Problem

• Today's apps usually consist of two parts – on device, in cloud
• Data transfer between these two parts defines user experience
• Cell networks have a varied, long latency, leading to a poor user experience
• Commercial networks are closed, we cannot modify or study them to alleviate these problems

Solution

Build our own cell network!
• Open interfaces that allow client and app data to be shared with the network
• Collect data on apps, users, and the network itself, and perform machine learning on data
• Intelligently move computation around the network to improve user experience based on analysis

Architecture

Four mobile base stations
• 3 computers
  1. Open-source software networking
  2. Virtual machines for local data processing
  3. OpenBTS, an open source implementation of GSM
• Radio system
  • Software-defined radio (USRP 2922)
  • Chain of filters, amplifiers, duplexer for 10W transmission (1-2 mile range)
Central computing server
• Machine learning database for user and network data
• FreeSWITCH, open source software to handle call routing between phones and out of the campus

Current Status

• We are able to make calls and send SMS over OpenBTS and FreeSWITCH, as well as (slow) data support.
• Mobile base stations assembled
• RF hardware assembled, tested, ready to deploy
• Awaiting experimental license from FCC

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