Documentation for layered App

Introduction

This Documentation includes three main parts. The first part introduces functions for each main feature. The second part lists all types of parameters. The third part introduces function spec and how to use these functions for target devices by combining different parameters.

Main Features

Layered App has three main features which are Add, Measurement and Sync offline result. All these three functions can be used independently or to combine other features. This section will briefly introduce these three main features.

1. Add a device
Layered app will add a new device with a specific device model. Once added, Layered app will send back the new device's MAC ID.

2. Measurement

Layered app will do a new measurement. Once finished, Layered app will send back the result of measurement.

3. Sync offline result

Layered app will get and display offline result from devices which support function of getting offline data such as BG5, BG Track, BP5S, BP7S, and send back the result.

Parameter Types

User needs to input and combine different types of parameter as URI to send intent to invoke the Layered App. FAQs will be invoked and user will be redirected to the FAQs page if URI is null. The following are all valid parameter types can be used.

1.devicemodel

Devices and relative strings of Number:
BP:
BP5 = 100, BP3L = 101, BPTRACK = 102, BP7S = 103, BP7 = 104, BP5S = 105

AM:
AM3S = 200, AM4 = 201

PO:
PO3 = 300

BG:
BG5 = 400, BG5S = 401, BG1 = 402

HS:
HS4 = 500, HS4S = 501, HS2 = 502

TH:
THV3 = 600

ECG:
ECG3 = 700, ECG3 USB = 701

2.cmd

Commands and relative strings of Number:

Measure = 0

(only measure operation, can be used in BP3L, BP5, BP5S, PO3, BG5, HS4, HS4S, THV3)

Add = 1

(only search operation, can be used in all devices)

Sync Offline Data = 2

(only synchronize device history data operation, BP3L does not support this function)

Add + Measure = 3

(All scanned devices will be listed and measured according to the device you selected only BP3L, BP5, BP5S, PO3, BG5, HS4, HS4S, c THV3 support this function)

Add + Sync Offline Data = 4

(All scanned devices will be listed and synchronize device's history data according to the device you selected. BP3L does not support this function)

Add + Sync Offline Data + Measure = 5

(All scanned devices will be listed and synchronize device's history data according to the device you choose, and then measure after synchronization. only BP5, BP5S, PO3, BG5, HS4, HS4S, THV3 support this function)

Sync Offline Data + Measure = 6

(Synchronizing historical data and measuring after synchronization. only BP5, BP5S, PO3, BG5, HS4, HS4S, THV3 support this function)

3.orientation

Different orientation modes for devices and relative Integer

Portrait = 0

Landscape = 1

Auto = 2

4.addType

Different orientation modes for devices and relative Integer

BT Scan = 0

QR Code Scan = 1

5. codeType

Only for BG Devices

BGQRCode = 0

BGOther = 1

6. unit

BloodGlucoseUnitMMOL_L = 0

BloodGlucoseUnitMG_DL = 1

BloodPressureUnitMMHG = 2

BloodPressureUnitKPA = 3

WeightUnitKG = 4

WeightUnitLBS = 5

WeightUnitST = 6

ThermometerUnitC = 7

ThermometerUnitF = 8

UnitMile = 9

UnitKilometer = 10

7. status

Different Status and relative integer.

ActionSuccess = 0

ActionFail = 1

ActionCancel = 2

ActionOther = 3

8. ver

Layer App protocol version number.

9. appId

The package name represents the app on the Android system, the Bundle Identifier represents the app on the IOS System.

10. popFlag

Scan to see whether to pop up a prompt when connecting to MAC.
0: no pop-up
1: pop-up prompt box

11. userId

The user's unique ID for the binding of AM devices. Assignment is a numeric type ranging from 1 - 2147483647.

12. age

Age of user. Assignment is a numeric type.

13. height

Height of User. Assignment is a numeric type. The units are centimeters ranging from 1-255.

14. weight

Weight of User. Assignment is a numeric type. The units are kg ranging from 1- 255.

