ResearchBit Overview

The purpose of this document is to provide an overview of the ResearchBit ecosystem and various platforms which can be used to handle communication with a device.

The ResearchBit ecosystem’s purpose is to collect consumer study data using an embedded device, allow collection of this information via bluetooth LE by an internet connected intermediary, and aggregate the data using a database for visualization on a dashboard.

## ResearchBit Ecosystem

The ResearchBit ecosystem consists of:

* **A bluetooth LE ResearchBit device:** used for collecting consumer study data
* **An internet connected, SDK-enabled device:** used to relay the information
* **A backend service with dashboard:** used to aggregate and visualize the data

## 

The purpose of these SDKs is to abstract the lower-level bluetooth communications with the ResearchBit Devices, and deliver event summary data to the implementing object.

## Communication Steps

The steps taken by each platform are outlined in the table below:

| **Task** | **Platform** | | |
| --- | --- | --- | --- |
| **Android** | **iOS** | **Particle** |
| Scan for available devices and create a list of detected devices | 1 | 1 | 1 |
| Connect to device | 2 | 2 | 2 |
| Discover services and characteristics | 3 | 3 | 3 |
| Request data from summary service | 4 | 4 | 4 |
| Set notify characteristics | 5 | 5 | 5 |
| Write acknowledgement that summary data was received | 6 | 6 | 6 |
| Set RTC with current time (\*if supported) | 7 | - | 7 |
| Disconnect | 8 | 7 | 8 |

## Event Summary Data

A ResearchBit device collects standard data for all events, and also supports custom data which can differ between implementations of the ResearchBit device. Data collected on all events includes awake time, trigger pulls and an array of tilt angles. Non-standard data can be stored in two blobs which are transmitted as Base64 encoded strings. Note that the iOS SDK does not support blobs currently.

## Device Real-time Clock

Some ResearchBit devices support setting the real-time clock so that summary data has the correct date and time for events. If the device supports this feature, the time is set after retrieval of the summary data. Note that the iOS SDK does not support setting the real-time clock at this time.

## Platforms for Data Retrieval

Existing platforms are as follows:

* Android SDK (link to Android repository)
* iOS SDK (link to iOS repository)
* Particle SDK (link to Particle repository)

Each SDK includes a README which outlines architecture, methods, and usage. The SDKs retrieve the list of events from the device and tell the device that the events are safe to delete after retrieval. The Particle and Android SDKs also manage setting the real-time clock on the device so that events are transmitted with the local timestamp.