



# PTZ Collaboration

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# Introduction

- The application is a remote video viewer and PTZ camera controller
- Android 1.6 platform
- A user can view & control a PTZ camera from an Android phone.
- Multiple Android phones can share control resources over the camera

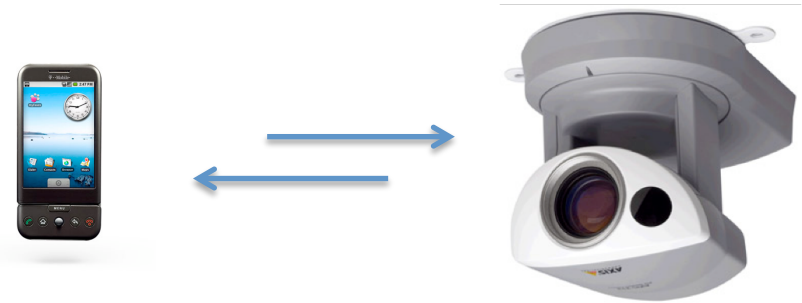
# Possible Applications

- Remote home / property monitoring
- Virtual meeting (If audio enabled)
- Remote learning ( lectures ...)

# Features

- Multiple simultaneous connections to the camera
- Multiple cameras access
- Video stream: Sequence of compressed frames
- Pan 0 to 360°
- Tilt 0 to 180°
- Control resources shared between peers

# Phone to Camera



- Axis Video API
- Sends HTTP requests for control and internal parameter values.
- Requests handled by the built-in Web server in the camera.
- e.g. : `http://myserver/axis-cgi/com/ptz.cgi?camera=1&pan=120&tilt=90`

# Video Processing



- Acquire video from independent thread
- Request single JPEG image from camera
- Receive single JPEG image
- Encode image to Bitmap
- Send image to Android ImageView container

# Phone to Phone Communication

- User Datagram Protocol
- Server is continuously listening for client's messages
- Client is continuously listening to server's messages
- Send - Receive functions in independent threads

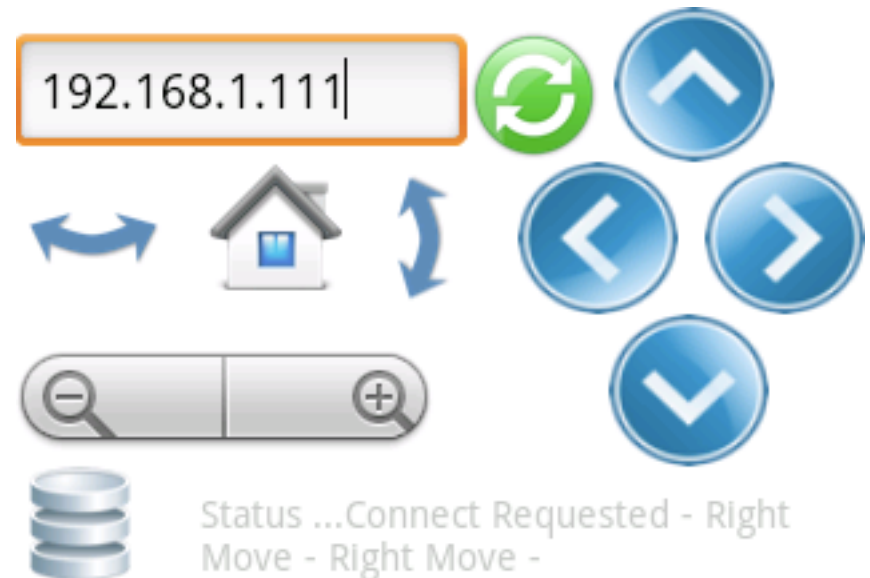
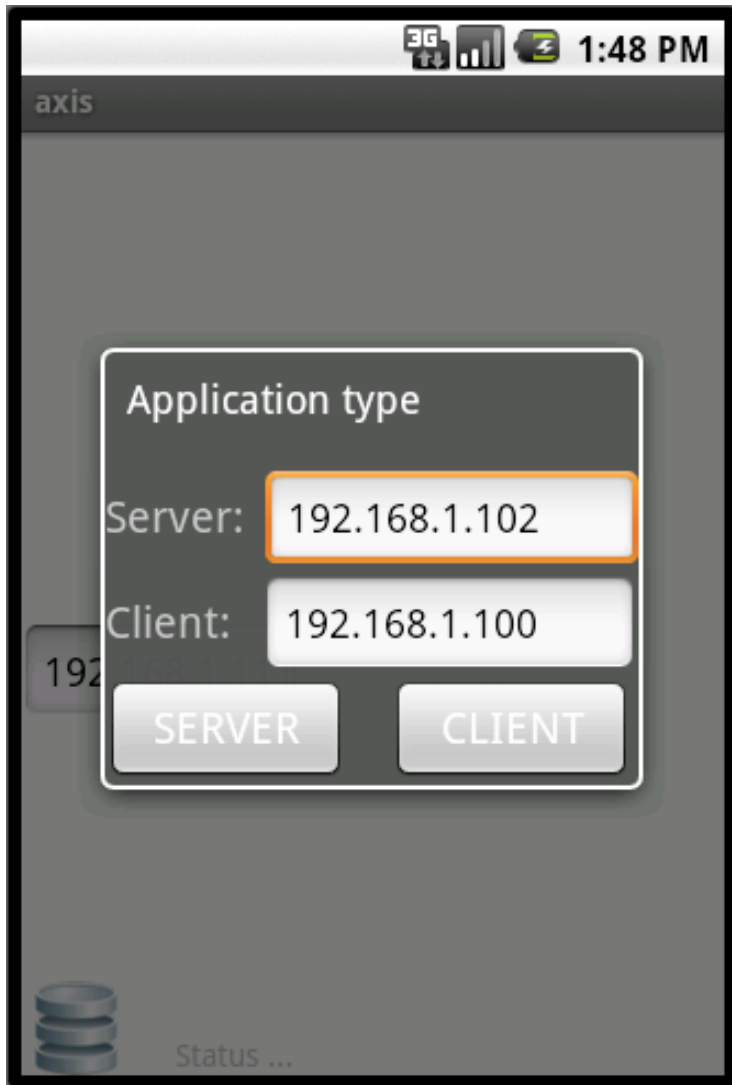
# Phone to Phone Communication