15.Key

All the keys that return the data in the result

```
String RESULT_KEY_SYSTOLIC = "systolic"      // Integer
String RESULT_KEY_DIASTOLIC = "diastolic"    // Integer
String RESULT_KEY_ARRHYTHMIA = "arrhythmia"    // 0/1
String RESULT_KEY_DATE = "measured_at"    // string, UTC time, in format yyyy-MM-dd-HH-mm-ss
String RESULT_KEY_BLOOD_GLUCOSE = "blood_glucose"    // float
String RESULT_KEY_TEMPERATURE = "temperature"    // float
String RESULT_KEY_WEIGHT = "weight"    // float
String RESULT_KEY_OXYGEN_SAT = "oxygen_saturation"    // float
String RESULT_KEY_PERFUSION_INDEX = "perfusion_index"    // Integer
String RESULT_KEY_HEART_RATE = "heart_rate"    // Integer
String RESULT_KEY_TIME = "time"
String RESULT_KEY_ACTIVE_DATA = "activedata"
String RESULT_KEY_SLEEP_DATA = "sleepdata"
String RESULT_KEY_SWIM_DATA = "swimdata"
String RESULT_KEY_STEPS = "steps"
String RESULT_KEY_CALORIES = "calories"
String RESULT_KEY_SLEEP_TIME = "sleeptime"
String RESULT_KEY_SLEEP_EFFICIENCY = "sleepefficiency"
String RESULT_KEY_SWIM_TIME = "swimtime"
String RESULT_KEY_ECG_START_TIME = "start_time"
```

String *RESULT_KEY_ECG_END_TIME* = "end_time"
String *RESULT_KEY_ECG_FILE_NAME* = "file_name"
String *RESULT_KEY_ECG_SIMPLING_RATE* = "simpling_rate"

Function Spec

In general, the URL scheme to invoke the layeredapp is:
LAYERED_APP_SCHEME://?appid=AppID&cmd=LayeredAction&devicemodel=HealthDeviceType&mac=MAC_ADDR&unit=VitalUnit&ver=100&scheme=CALLER_APP_SCHEME

Please note that:
1.For all Android calls, parameter "appId" is mandatary, and the value of the appId parameter is client app's bundle ID. This parameter is not needed for iOS calls;
2.If there are more URL parameters than the ones defined in this spec, the layered app should simply return them in original format, with value untouched.
3.URL input parameters are either uppercase or lowercase. The layered app should simply return them in original format with android, in lowercase format with iOS, with value untouched.
4.<YOUR_SCHEME> is a parameter in data of AndroidMainfest.xml file which customized by user so that user's customized activity can communicated with Layerdapp by sending intent.

Dynamic Callback URL

For white listed apps, they can also use dynamic URLs defined in the query parameter.

For example:
LAYERED_APP_SCHEME://?cmd=LayeredAction&devicemodel=HealthDeviceType&mac=MAC&unit=VitalUnit&ver=100&callerurl=my-dynamic- url-0x7765://
To support dynamic URL, instead of using a specific URL in the AppWhiteList.plist file, "*" is used. For example:
<key>com.ihealth.nextapp</key> <string>*</string>

In this way, when layered app receives a call from a white listed app with dynamic URL, callbacks will be sent to the URL defined in the "callurl" parameter from the query string. For example, in query:

LAYERED_APP_SCHEME://?cmd=LayeredAction&devicemodel=HealthDeviceType&mac=MAC&unit=VitalUnit&ver=100&callerurl=my-dynamic-url-0x7765://
The callback URL will be "my-dynamic-url-0x7765://".

Add a Device(cmd = 1)

There are two ways in Layered App to add new Devices:

Add a new device by searching for connected Bluetooth devices (done)
Add a new device by scanning the QR code (mac address) on the device or box.
If the barcode just represents the MAC ID, or in format "ID:MAC", just use the mac ID;
If the barcode is in format "DEVICE_MODEL_STRING:MAC": Verify the DEVICE_MODEL_STRING against the requested devicemodel, if failed, return error. The DEVICE_MODEL_STRING is actually device model, such as BP3L, BP5, BP5S, BP7S, KN550BT, PO3, BG5, HS4, HS4S, HS2, FDIR-V3, AM3S, AM4.
Otherwise return the MAC ID.

