GARMIN

Wearables in the Workplace

Workshop Materials

Download

Please download *Wearables in the Workplace.zip*

https://ssl.thisisant.com/public/CiqWorkshop2019

Workshop Goals

Demonstrate how an off-the-shelf Garmin wearable can be used in an industrial workplace environment.

Demonstrate how a custom Connect IQ application can, be used to bring together the built in sensor capabilities of the device, existing ANT wireless mesh technologies, and cloud applications.

Workshop Overview

Premise

You are a developer for a company which needs to track some data from their employees while they are working in a potentially hazardous environment.

Workshop Overview

Premise

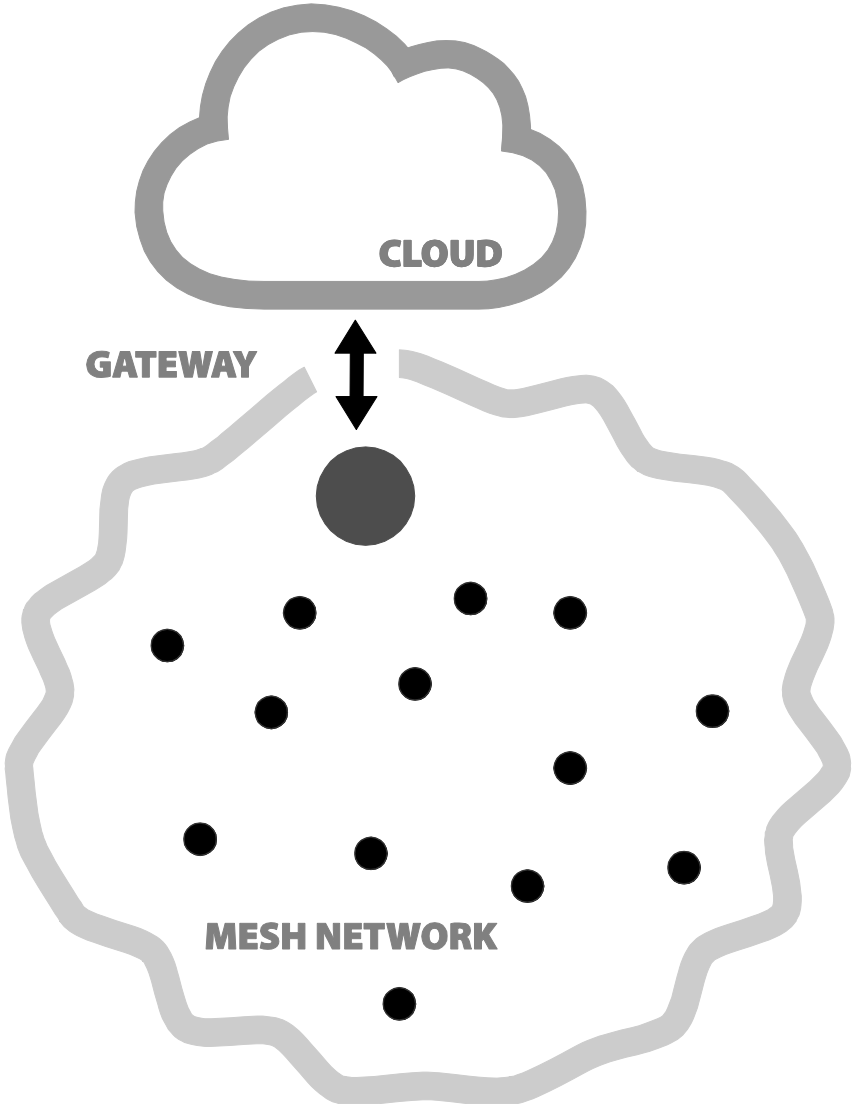
The data that the employer would like to collect is:

- Heartrate (and if the employee is still wearing the watch)
- Self reported employee status
- Custom alert activated by the employee to call for help

Workshop Overview

Premise

- To cover the large area, use a mesh network (ANT BLAZE)
- The mesh network routes data to a cloud application via a gateway device connected to the internet



Workshop Components

Garmin Wearable

- The vívoactive 3 collects the heart rate data via the optical heart rate sensor
- Serves as the user's interface to the system for sending status and alerts
- Connects into the ANT BLAZE network to send data

