

Dimitri Gielis

APEX Wearables



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Dimitri Gielis

- ❖ Founder & CEO of APEX R&D
- ❖ 17+ years of Oracle Experience (OCP & APEX Certified)
- ❖ Oracle ACE Director
- ❖ “APEX Developer of the year 2009” by Oracle Magazine
- ❖ Presenter at Oracle Conferences (OOW, ODTUG, OGh, UKOUG, ...)



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Dimitri Gielis Blog (Oracle Application Express - APEX)

I created this Blog to share my knowledge especially in Oracle Application Express (APEX) and my feelings ...

FRIDAY, SEPTEMBER 26, 2014

APEX 4.2.6 patch available

Oracle released [APEX 4.2.6](#) yesterday, it's also available from My Oracle Support as a patch set 19595896.

Here's the table of bug fixes.

Table 6 Bugs Fixed in the Oracle Application Express 4.2.6.00.03 Patch Set

Bug Number	Description
18393429	Importing pre-4.2 application with data loading results in runtime error
18609856	APEX_WEB_SERVICE.CLOBBASE642BLOB converts incorrectly
18658967	Corrupted HTML mail messages are created from APEX_MAIL.SEND
18719750	ORA-01858 during application import
18733989	Errors picking up session with cookie when TOP CALL is not F, SHOW, or ACCEPT
19021052	Oracle Application Express 4.2.4 throwing error while generating check boxes
19313700	Check box fails with ORA-06502 after upgrade from release 4.0 to 4.2.4
19482775	ORA-06502 when importing application containing translations

Applying the patch took less than 7 minutes.

```
Session altered.
...Validating Application Express
...Database user "SYS", database schema "APEX_040200", user# "106" 20:48:40
...Compiled 0 out of 3014 objects considered, 0 failed compilation 20:48:40
...271 packages
...263 package bodies
...452 tables
...11 functions
...16 procedures
...3 sequences
...457 triggers
...1320 indexes
...211 views
...0 libraries
...6 types
...0 type bodies
...0 operators
...0 index types
```

My next public appearances:

- [Oracle Open World: 27-SEP/2-OCT-2014](#)
- [ORCLAPEX-BE Meetup: 19-NOV-2014](#)
- [ODTUG KScope: 21/25-JUN-2015](#)

About Me

[Dimitri Gielis](#)

Passionate about Oracle and especially Oracle Application Express (APEX). Building applications with love @ APEX R&D.

[View my complete profile](#)