Supported Devices:
BP3L, BP5, BP5S, BPTRACK, BP7, BP7S, AM3S, AM4, PO3, BG5, HS4, HS4S, HS2, THV3

URL Scheme:
Android
LAYERED_APP_SCHEME://?appid=AppID&cmd=1&addtype=LayeredAddType&devicemodel=HealthDeviceType&ver=100&popflag=[0|1]&scheme=CALLER_APP_SCHEME

Example
A Bluetooth scan for the MAC address of BP5

LAYERED_APP_SCHEME://?appid=AppID&cmd=1&addtype=0&devicemodel=100&ver=100&popflag=0&scheme=CALLER_APP_SCHEME

iOS
LAYERED_APP_SCHEME://?cmd=0&devicemodel=HealthDeviceType&mac=MAC&unit=VitalUnit&ver=100&scheme=CALLER_APP_SCHEME

Example
a Bluetooth scan for the MAC address of BP5

LAYERED_APP_SCHEME://?cmd=1&addtype=0&devicemodel=100&ver=100&popflag=0&scheme=CALLER_APP_SCHEME

devicemodel is defined above in Parameter Type Introduction.
popflag is parameter when adding the device. 0: no pop-up prompt 1: pop-up prompt
If the device, you want to add is AM3 or AM4 the URL is:

ihealth-layer://?cmd=LayeredAction&devicemodel=200|201&addtype=[0|1]&userid=1111&age=1&sex=UserSex&height=11&weight=11&swim=SwimSwitch&unit=[9|10]&ver=100&scheme=CALLER_APP_SCHEME

Callback
1.Success:
CALLER_APP_SCHEME://?cmd=1&addtype=LayeredAddType&devicemodel=HealthDeviceType&status=0&mac=MAC_ADDR&ver=100

2.Cancel:
CALLER_APP_SCHEME://?cmd=1&addtype=LayeredAddType&devicemodel=HealthDeviceType&status=2&ver=100

3.Fail:
CALLER_APP_SCHEME://?cmd=1&addtype=LayeredAddType&devicemodel=HealthDeviceType&status=1&ver=100&reason=ERROR_DETAILS

Error
When in search mode, no paired device can be found, return error;
When in QR code mode, if the DEVICE_MODEL prefix doesn't match requested device model, return error;
When in QR code mode, if the MAC ID doesn't match mac address' format (12 chars, 0-9 or A-F), return error.
If the device you want to add is AM3 or AM4， callbackurl incoming: userid, weight, height, sex, swim, age

Measure (cmd = 0)

Supported Devices:
BP3L, BP5, BP5S, BP7, PO3, BG5, BG1, HS4, HS4S, HS2, THV3

URL scheme:
Android
LAYERED_APP_SCHEME://?appid=AppID&cmd=0&devicemodel=HealthDeviceType&mac=MAC&unit=VitalUnit&ver=100&scheme=CALLER_APP_SCHEME

Example
BP5 for measurement
LAYERED_APP_SCHEME://?appid=AppID&cmd=0&devicemodel=100&mac=004D3208D2F4&unit=0&ver=100&scheme=CALLER_APP_SCHEME

iOS
LAYERED_APP_SCHEME://?cmd=0&devicemodel=HealthDeviceType&mac=MAC&unit=VitalUnit&ver=100&scheme=CALLER_APP_SCHEME

Example
BP5 for measurement
LAYERED_APP_SCHEME://?appid=AppID&cmd=0&devicemodel=100&mac=004D3208D2F4&unit=0&ver=100&scheme=CALLER_APP_SCHEME

where, devicemodel and unit are defined in Parameter Type Introduction.
If the product is BG5. Increasing the incoming parameters: codeType= LayeredBGCodeType&code= codestring. Scanning QR code for the incoming string if using a BGCode since BG only support blood

measurement in Layered App.

Callback

1.Success

CALLER_APP_SCHEME://?cmd=0&devicemodel=HealthDeviceType&mac=MAC&unit=VitalUnit&ver=100&status=0&result=[{systolic:10,diastolic:10,heart_rate:10,arrhythmia:0,measured_at:2017-10-10 10:10:10}]

2.cancel:

CALLER_APP_SCHEME://?cmd=0&devicemodel=HealthDeviceType&mac=MAC&unit=VitalUnit&ver=100&status=2&reason=ERROR_CANCEL

3.fail:

CALLER_APP_SCHEME://?cmd=0&devicemodel=HealthDeviceType&mac=MAC&unit=VitalUnit&ver=100&status=1&reason=errorcode#errorcode:ERROR-devicetype-errorCode

Callback result keys are defined in Parameter Type Introduction when it is successful. The values of the returned results should be in the unit specified in the caller URL.

