AD HOC – P2P on Android

YoungJoon Byun, Ph.D.
Sathya Narayanan, Ph.D.

Computer Science and Information Technology Program
California State University, Monterey Bay

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Overview of Talk

- Background
- Demo
- Software Architecture and Development
- Future Plans
Background

Network connectivity between nodes without infrastructure support

Finding resources in a network without a central location/server

Novel applications utilizing the capabilities of mobile platforms

Our project focuses here

Smart Phone Applications

AD HOC Networking

P2P Networking
Our Achievements So Far

- Initial Objective
  - Feasibility study of peer-to-peer communication system on an Ad-Hoc network of Smartphones

- Prototype System Development
  - We developed a prototype system based on an open source project
  - A user can exchange text messages with a peer on an Ad-Hoc network
Demo – Text Messenger Application

- Direct communication between two phones

Alice  John
Demo – Text Messenger Application

- Indirect communication through a routing phone

Alice

unreachable

John

Captain
Software Architecture

- We started this project based on an open source implementation
  - But the source code was not fully matured
    - Stabilized the source base
    - Ported to multiple platforms

- Software Architecture
  - Two Components
    - Ad-hoc library
    - Android application on top of the library
      - Contains P2P functionality
Software Architecture

Android Applications
(Text Messenger, File Transfer, etc)

P2P

Ad-Hoc Library
(Routing, Communication, Exception Handling, etc)

Hardware-Dependent Code

Android Device
(WiFi Adapter, Linux Kernel, and Operating Environment)
Routing Protocol

- Ad-hoc library uses AODV (Ad-hoc On-Demand Distance-Vector) routing protocol
  - A route between two phones is constructed ONLY when needed (on demand)
  - The routing protocol maintains routes as long as they is active data communication
    - Route times out when not used for a given amount of time
  - AODV uses several messages to build routes such as route request, route reply, and route error.
**Android Platforms Supported**

- The software has been ported on the Nexus One and HTC Evo 4G.
- **Hardware-Dependent Code**
  - Turn on/off the WiFi network driver
  - Enable WiFi ad hoc mode
  - Control signal strength
  - Etc
Future Plans

- On demand VS table driven routing
- Manual vs Automatic resource find at the P2P layer
  - Structured vs unstructured P2P
- Security implications
- Portability
- Seamless integration into Android