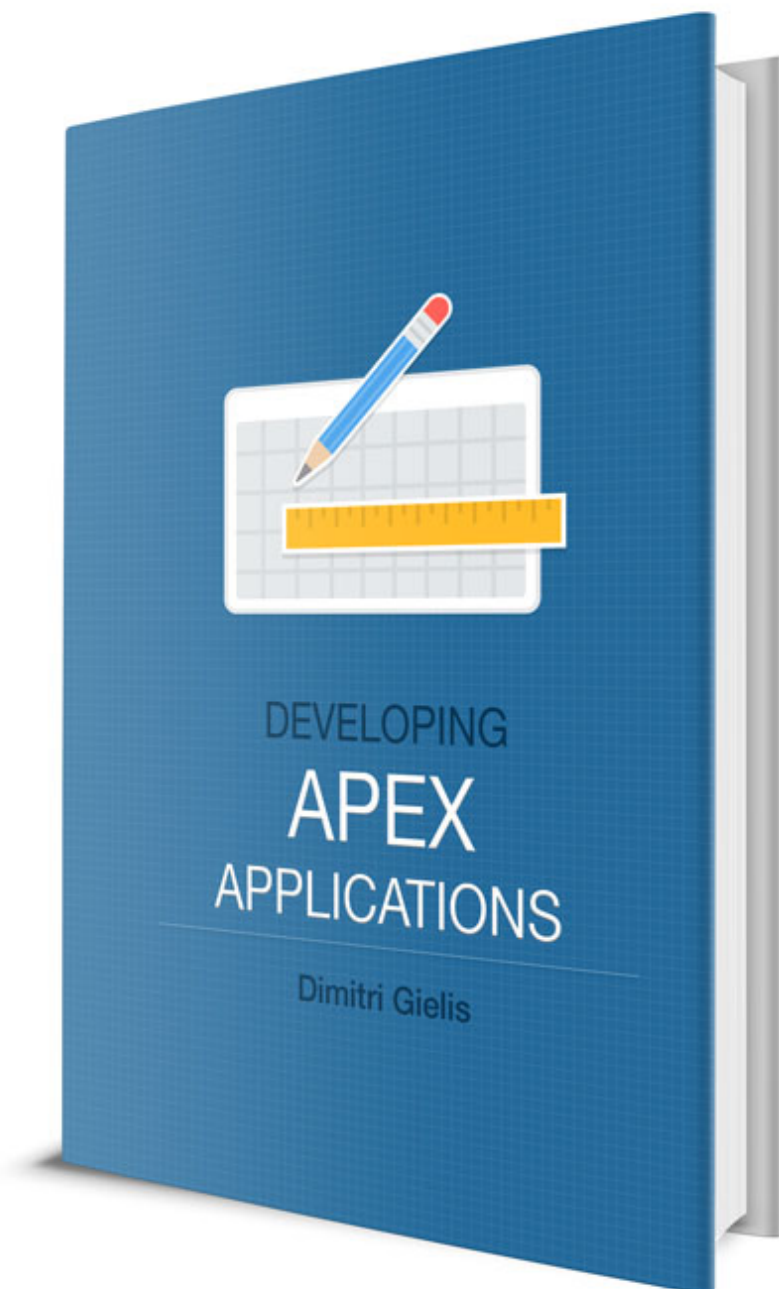
Need APEX consulting, training, development, then visit:



Twitter



A blue cartoon bird, resembling a Twitter logo, standing on a reflective surface. The bird is facing right, with its beak open as if chirping. It has yellow feet and a yellow beak. The background is a light blue gradient.



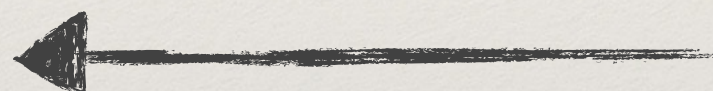
Wearables?



APEX and Wearables?



View
data



Capture
data



How we started

Research the market



Feature Comparison

	Microsoft Band	Apple Watch	Motorola Moto 360	Samsung Gear		
				Simband	Fit	S
Heart rate	X	X	X	X	X	
Blood Pressure				X		
UV	X					X
Gyroscope	X			X	X	X
Skin Temperature	X			X		
Accelerometer	X	X		X	X	X
Step Pace	X	X	X	X	X	
Galvanic Skin Response	X			X		
Ambient Light	X			X		X
Blood data (oxygen levels and blood flow)				X		