Sync offline Data (cmd = 2)

Support Devices:

BP5, BPTRACK, BP7S, BP7, AM3S, AM4, PO3, BG5, HS4, HS4S, HS2, THV3

URL Scheme:

Android:

LAYERED_APP_SCHEME://?appid=AppID&cmd=2&devicemodel=HealthDeviceType&mac=MAC&unit=VitalUnit&ver=100&scheme=CALLER_APP_SCHEME

IOS:

LAYERED_APP_SCHEME://?cmd=1&devicemodel=HealthDeviceType&mac=MAC&unit=VitalUnit&ver=100&scheme=CALLER_APP_SCHEME

If the device you want to add is AM3 or AM4,

Url is followong:

ihealth-layer://?cmd=2&devicemodel=200|201&mac=MAC&userid=1111&age=1&sex=UserSex&height=11&weight=11&swim=[0|1]&unit=[9|10]&ver=100&scheme=CALLER_APP_SCHEME

where,devicemodel and unit are defined in Parameter Type Introduction.

Callback will return all values in one encoded when it is successful. The flattened Json string need no indentation and no new lines. The limit of the URL is 20K for iOS.

Example of unflatten result:

```
{
result: [
        {key1 : val1, key: val2, ... , measured_at: measurement_timestamp},
        {key1 : val1, key: val2, ... , measured_at: measurement_timestamp},
        {key1 : val1, key: val2, ... , measured_at: measurement_timestamp},
        {key1 : val1, key: val2, ... , measured_at: measurement_timestamp},
        ...
        ]
  }
```

Where key and val are defined same as previous section Measurement with an additional key to record measurement time.

If the product is AM3S or AM4. Increasing the incoming parameters: userid, weight, height, sex, swim, age.

Example of AM3S、AM4 callback RESULT_JSON:

```
[
        {
        time : 2017-1-1
                activedata : {
                        steps=1000,
                        calories=1000
                        }
                  sleepdata: {
                        sleeptime=100,
                        sleepefficiency=100 //0-100
                        }
                swimdata : {
                                  swimtime=1000, //unit:minutes
                        calories=1000
                        }
        }
]
```

Add a Device and Measure(cmd = 3) or Add a Device and Sync offline Data (cmd = 4)

Supported Devices:

1. Add a device and Measure

BP3L, BP5, BP5S, BP7, PO3, BG5, HS4, HS4S, HS2, THV3

2. Add a device and Sync Offline Data

BP5, BP5S, BPTRACK, BP7, BP7S, AM3S, AM4, PO3, BG5, HS4, HS4S, HS2, THV3

URL Scheme:

Android:

LAYERED_APP_SCHEME://?appid=AppID&cmd=LayeredAction&devicemodel=HealthDeviceType&unit=Vit

alUnit&addtype=LayeredAddType&ver=100&scheme=CALLER_APP_SCHEME

IOS:
LAYERED_APP_SCHEME://?cmd=LayeredAction&devicemodel=HealthDeviceType&unit=VitalUnit&addtype=LayeredAddType&ver=100&scheme=CALLER_APP_SCHEME
cmd, addtype, devicemodel and unit are defined in "Parameter Type Introduction" section.

Callback
  1.success:
CALLER_APP_SCHEME://?status=0&cmd=LayeredAction&devicemodel=HealthDeviceType&mac=MAC&unit=VitalUnit&addtype=LayeredAddType&result=[{systolic:10,diastolic:10,heart_rate:10,arrhythmia:0,measured_at:2017-10-10 10:10:10}, {},
{}, ...]&ver=100

2.cancel
CALLER_APP_SCHEME://?status=2&cmd=LayeredAction&devicemodel=HealthDeviceType&mac=MAC&unit=VitalUnit&addtype=LayeredAddType&ver=100