Workshop Components

Connect IQ

- Garmin's app platform allows for developers to extend their brand into Garmin's device ecosystem
- Take advantage of Garmin's experience in power management, activity tracking, and wireless communication

Workshop Components

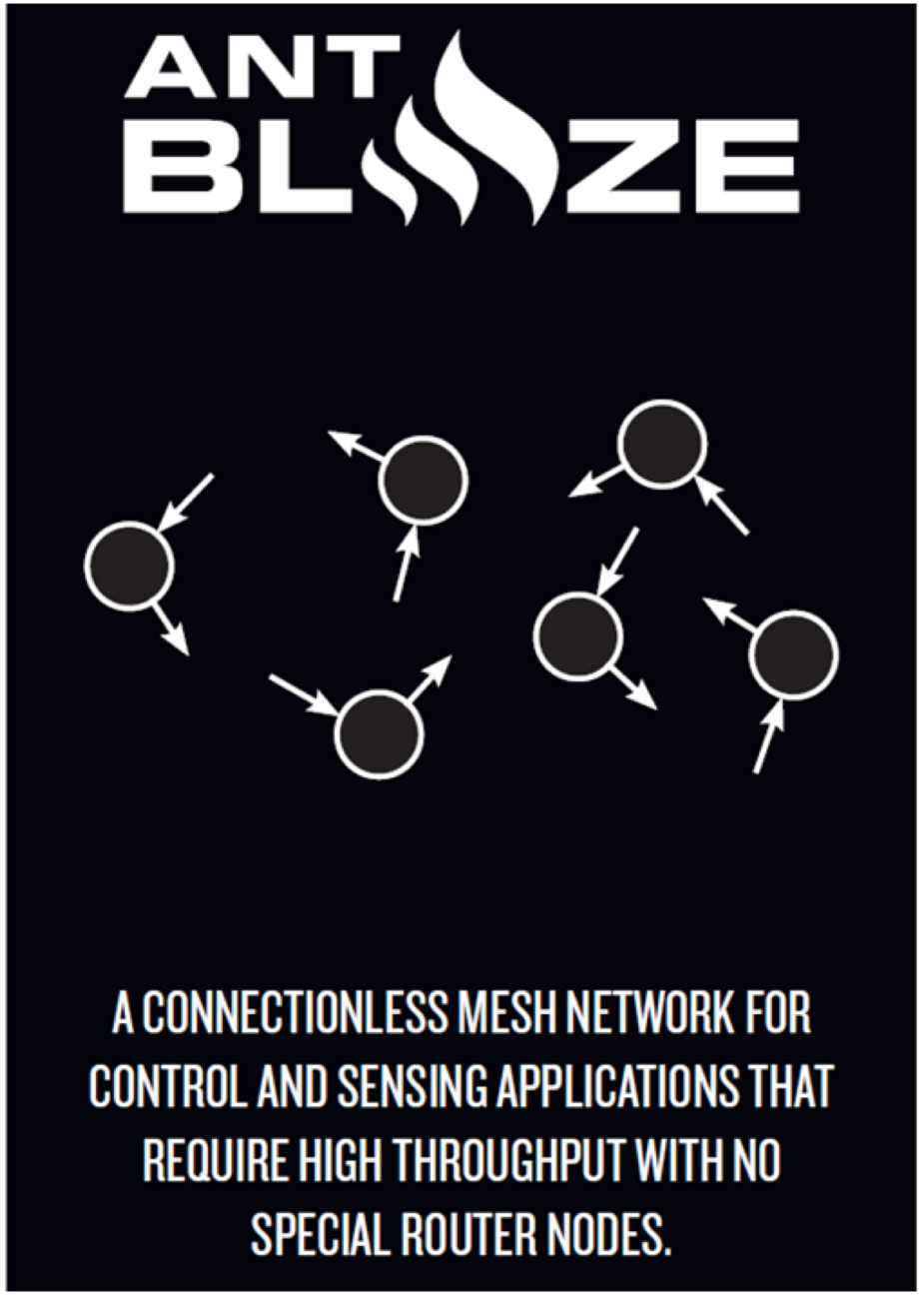
Monkey C

- Programming language for Connect IQ app platform
- Dynamically typed scripting languages akin to JavaScript
- The language you didn't know you already knew