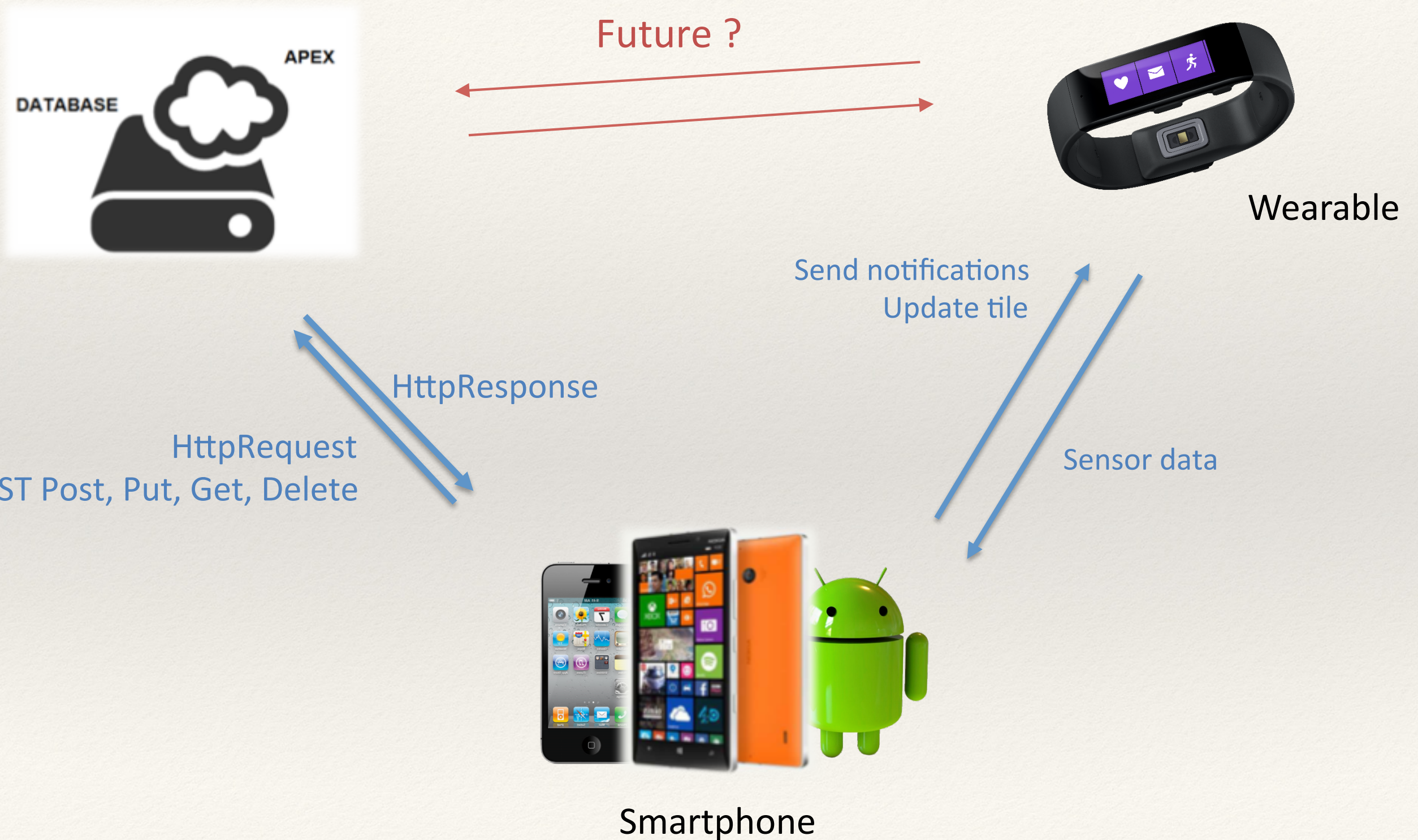
SDKs

- ❖ Android Wear & Apple Watch:
 - ❖ SDK released
 - ❖ Full applications
- ❖ Microsoft Band:
 - ❖ SDK Preview
 - ❖ Only pushing notifications
 - ❖ Reading sensor data

Design choices

- ❖ Avoid prompting to use phone
- ❖ Avoid keyboard input
- ❖ Short battery life
- ❖ Sensors (capturing – passive/active)
- ❖ Small screen of device (wearable)
- ❖ Different interactions (voice, one tab, ...)

