A Maker's Approach to Home Automation

From DIY light switch robots to affordable synchronous multi-room audio.
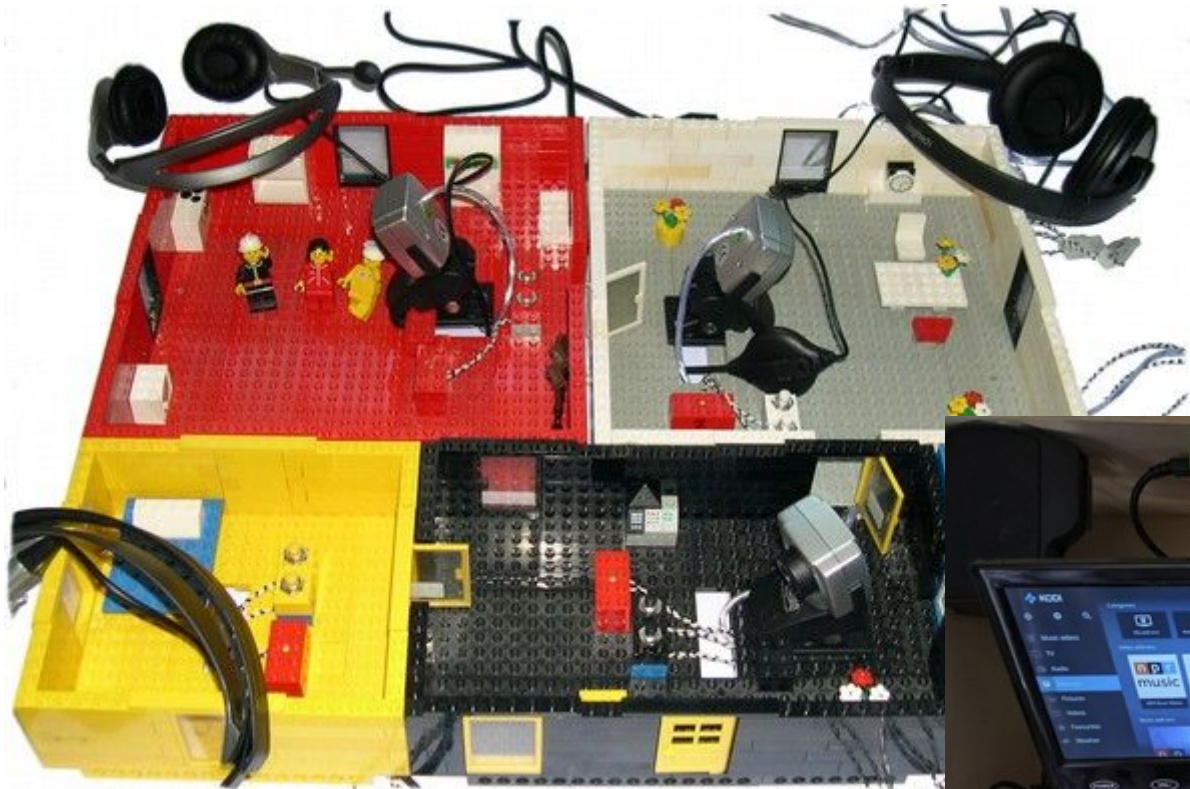
Nova Maker Faire 2017
Ulrich Norbisrath (http://ulno.net)

What about you?

- Who would think they are a Maker?

- Who knows how to program (any language)?

- Who knows what an Arduino is?

- Who knows the ESP8266 (Amazon Dash)?

- Who has an idea about the Internet of Things (IoT)?

2002-2017

Your Friend's Home

ground floor plan

first floor plan

- 2 stories, 2.5 baths, 4 bedrooms, 2 garage stalls
- House+garage: 4000 sq ft
- Garden: 9000 sq ft + pool

- How much would it cost to turn this (when existing) into a smart home?

Student Results

- Average: $40,000

- Maximum: $120,000

- Minimum: $5,000

  without labor: $3,000

  How is this possible?