Workshop Components

ANT BLAZE Mesh Network

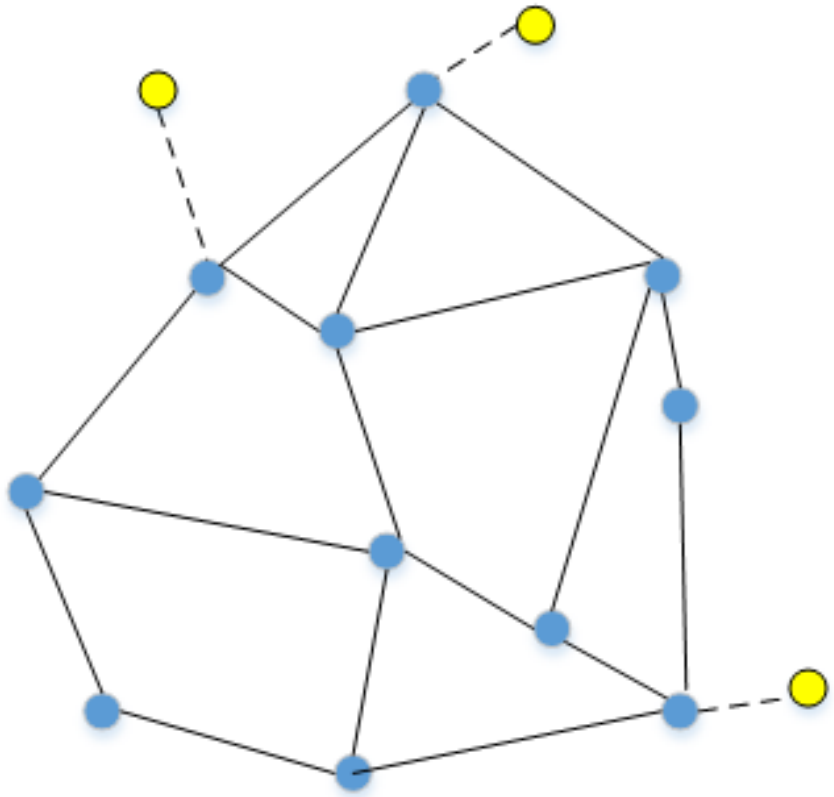
- Connectionless mesh stack
- Optimized for sensor data collection
- Available now – BLAZE is out in the wild



Workshop Components

ANT BLAZE Mesh Network

- The Connect IQ watches will participate the ANT BLAZE network as “BLAZE Lite” devices
- Lower powered variation of BLAZE for wearables
- Does not contain the full BLAZE implementation - pairs up with a nearby BLAZE node in the network
- Proof of concept showing how a wearable can participate in BLAZE network