- Server can accept or deny a message
- Client can accept or deny a message
- Message format, binary (Less bytes used)

<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>
Vertical	Horizontal	Zoom	Home	Pan	Tilt



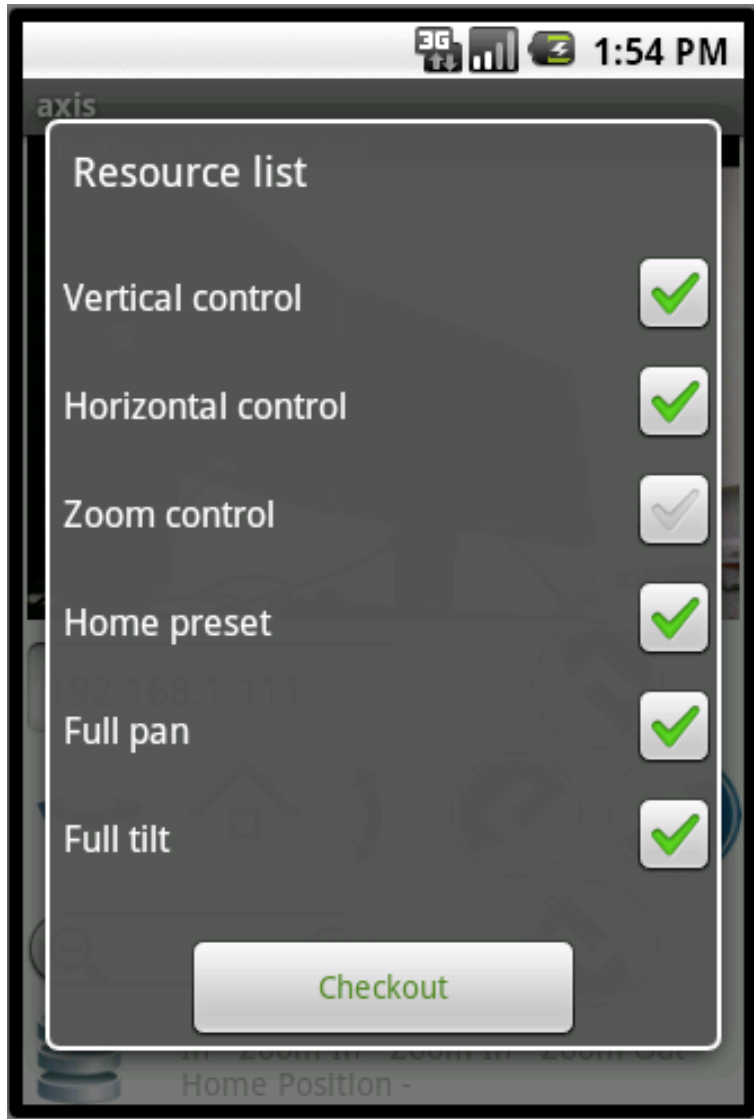
# User Interface



# User Interface



# User Interface



1 1 0 1 1 1

# Problems Encountered

- Video Processing (Real-Time constraint)
- Closing Application Threads on Android
- Permissions to access protected parts of the API
- Device discovery

# Future implementation

- Phone to phone discovery
- Multi-camera viewer on one screen

# DEMO

- Video & control from the emulator
- Video & control from phones
- Phone to phone communication