Developing a Mobile Application for Off-Net Multicast Users

Bradley Cao
Previous Work + Rationale

- **Multicast Menu (Lauren Delwiche)**
  - Supports viewing multicast streams in VLC as well as in browser
  - Works great on PC, less great on mobile devices
    - No nightly builds for VLC = no AMT support for VLC mobile
    - People don’t watch YouTube, Twitch, Netflix, etc. in their mobile browser

- **Unicast2multicast translator**
  - Enabled off-net streaming
Goal: Develop a mobile application for an off-net mobile device to interact with a multicast-enabled network
Cross-Platform Mobile Application

- **Kivy**
  - Python multi-platform GUI framework, allows for relative ease of utilizing existing scripts that have already been written in Python
  - Compiles to Android and iOS, allows for wider accessibility

- **Python 4 Android**
  - "Recipes" for required Python libraries

- **Kivy-iOS**
App Features

- Sending video streams via unicast2multicast translator
- Viewing video streams
  - Initializes device as an AMT Gateway that communicates with AMT Relays
- YouTube-ish GUI
  - Goal to make interaction akin to traditional mobile streaming platforms
All available streams are listed below.
Click one to watch!
Kivy TO-DO

- Integration with Multicast Menu for scraping stream information to be made available to client user
- Fix video encoding + camera orientation
- Deploy to Android and iOS, solve issues currently preventing it
  - Permissions, compatibility, etc.
- Native Multicast integration
Mobilecast Java Rewrite

- Born out of necessity and annoyance at Kivy
  - Android Permissions
  - Works in Kivy dev environment, not in actual deployment environment
  - “Hacky” methodology to get things working
- Android MulticastSocket, MulticastChannel support IGMPv3
- Overall cleaner integration with Android OS
Limitations of Android and IP Multicast (so far)

- IP Multicast needs to be enabled in Android kernel
  - Sadly it appears many devices do not come with this enabled
  - Requires build from source / rooting Android device (not practical for most users)
  - Only limits native multicast

- Video encoding + decoding
  - VLC and FFmpeg on PC work great and do everything for the user very well
  - Android port of VLC is not VLC 4.0, meaning no AMT support, can be used for encoding and sending network streams
Continued Development

- Multicast Mobile (Kivy): [https://github.com/KatMerrill/Multicast-Mobile](https://github.com/KatMerrill/Multicast-Mobile)
- Mobilecast (Android + Java): Open source coming soon!
  - Native Java rewrite for Android, should eliminate any teething compatibility issues between Python and Android
  - Will require compiling Android with IP-Multicast enabled, or figure out another way to send IGMPv3 packets