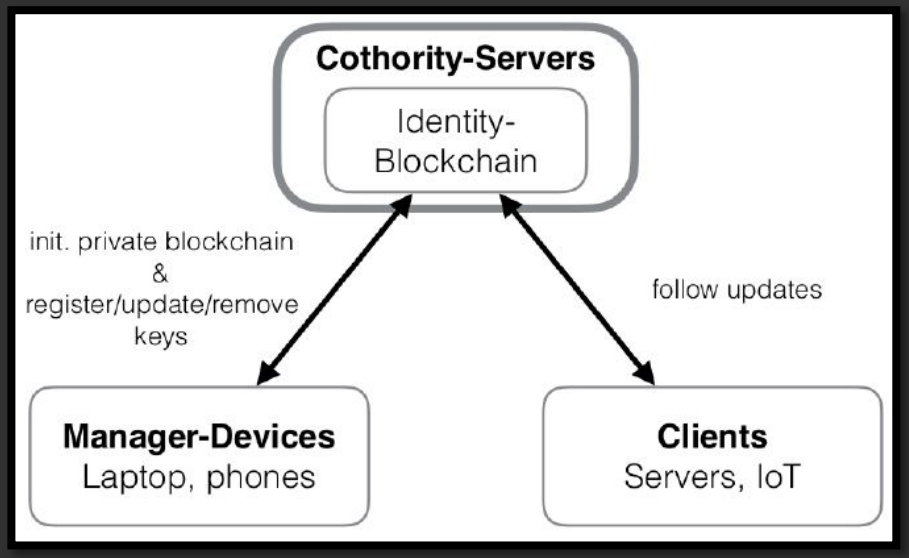
- Existing application uses JSON-interface
- Make application available both for Android and iOS
- Libraries needed to implement Cothority services

Introduction - PhoneGap

- CSS3, HTML5 and JavaScript
- Hybrid application:
  - Access to most of the native APIs
  - Layout rendered via web views
- PhoneGap Build

Introduction - CISC

- Add device to access-control-list
- Make proposition
- Vote proposition

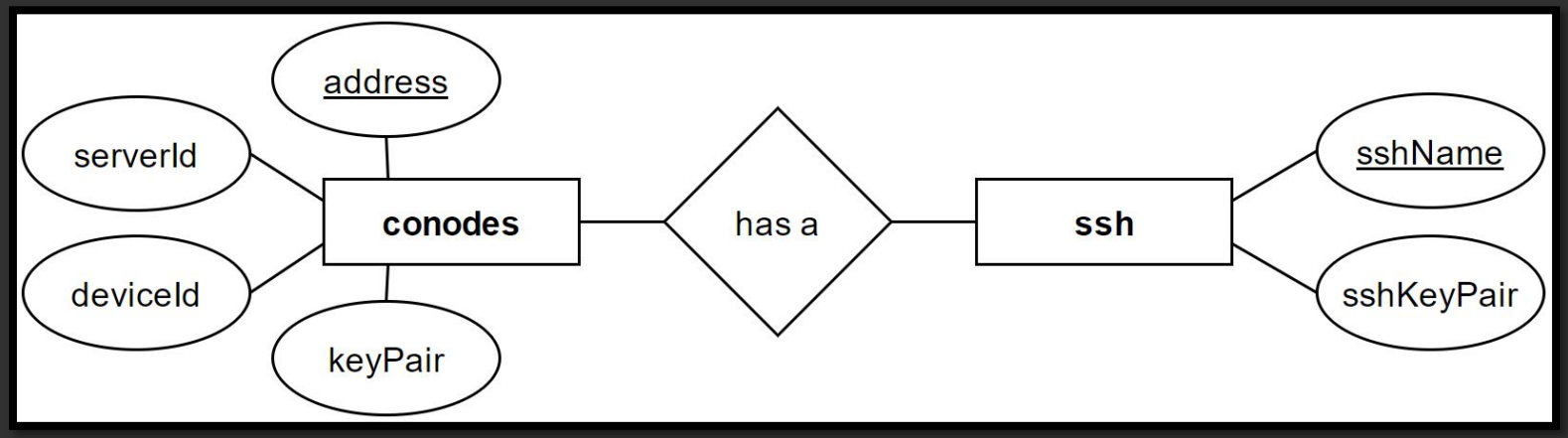


Architecture - Libraries

- Implementation coordinated by Gaylor
  - Cothority ProtoBuf
  - CryptoJS
- Extended to satisfy needs of my application
  - CISC messages
  - hashConfig and SchnorrSign