Workshop Components

ANT BLAZE Mesh Network

- Running on Nordic Thingy:52 devices dispersed around the room

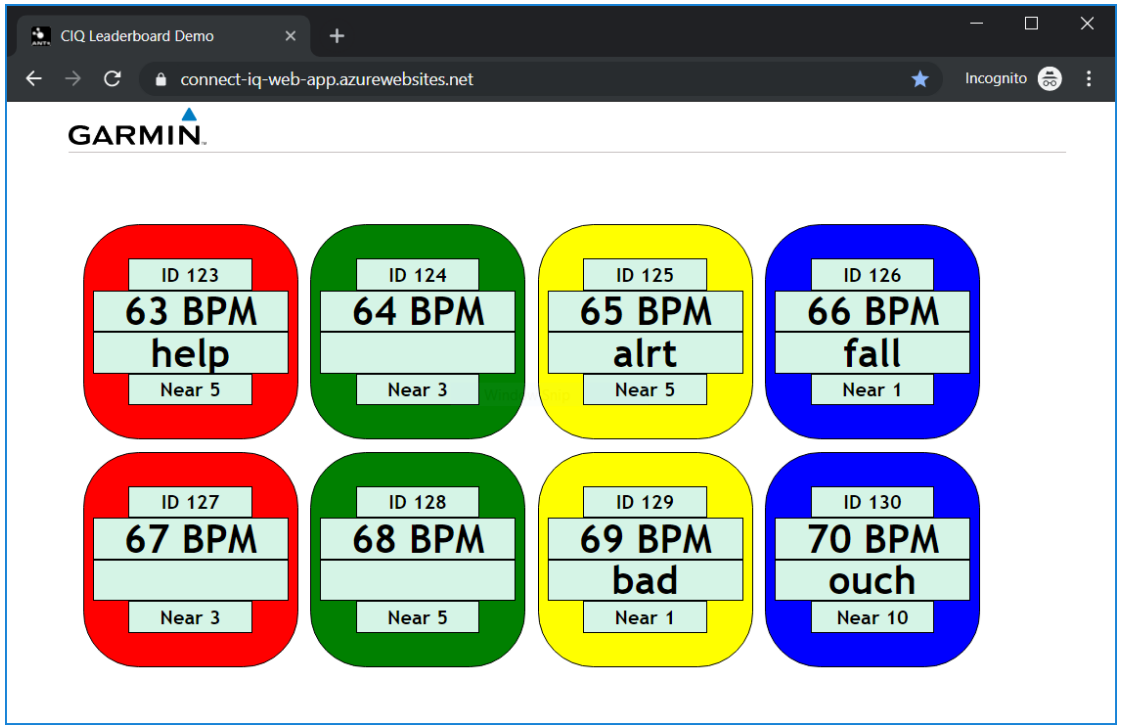
Workshop Components

ANT BLAZE Gateway / MQTT Client

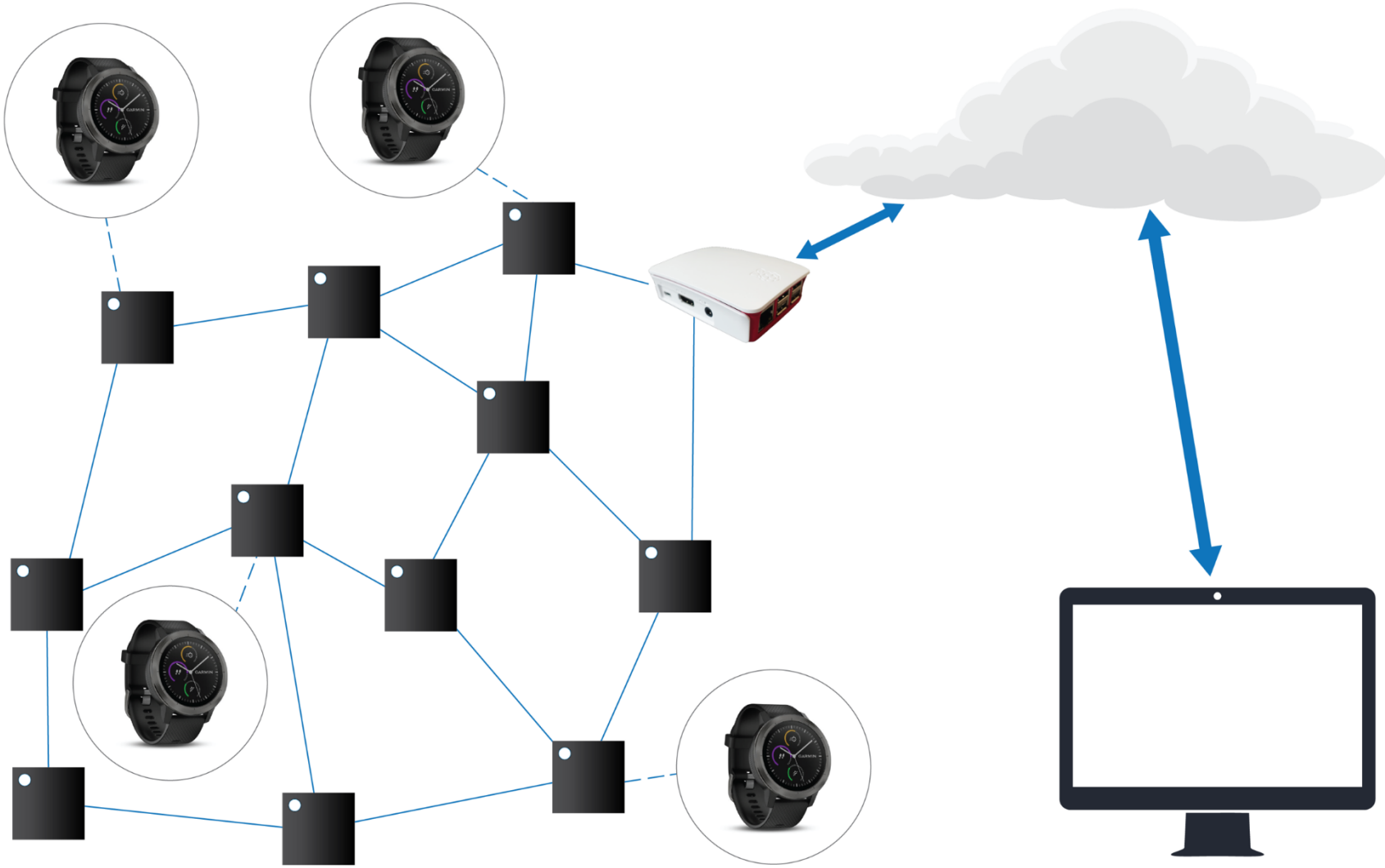
- Raspberry Pi with ANT BLAZE Serial Gateway
- Link between the ANT BLAZE network and the cloud application
- Uses MQTT (Message Queuing Telemetry Transport) protocol to communicate with cloud app
- In this case uses WIFI but could use cellular or satellite (with additional hardware) for remote-location use

