SmartNetwork

Team SMART/RG

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Problem/Motivation

People want to know:

- Where in my house is the WiFi generally strong or weak?
- What is the speed of my WiFi in certain areas of my house?
- Can I position my router differently to get better results?
- Do I need extra hardware (e.g. extenders) to get good WiFi across my whole house?

What we want to test is the connectivity over WiFi to the router, not to the rest of the devices on the internet.

Users of the Application

IT Technicians:

- Technicians can install routers easier, because they have accurate and detailed wifi connectivity data.
- View last saved household data to better debug wifi connectivity issues.

Everyday User:

- View where the wifi has good or bad connectivity in the house.

Solution Design - Wifi Testing

- Display real-time connection speed data
  - WiFi Speed Test
- Allow users to drop 'pins' at certain parts of their house
  - At each pin, get connection data by using Iperf and communicating with the router
  - A speed test will be run at each pin, showing the WiFi speed at that location
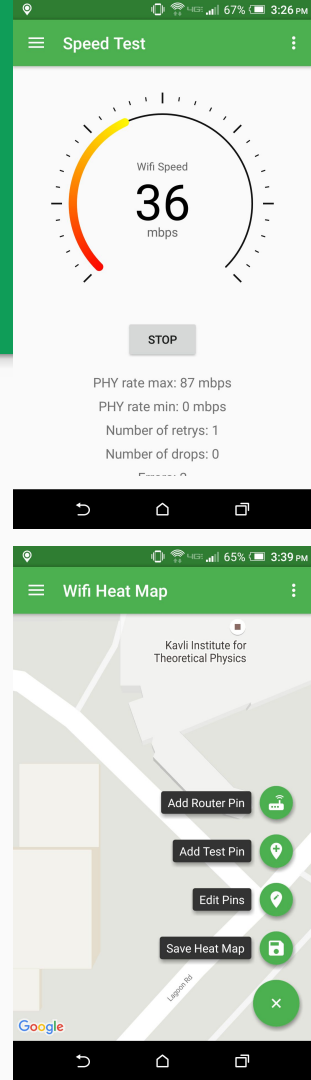
Solution Design - Heatmaps

- Create a heatmap based on the data generated from the speed tests at each pin in a house
  - The map will be color-coded based on the WiFi strength at each pin
- The purpose of the heatmap is to expose areas of weak WiFi, where an extender might be useful
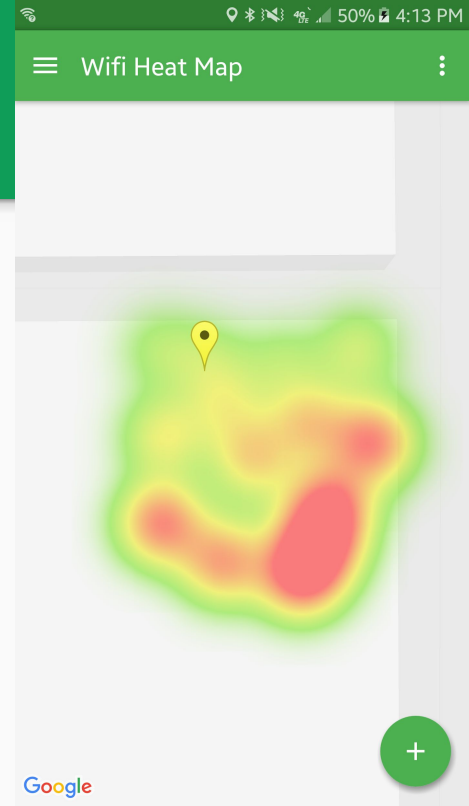
Solution Design - Persistance

- Heatmaps will be saved in order to show differences between current connection data vs. previous data
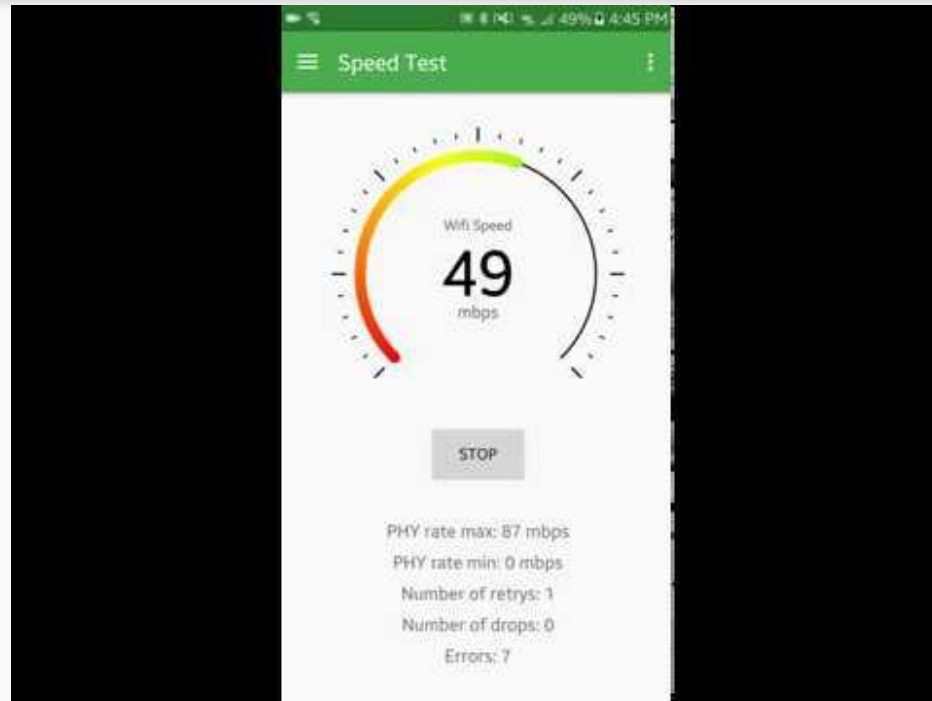- Saved heatmaps in our database will be queried based on certain search criteria

Technologies

- Android
- Iperf3
- Ruby on Rails
- MySQL
- Docker
- Google Maps API
- Google Heat Map API
- Linux
- Android NDK

Demo

What's next?

- Get iperf working on Android platform
- Create action in API that allow the android app to query heatmaps.
- Create action in API that allows the android app to save heatmaps.
- Innovative algorithm to set the color intensity of the Heat Map generation
  - Factors to consider:
    - test results(Mbps, latency, jitter, # of retries, etc.) from router at test location
    - distance between test location and router

The End

Yay!