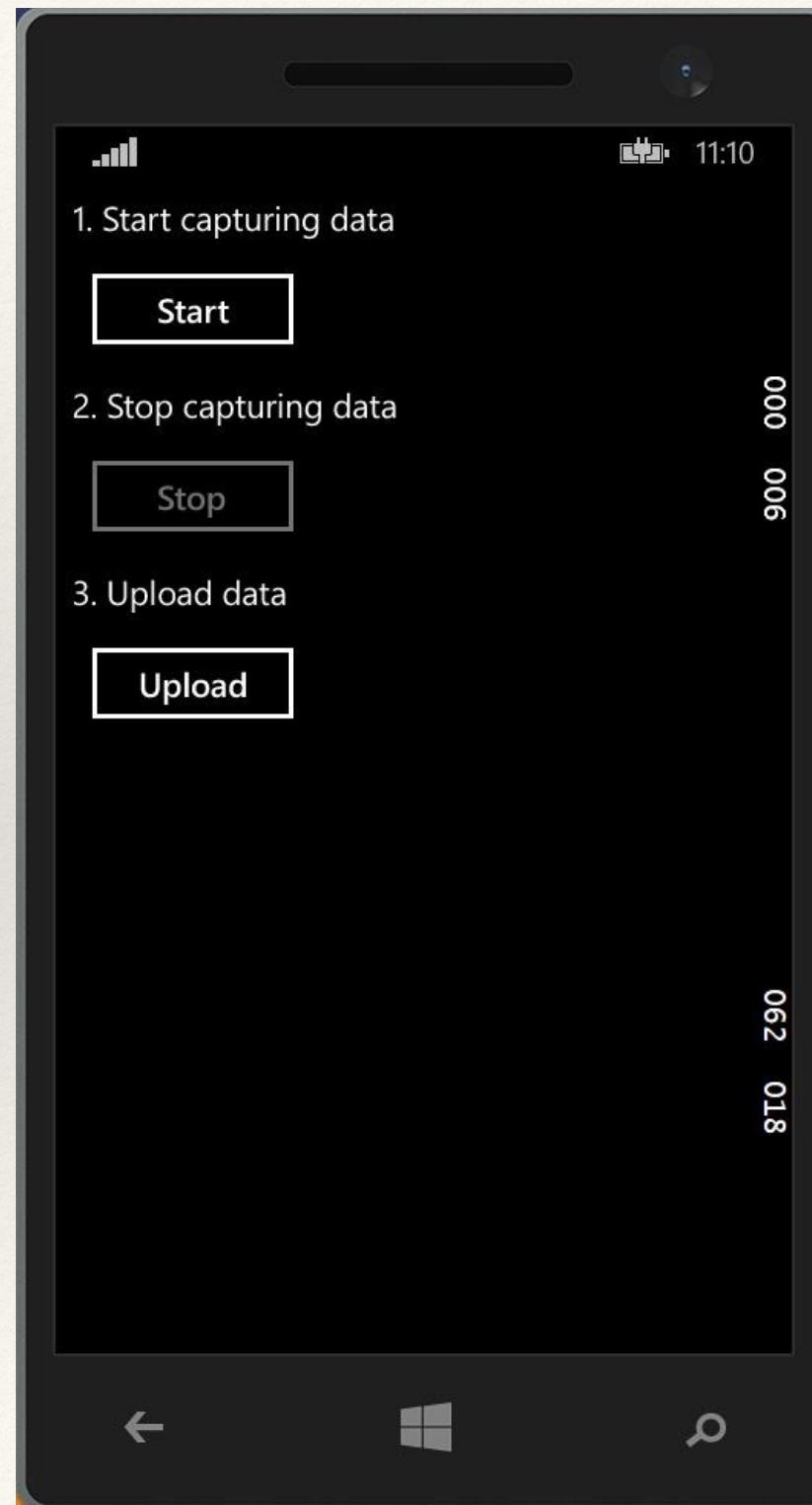
Architecture



Flow of app

Wearable — — —>
APEX

Read data from sensors



Read data from sensors



Read data from sensors

The screenshot displays the Microsoft Visual Studio IDE with the 'APEX Wearables Demo' project open. The code editor shows the `MainPage.xaml.cs` file, which contains the following C# code:

```
124
125     IEnumerable<TimeSpan> supportedHeartBeatReportingIntervals = bandClient.SensorManager.HeartRate.SupportedReport
126     bandClient.SensorManager.HeartRate.ReportingInterval = supportedHeartBeatReportingIntervals.First<TimeSpan>();
127     bandClient.SensorManager.HeartRate.ReadingChanged += (sender, args) =>
128     {
129         if (args.SensorReading.Quality == HeartRateQuality.Acquiring)
130         {
131             Debug.WriteLine("[LOG] HeartRate: Acquiring");
132         }
133         else
134         {
135             Debug.WriteLine("[LOG] HeartRate: " + args.SensorReading.HeartRate);
136             log.heartrate.Add(new HeartRateItem(
137                 args.SensorReading.HeartRate,
138                 args.SensorReading.Timestamp));
139         }
140     };
141     await bandClient.SensorManager.HeartRate.StartReadingsAsync();
```