Workshop Components

Web Application



- Microsoft Azure web application
- Receives and displays data sent from the gateway
- Accessible from any web browser
- https://connect-iq-web-app.azurewebsites.net/



Web Browser

Azure Web App
MQTT Broker

Thingy:52
BLAZE Nodes

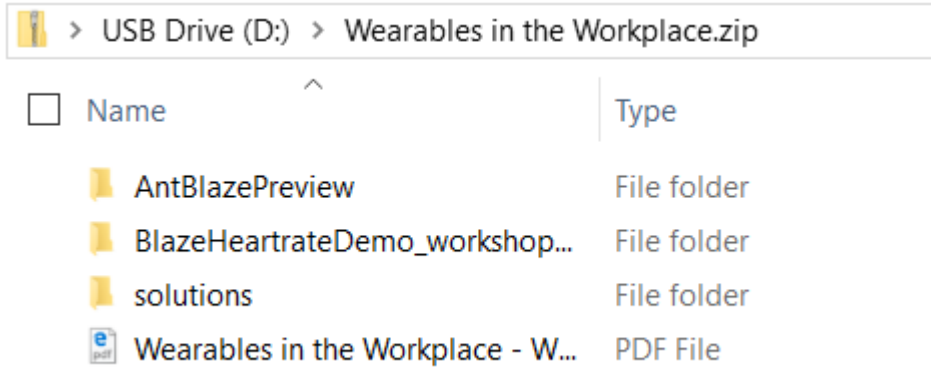
Connect IQ Watch
BLAZE Lite Node

Raspberry Pi
BLAZE Gateway
MQTT Client

Lets get started.

Project Files

- BlazeHeartrateDemo_workshop_start
  - The project you will import into Eclipse
  - Contains project files and the starting source code
  - It has some things done already and some things you'll need to fill in as instructed in the manual
- solutions
  - Contains the finished files for each activity
- BlazeLiteBarrel
  - Shareable library (Monkey Barrel)
  - Contains the BLAZE Lite implementation
  - Also contains a API guide