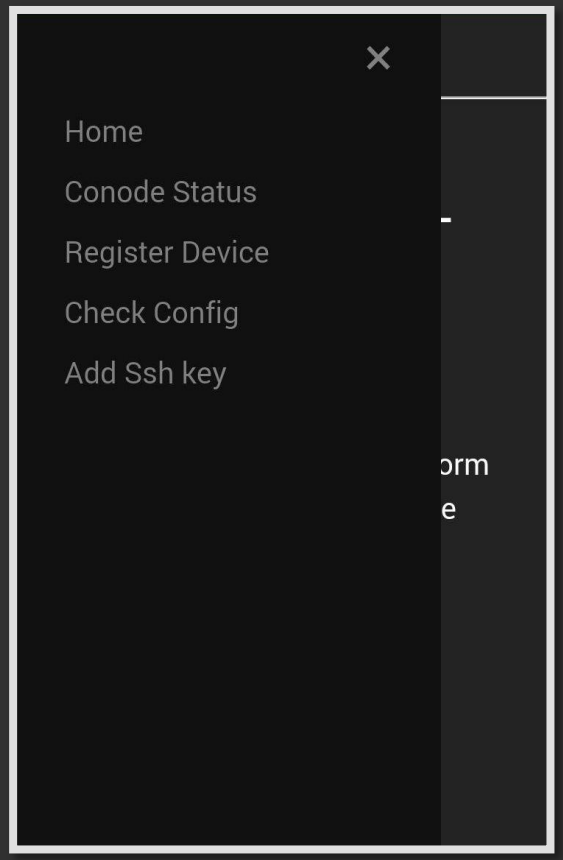
Architecture - Database

- Need to store:
  - Private keys
  - Conode information



Architecture - Setup

- Create PhoneGap project
- Import libraries
- Sidebar



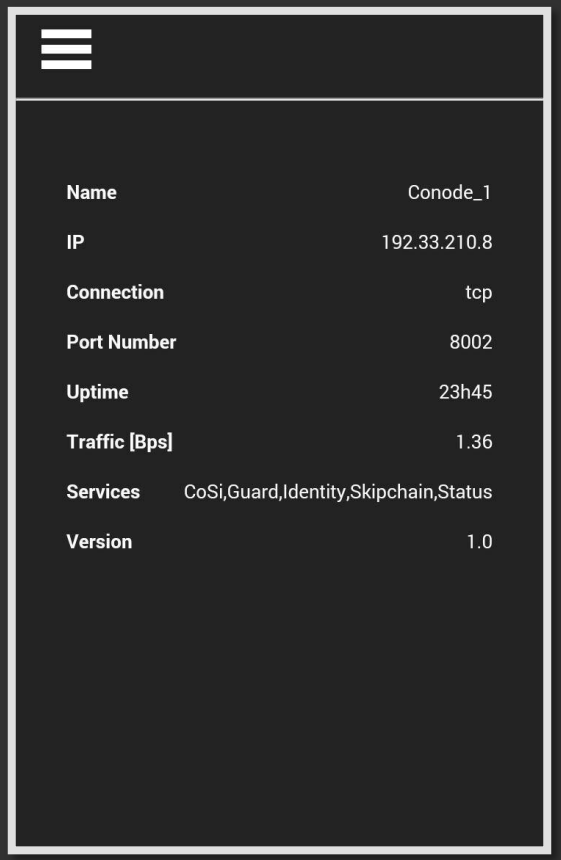
Implementation - Database

- API described into PhoneGap Documentation
- Traditional SQL statements
- Asynchronous task: handlers

Implementation - Conode Status

- Test device - conodes communication

- Procedure:
  1. Send empty message
  2. Show conode status to the user



Implementation - WebSocket

- Reuse same connection
- Send message: asynchronous task
- Use handlers

Implementation - Register Device

1. Scan QR-code encoding conode ID
2. Parse scanned string
3. Create and send proposition
4. Show informative message

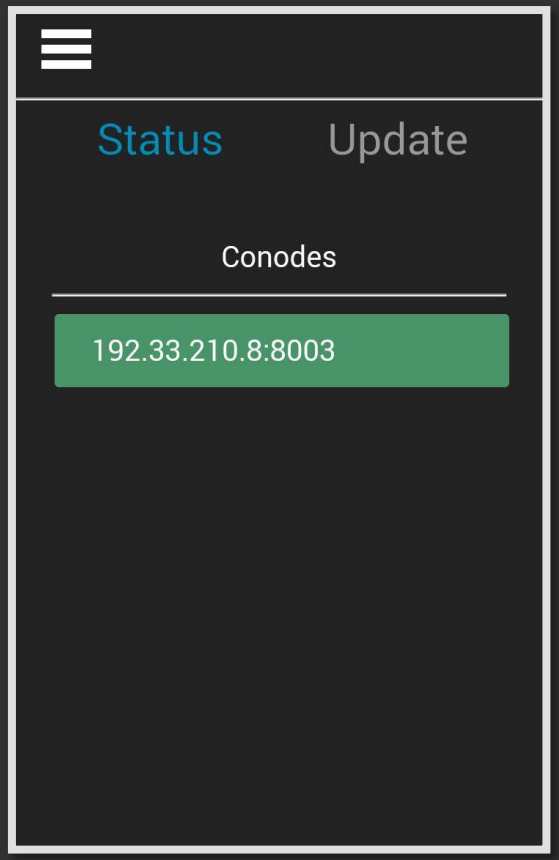
```
"threshold": 2,
"device": {
        "icsil1-conode1": {
                "point":  /*public key*/
        }
},
"data": {
        "ssh:icsil1-conode1:test1":  /*ssh key*/
}
```