1. DIY/Maker

- Time, commitment, perseverance
- Stamina to endure failures
- Will to tinker and learn
- Access to workspace
- Access to community

2. Affordable IoT devices (ESP8266)

- Arduino on steroids for less
  - 160 MHz
  - GPIO ports
  - 0.5-16 MB
  - Ram 64k + 92k
  - Wifi on board
- Programmability
  - C/C++ with Arduino IDE
  - Lua
  - Javascript
  - Micropython
- Price: $1- $10
- You can also hack an Amazon Dash Button ($5)
- (Don't forget the new Raspberry Pi Zero W for $10 and other mini full computers)
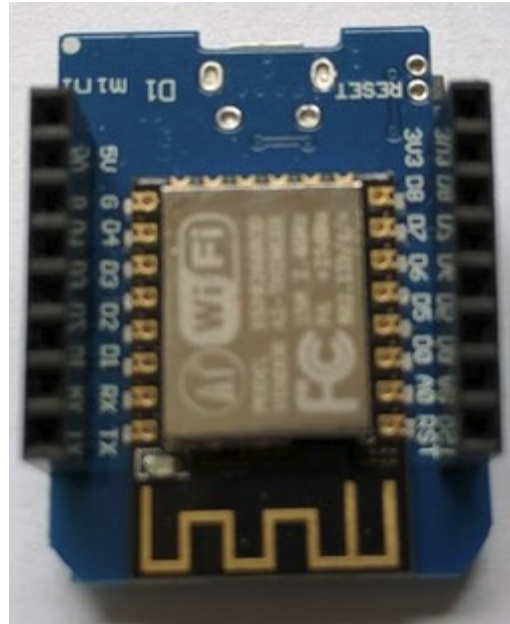
Personal favorite: Wemos D1 Mini ($3)

Lighting

- Philips Hue: USD 15 per bulb (white)
- Or control existing light switch
  - 2 laser cut acrylic or wood pieces:<$10
  - 1 ESP8266: $3
  - 1 power adapter: available or $1
  - 1 small servo motor: $2.50
  - Screws, washers, and nuts: available
- Adapted from:
  http://www.instructables.com/id/
  Easy-Home-Automation-using-servo-
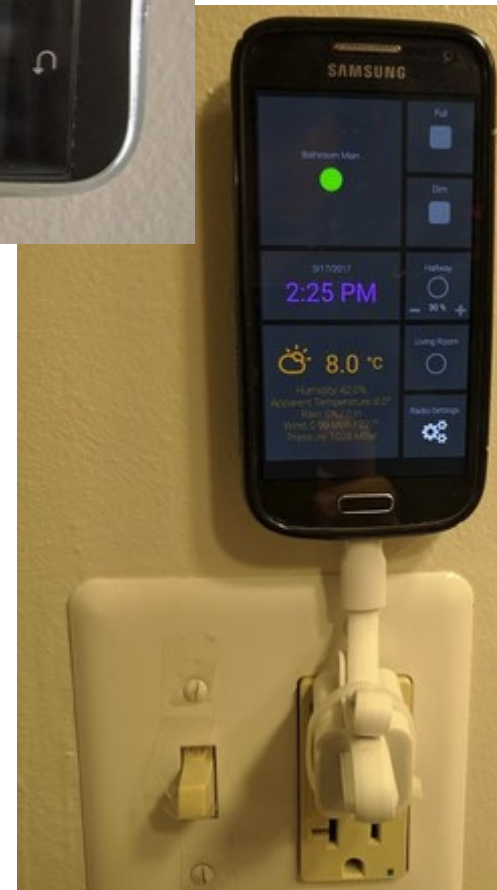 switches/