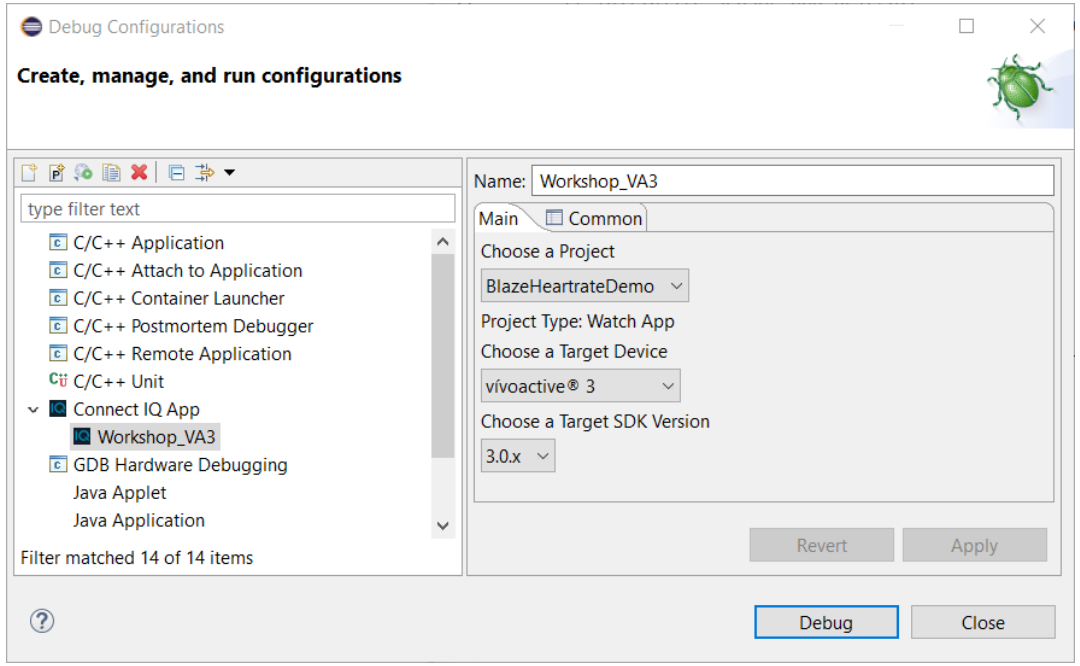


Setup

1. If your computer has not been setup, turn to the section in the manual called “Computer Setup” (section 2.2) and follow the instructions
2. If your computer already has the required software (Eclipse, CIQ Plugin, CIQ SDK), import the Connect IQ project following Section 2.3 in the manual

Running the Application (Simulator)

- Click the *Run* > *Debug Configurations* menu
- Right click on the *Connect IQ App* option in the list on the left side of the window, and select *New Configuration*
- Give the configuration a name at the top
- Choose the Connect IQ project that will use this configuration (It should automatically select your current project, but the Project button can be used to select a different one)
- Choose a target device (vívoactive 3)
- Click *Apply* and *Debug*



Running the Application (Simulator)

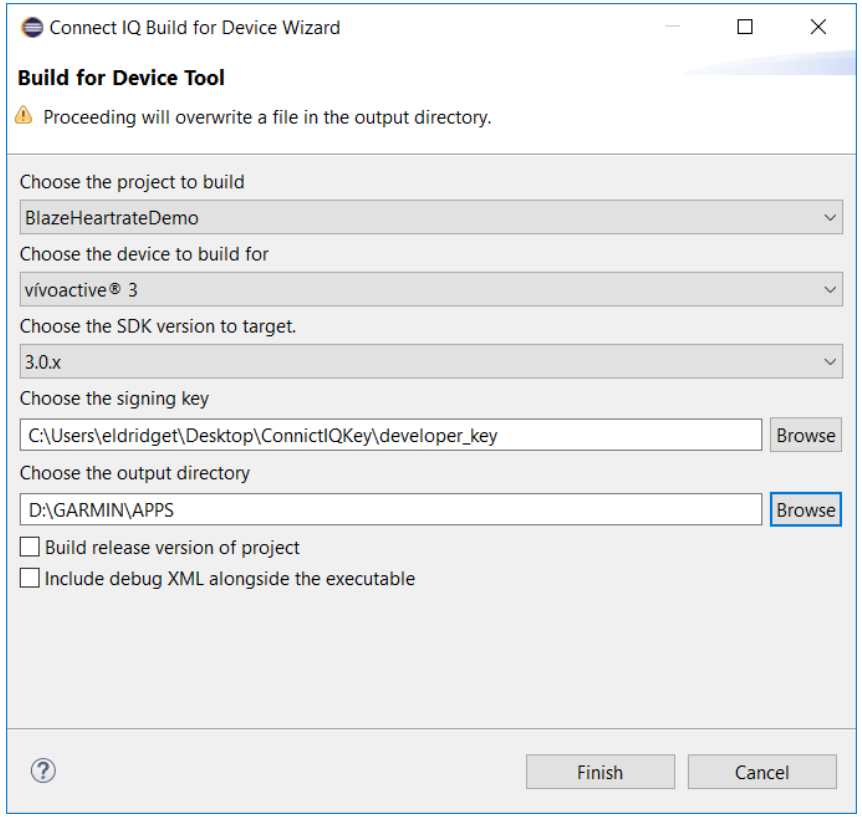
- The application runs…but is not doing much at this point

Running the Application (On Watch)