The Output window at the bottom shows the following debug logs:

```
Speed: 0
Pace: 0
Type of movement: Idle
Total distance: 10175786
[LOG] HeartRate: 58
[LOG] Pedometer
Total steps: 128140
[LOG] Distance
Speed: 0
Pace: 0
Type of movement: Idle
Total distance: 10175786
[LOG] HeartRate: 58
[LOG] Pedometer
Total steps: 128140
[LOG] Distance
Speed: 0
Pace: 0
Type of movement: Idle
Total distance: 10175786
[LOG] HeartRate: 63
```

Upload data



REST Post, Put



Upload data - Device

```
Output
Show output from: Debug
'Apex Wearables Demo.exe' (CoreCLR: .): Loaded 'C:\Data\SharedData\PhoneTools\AppxLayouts\06ce6e96-4a55-467c-9369-9ce449758744VS.Debug_AnyCPU.Jonas\Newtonsoft.Json.DLL'. Cannot find or open the PDB file.
'Apex Wearables Demo.exe' (CoreCLR: .): Loaded 'C:\windows\system32\SYSTEM.TEXT.ENCODING.NI.DLL'. Skipped loading symbols. Module is optimized and the debugger option 'Just My Code' is enabled.
[UPLOAD] serializing log
'Apex Wearables Demo.exe' (CoreCLR: .): Loaded 'C:\windows\system32\SYSTEM.RUNTIME.SERIALIZATION.NI.DLL'. Skipped loading symbols. Module is optimized and the debugger option 'Just My Code' is enabled.
'Apex Wearables Demo.exe' (CoreCLR: .): Loaded 'Anonymously Hosted DynamicMethods Assembly'.

{"heartrate":[],"skintemperature":[{"temperature":28.81,"timestamp":"2015-04-17T11:43:11.1003987+02:00"}],"accelerometer":[],"gyroscope":[],"contact":[{"state":"Worn","timestamp":"2015-04-17T11:43:11.0066543+02:00"}],"distance":[{"currentmotion":null,"pace":0.0,"speed":0.0,"totaldistance":10175786,"timestamp":"2015-04-17T11:43:11.6693162+02:00"}, {"currentmotion":null,"pace":0.0,"speed":0.0,"totaldistance":10175786,"timestamp":"2015-04-17T11:43:12.7354972+02:00"}, {"currentmotion":null,"pace":0.0,"speed":0.0,"totaldistance":10175786,"timestamp":"2015-04-17T11:43:13.7333324+02:00"}, {"currentmotion":null,"pace":0.0,"speed":0.0,"totaldistance":10175786,"timestamp":"2015-04-17T11:43:14.7283728+02:00"}, {"currentmotion":null,"pace":0.0,"speed":0.0,"totaldistance":10175786,"timestamp":"2015-04-17T11:43:15.756112+02:00"}, {"currentmotion":null,"pace":0.0,"speed":0.0,"totaldistance":10175786,"timestamp":"2015-04-17T11:43:16.7567687+02:00"}],"pedometer":[{"totalsteps":128140,"timestamp":"2015-04-17T11:43:11.7786855+02:00"}, {"totalsteps":128140,"timestamp":"2015-04-17T11:43:12.6668424+02:00"}, {"totalsteps":128140,"timestamp":"2015-04-17T11:43:13.6711271+02:00"}, {"totalsteps":128140,"timestamp":"2015-04-17T11:43:14.6740821+02:00"}, {"totalsteps":128140,"timestamp":"2015-04-17T11:43:15.6939009+02:00"}, {"totalsteps":128140,"timestamp":"2015-04-17T11:43:16.6942183+02:00"}],"ultraviolet":[]}

[UPLOAD] upload start
[UPLOAD] RESPONSE CODE: OK
[UPLOAD] upload end
The thread 0xbc8 has exited with code 0 (0x0).
The thread 0x15c0 has exited with code 0 (0x0).
The thread 0xc94 has exited with code 259 (0x103).
The thread 0x1450 has exited with code 259 (0x103).
The thread 0x124 has exited with code 259 (0x103).
The thread 0x13a0 has exited with code 259 (0x103).
The thread 0x13ec has exited with code 259 (0x103).
The program '[904] Apex Wearables Demo.exe' has exited with code -1 (0xffffffff).
```