3.fail
CALLER_APP_SCHEME://?status=1&cmd=LayeredAction&devicemodel=HealthDeviceType&mac=MAC&unit=VitalUnit&addtype=LayeredAddType&reason=ERROR_DETAILS&ver=100

Add a Device and Measure and Sync offline Data (cmd = 5)

Supported Devices:
BP5, BP5S, BP7, PO3, BG5, HS4, HS4S, HS2, THV3

URL Scheme:
  Android:
LAYERED_APP_SCHEME://?appid=AppID&cmd=ActionAddSyncMeasure&devicemodel=HealthDeviceType&unit=VitalUnit&addtype=LayeredAddType&ver=100&scheme=CALLER_AP P_SCHEME

IOS:
LAYERED_APP_SCHEME://?cmd=ActionAddSyncMeasure&devicemodel=HealthDeviceType&unit=VitalUnit&addtype=LayeredAddType&ver=100&scheme=CALLER_APP_SCHEME

cmd, addtype, devicemodel and unit are defined in "Parameter Type Introduction" section.

Callback:
  1.success:

CALLER_APP_SCHEME://?status=0&cmd=1&devicemodel=HealthDeviceType&mac=MAC&unit=VitalUnit&addtype=LayeredAddType&ver=100&result={
  measureresult:(

{systolic:10,diastolic:10,heart_rate:10,arrhythmia:0,measured_at:2017-10-10 10:10:10},
{}, {}, ...)
syncresult:({systolic:10,diastolic:10,heart_rate:10,arrhythmia:0,measured_at:2017-10-10 10:10:10}, }
{}, {}, ...)

2.cancel
CALLER_APP_SCHEME://?status=2&cmd=1&devicemodel=HealthDeviceType&mac=MAC&unit=VitalUnit&addtype=LayeredAddType&ver=100

3.fail
CALLER_APP_SCHEME://?status=1&cmd=1&devicemodel=HealthDeviceType&mac=MAC&unit=VitalUnit&addtype=LayeredAddType&reason=ERROR_DETAILS&ver=100

Callback will return all values in one encoded when it is successful. The flattened Json string need no indentation and no new lines. The limit of the URL is 20K for iOS.

Measure and Sync offline Data (cmd = 6)

Supported Devices:
BP5, BP5S, BP7, PO3, BG5, HS4, HS4S, HS2, THV3

URL Scheme:
Android:
LAYERED_APP_SCHEME://?appid=AppID&cmd=ActionAddSyncMeasure&devicemodel=HealthDeviceType&unit=VitalUnit&mac=MAC&ver=100&scheme=CALLER_APP_SCHEME

IOS:
LAYERED_APP_SCHEME://?cmd=LayeredAction&devicemodel=HealthDeviceType&unit=VitalUnit&mac=MAC&ver=100&scheme=CALLER_APP_SCHEME

cmd, addtype, devicemodel and unit are defined in "Parameter Type Introduction" section.

Callback:
1.success:
CALLER_APP_SCHEME://?status=0&cmd=1&devicemodel=HealthDeviceType&mac=MAC&unit=VitalUnit&ver=100&result={
measureresult:({systolic:10,diastolic:10,heart_rate:10,arrhythmia:0,measured_at:2017-10-10 10:10:10},
{}, {}, ...)
syncresult:(
{systolic:10,diastolic:10,heart_rate:10,arrhythmia:0,measured_at:2017-10-10 10:10:10},
} {}, {}, ...)

2.cancel
CALLER_APP_SCHEME://?status=2&cmd=LayeredAction&devicemodel=HealthDeviceType&mac=MAC&un

it=VitalUnit&ver=100

3.fail

CALLER_APP_SCHEME://?status=1&cmd=1&devicemodel=HealthDeviceType&mac=MAC&unit=VitalUnit&reason=ERROR_DETAILS&ver=100

Callback will return all values in one encoded when it is successful. The flattened Json string need no indentation and no new lines. The limit of the URL is 20K for iOS.

*Process Callback data

Android user who wants to get and display callback data needs to customize a result activity to receive callback data and set <data android:scheme=”<YOUR_SCHEME>” in AndroidManifest.xml file to request Layered App with parameter name scheme. Otherwise, the data cannot be correctly called back.