- Start up the watch with the button on the side
- Go through all the setup questions
  - Do not use GPS time – it will take a long time to setup while indoors
  - There is no need to pair a phone right now
- Plug the watch into your computer's USB Port
- It should show up as a storage device

Running the Application (On Watch)

- Click the Connect IQ menu
- Select *Build For Device Wizard* to open the wizard
- Choose the project and device for which you wish to build from the drop down menus
- Set the output directory to your device's GARMIN\APPS directory of the watch
- Click the Finish button.
- Close the window when the process completes



Running the Application (On Watch)

- To run the application, eject the watch by pressing the eject button on the watch screen
- Press the physical button of the watch
- Select the app you wish to run
  - The first time you do this, the vívoactive 3 will ask you to select some favorite apps
  - Select your BlazeHeartrateDemo as a favorite so it is easily found

How to do the Activities

- Follow the instructions in the manual step by step
- Activates consists of several tasks which will usually ask you to implement code in between two comments which look like this:

```
// TODO Task 1.2.3 Start


// TODO Task 1.2.3 End
```

- Useful resources (also in Section 2.1 of manual):
  - developer.garmin.com/connect-iq/api-docs/
  - developer.garmin.com/connect-iq/programmers-guide

- If you do not have a background in programming, feel free to follow along by copy-pasting the provided solutions for each activity
- We'll be walking around to provide assistance
- Work with other people at your table

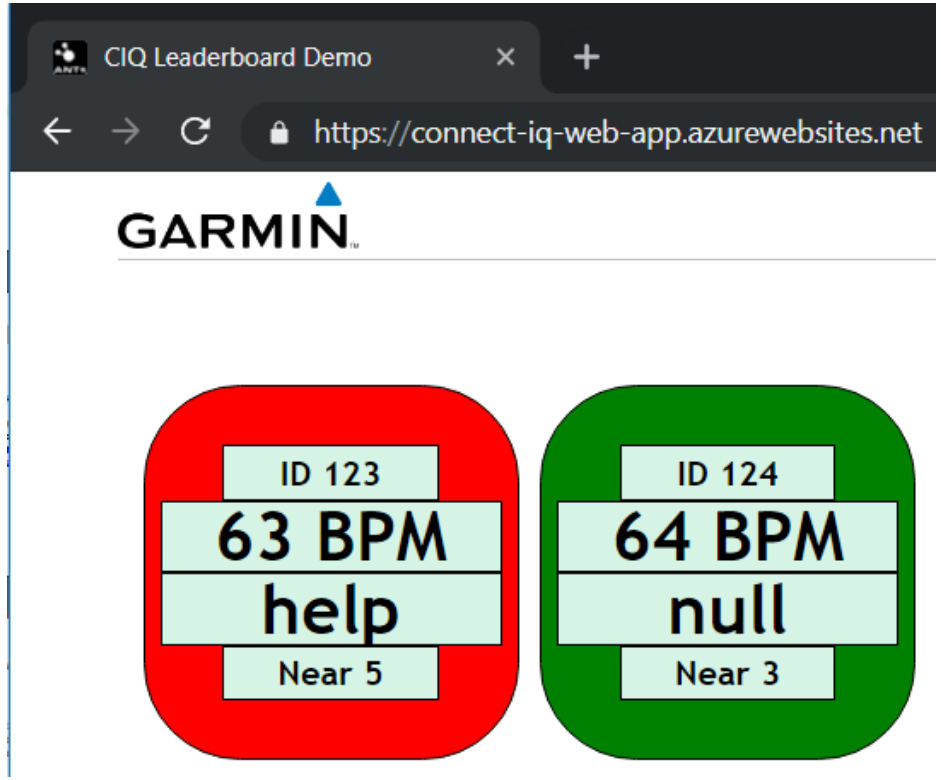
Begin Activities 1 - 3

ANT BLAZE Lite Barrel

- Activity 4 and 5 rely on the ANT BLAZE Lite Barrel
- Included in the zip file with the project files
- Also contains an API guide
- More info about barrels in Programmer's Guide: developer.garmin.com/connect-iq/programmers-guide/shareable-libraries/

Web Application

- As you complete Activity 4 you will start to be able to see your Watch show up on the web application
- You can also access the web app in your own browser:
- https://connect-iq-web-app.azurewebsites.net/



Begin Activities 4 - 5