Upload data - REST

RESTful Services > RESTful Service Module > Resource Template > Resource Handler

wearables

heartrate

GET

POST

+ Create Handler

heartrate_jonas

+ Create Handler

json

GET

POST

+ Create Handler

medication_reminder/{patient_id}

GET

+ Create Handler

patients/get/{id}

DELETE

GET

+ Create Handler

question/get/{id}

GET

+ Create Handler

questions/get/{id}

Resource Handler: POST

A resource handler is a query or an anonymous PL/SQL block responsible for handling a particular HTTP method. Although multiple resource handlers can be defined for a particular resource template, only one resource handler per HTTP method is permitted.

RESTful Service Module: ?

URI Template: json ?

Method: POST ?

Source Type: PL/SQL ?

MIME Types Allowed:

Requires Secure Access: No ?

Source

* Source ?

```
1 declare
2   l_blob blob;
3   l_clob clob;
4 begin
5   l_blob := :body;
6   l_clob := wwv_flow_utilities.blob_to_clob(l_blob);
7
8   INSERT INTO WEA_REST (patient_id, json_blob, json_clob)
9   VALUES (:patient_id, l_blob, l_clob);
10 end;
```

Sensor data in APEX

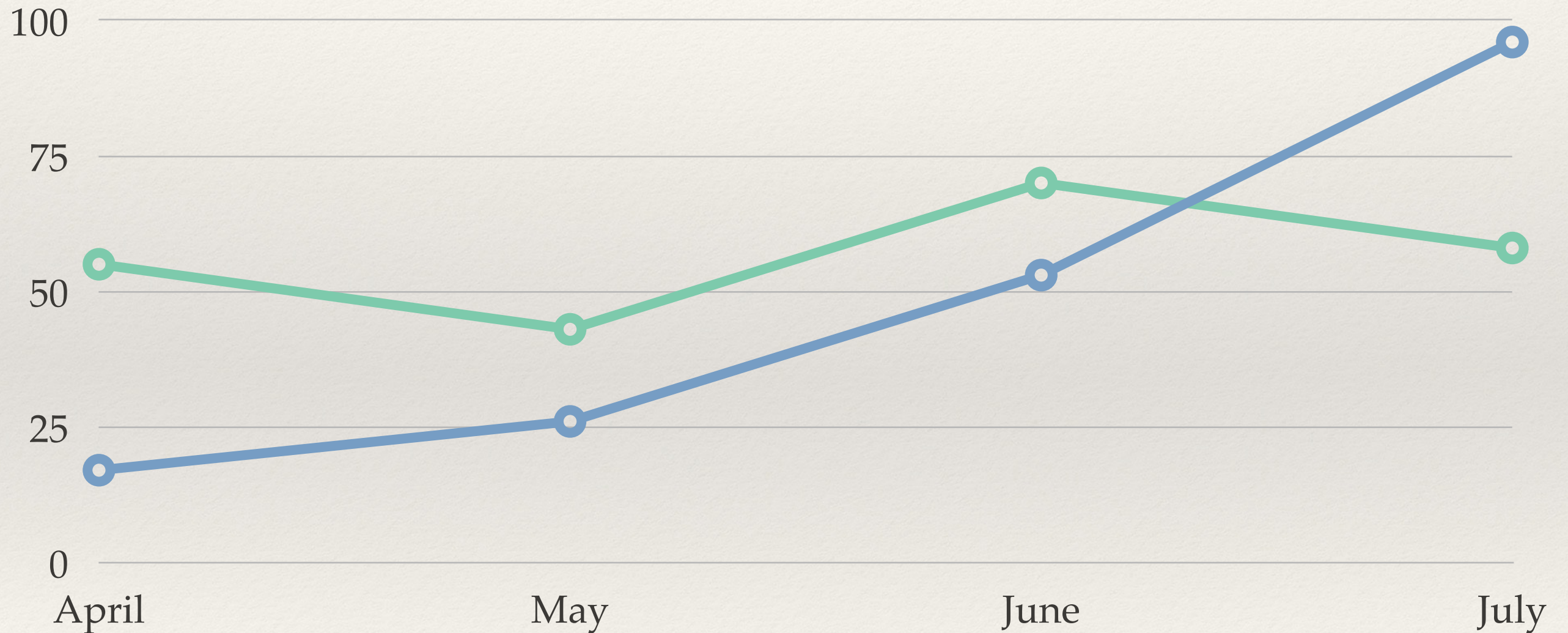
APEX Wearables				
Sensor Data				
Q Go Actions				
Edit	Id	Json Blob	Json C	
	42	Download	{ "heartrate": [], "skintemperature": [{ "temperature": 28.81, "timestamp": "2015-04-17T11:43:11.7786855+02:00" }, { "state": "Worn", "timestamp": "2015-04-17T11:43:11.0066543+02:00" }, { "currentmotion": null, "pace": 0.0, "speed": 0.0, "totaldistance": 10175786, "timestamp": "2015-04-17T11:43:11.6693162+02:00" }, { "currentmotion": null, "pace": 0.0, "speed": 0.0, "totaldistance": 10175786, "timestamp": "2015-04-17T11:43:13.6711271+02:00" }, { "currentmotion": null, "pace": 0.0, "speed": 0.0, "totaldistance": 10175786, "timestamp": "2015-04-17T11:43:15.6939009+02:00" }], "totalsteps": 128140 }	