Wireless Buttons

- Wemos D1 Mini: $3

- Power Supply: $0-1

- Buttons: $1-2

- Wire: available

- Cardstock, felt, hot glue: insignificant

Old Phone Dashboard

- Any old Android phone or Tablet

- Full screen browser

- Daydream/Screensaver mode, touch to wake

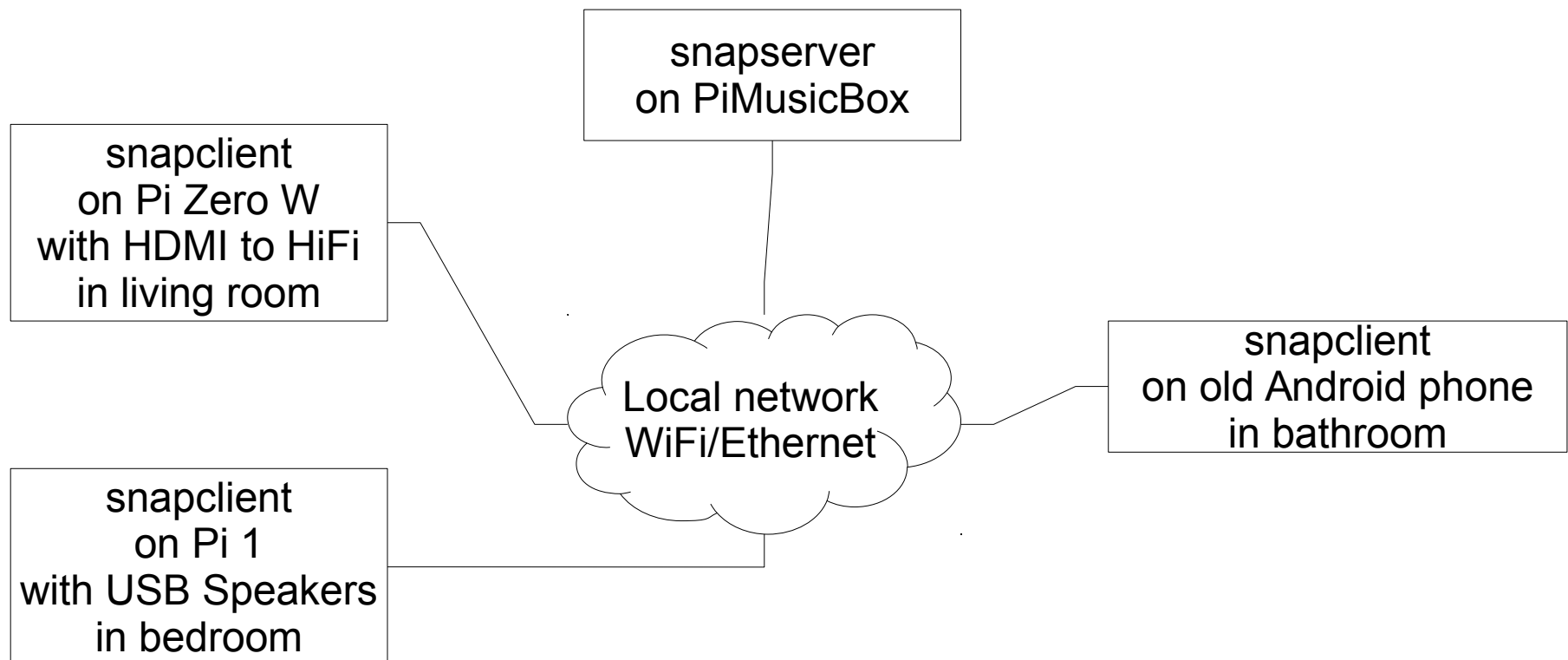- Home assistant or openhab dashboard

- Glue to wall and power

Multiroom Synchronous Audio

- Use Snapcast – really simple open source audio sync solution

- Android dashboards can be utilized

Bind it together

- Home Assistant (http://home-assistant.io)

- openHAB (http://openhab.org)

- FHEM (http://fhem.org)

- Use Micropython for ESP8266 devices!

  - Wireless login + command shell

  - OTA update

Come, Visit, Share Your Ideas

Check out more IoT and home automation at

Booth of GMU MIX
South Lakes Gym: 211, 212

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