Implementation – Key Idea

- One html element for each phase
- Change elements style programmatically
- Wrap related JavaScript in a single file

Implementation – Check Config

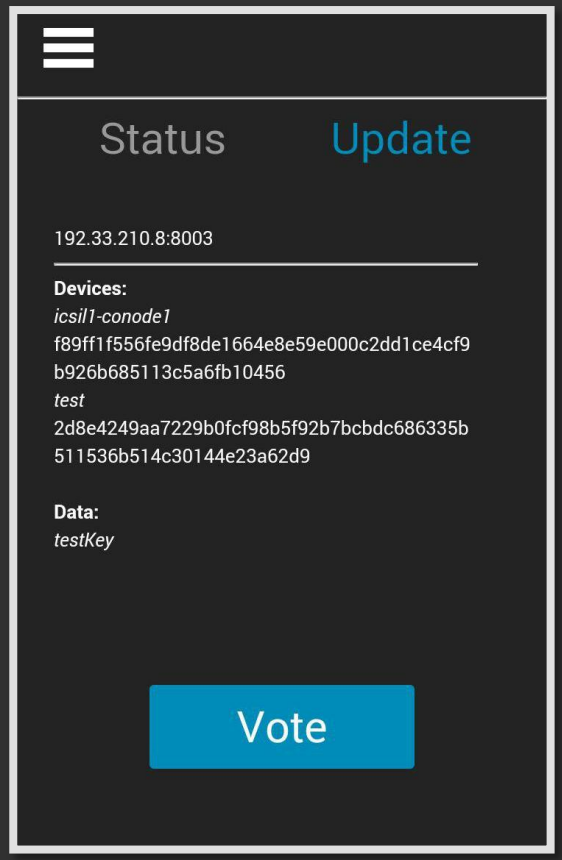
- Tab menu
- Phases
  - Conode list
  - Send correct message
  - Display Config
  - Vote (if update)



Implementation - Vote

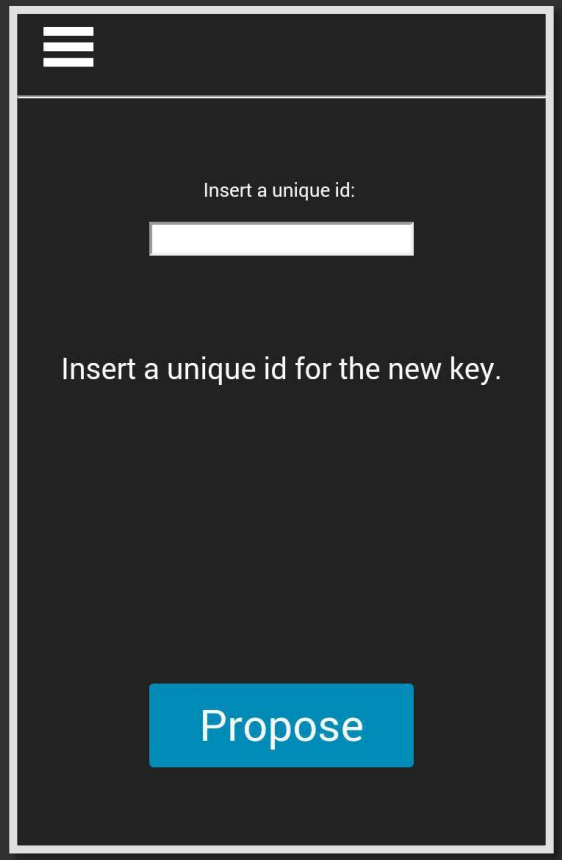
- Procedure:
  1. Compute Config hash
  2. Sign resulting hash
  3. Send ProposeVote message

- Use theCryptoJS library



Implementation - Register SSH

1. List conodes
2. Send ConfigUpdate
3. Create new key pair
4. Make and vote proposition
5. Show informative message



Results Analysis - Encountered Issues

- React and ES6
- From PoP to CISC
- Server not sending error messages

Results Analysis - Limitations

- Vanilla PhoneGap:
  - Only script tag to import files/libraries
  - No official automated testing tool

- Mobile application:
  - Stuck in case of server error
  - Cannot create SSH keys yet
  - Layout compromise

Future work

- Handle server errors
- Allow user to create SSH keys
- Test PoP messages
- Extend the two libraries
- Extend the application with other services

DEMO