Reading JSON in the Database

```
CREATE TABLE ssn_json
(id          NUMBER GENERATED ALWAYS AS IDENTITY NOT NULL,
 date_loaded DATE,
 json_document CLOB
 CONSTRAINT ensure_json CHECK (json_document IS JSON));
```

- ❖ select statement
 - ❖ json_value
 - ❖ json_table

Data analysis and Reporting



APEX — — —>
Wearable

Data in APEX

≡

APEX Wearables

📄

Home

📄

Medication Reminder

📄

Sensor Data

Medication Reminder /

Add/Edit Medication Reminder

Add/Edit Medication Reminder

Patient Id

21

Title

Dafalgan

Description

Tegen de hoofdpijn en koorts, max 1 maal per dag

Alert Time

30-MAR-15

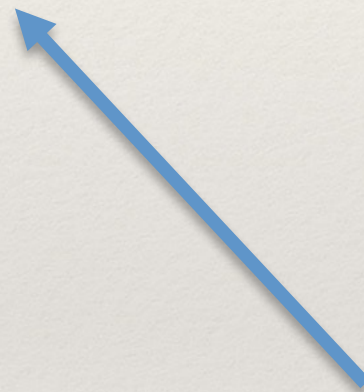
📅

Cancel

Retrieve Data



REST Get



Medication Reminder



Send data to wearable



Medication Reminder

Tile

Looks like a pill

Unread notifications

Notification

Notify, alert

Reminder (late)



Lessons Learned

Wearables challenges

- ❖ Wearables are costly (as you need a smartphone)
 - ❖ minimum 300 USD combines purchase
- ❖ New technology (SDK new and still evolving)
- ❖ When no internet, low battery, ...
- ❖ Privacy, Security and Compliance challenges

Interesting to combine with APEX

- ❖ REST Webservices
- ❖ JSON in the database
- ❖ Native code language of smartphone / wearable

Q&A

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research & development



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Consulting, Development, Training

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