

Barnes Wearable Prototype Documentation Guide

Overview

The Barnes wearable prototype app is designed to show users images and associated short text based on their proximity to a set of Bluetooth Beacons.

There are three main technical components to the project: the Android Wear app, the Salesforce Content Management System and backend API, and the Bluetooth Beacon hardware. This guide will provide step-by-step instructions to setup and manage the non-technical aspects of all three components. There's also a readme on github which details the Android Wear app code.

Once set up, the system works as follows:

The Watch App detects nearby Beacons ->
The App determines the nearest Beacon and its Major ID ->
The App sends that Major ID to the Salesforce API ->
Salesforce finds the Region that Major ID is associated to ->
Salesforce finds the Items associated to that Region ->
Salesforce API returns the data of those Items to the Watch App ->
The App receives the items and randomly picks one to display ->
The App begins downloading the image for that item, and waits until it's done ->
The App displays that item on the screen and vibrates ->
The App continues listening for Beacons, and waits until a new beacon is closest ->
Repeat

The Barnes Foundation wearable digital prototype was engineered by [HappyFunCorp](#) and the project was funded by the Barra Foundation as part of their [Catalyst Fund](#). Read more about the development and testing of Barnes wearable on [Medium](#).

Salesforce

In this implementation Salesforce acts as both the CMS and the backend API that the watch app uses to retrieve the content uploaded. This is the first part of the wearable experience you should setup.

After setting up your trial account or purchasing an instance of Salesforce, the first step to setting up a wearable project is to create a custom App within Salesforce.

- 1) Once logged into Salesforce click on the 'Setup' link at the top navigation bar of the page
- 2) Click on the 'Add App' button in the 'Getting Started' section
- 3) Choose a name for your app (e.g. "Wearables")
- 4) Fill out the 'Label' field with 'Region' and plural with 'Regions'
- 5) Click 'Go to my app'
- 6) Take the Tour of your app - it's a great way to get familiar with Salesforce

The 'Region' section you created when you created the app is what Salesforce calls an 'Object', which defines a certain type of data. In this case we created Regions to define what content is associated to a Beacon Region - more on that later.

To complete the wearable app, you will need to create five (5) different types of Objects:

Item

Represents all the data for each artwork to be presented in a notification.

Region

Represents the Beacon Major numbers and the associated items to be delivered for that Region.

Device

Represents individual Android Wear devices, with an associated user.

Device User

Represents a gallery guest and their email address.

Saved Item

Represents a single item saved by a specific user on a specific device.

Follow these steps for each of the objects above (except for Regions, of course):

- 1) Click on 'Setup' again, at the top of the page
- 2) Scroll down to the 'Quick Links' section
- 3) Click on 'New custom object' under 'Tools'
- 4) Fill out the 'Label' and 'Plural Label' fields corresponding to the Object you're creating
- 5) Scroll Down to 'Object Creation Options'
- 6) Check off 'Launch New Custom Tab Wizard after saving this custom object'
- 7) Click 'Save'
- 8) Select a Tab Style (it doesn't matter which)
- 9) Click 'Next'
- 10) Click 'Next'

- 11) Leave all boxes checked
- 12) Click 'Save'

Once all of the above Objects are created, we now have to create the Custom Data Fields for each object. Each object has different required custom data fields. Below are instructions on how to create custom data fields, followed by a list of all of the required fields for each Object.

- 1) Click on 'Setup' again
- 2) Find 'Recent Items'
- 3) Click on the Object you want to edit, making sure to click on on the 'Custom Object Definition' and NOT the Custom Tab Definition
- 4) Scroll down to 'Custom Fields & Relationships'
- 5) Click on the 'New' button in 'Custom Fields & Relationships'
- 6) Select the desired Data Type (see reference below)
- 7) Set that Parameters for that data field based on the reference below
- 8) Once you reach 'Established field-level security...' page, leave all defaults and continue
- 9) Leave all other defaults, and Save the data field

Item

Data Type	Field Label	Parameters
URL	Image URL	225 Characters
Text	Item Id	50 Characters, Unique, Case Sensitive
Long Text Area	Push Text	500 Characters
Lookup	Region	Region, Required

Region

Data Type	Field Label	Parameters
Text	Beacon UUIDs	255 Characters

Device

Data Type	Field Label	Parameters
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Text	Unique Id	255 Characters, Unique Case Sensitive
Lookup	Device User	Device User

Device User

Data Type	Field Label	Parameters
Email	Email	Unique

Saved Items

Data Type	Field Label	Parameters
Lookup	Device User	Device User
Lookup	Item	Item
Text	Unique Combination	225 Characters, Unique Case Sensitive

Once all of the Custom Objects are setup with their respective Custom Data Fields, the Salesforce CMS should be set up and ready to input data.

NOTE: While the Salesforce CMS is setup, the API side of Salesforce also needs to be setup. This requires a developer to change the schema of the app itself, and is outlined in the technical documentation on Github.

Entering Data in Salesforce

Each Object type is vital to how the system works, however some are more used than others. This will walk you through a description of each object's various data fields and how they work, along with their various requirements.

All objects can be created from the drop down menu named "Create New..."

Region

Field Name	Description
Region Name	The name of the region - for internal use only. Name it whatever you like.
Beacon UUIDs	This correlates to the Beacon Major numbers. Important: each new Major number must be surrounded by parenthesis, e.g. if you have two regions, 1 and 2, this field should be entered as: (1)(2)

Item

Note: at least one Region must exist to create a new Item.

Field Name	Description
Item Name	The name of the item - internal use only. Name it whatever you like.
Push Text	This is the message that appears in the app. Put the text here you'd like to see displayed with an image. Can handle line breaks.
Image URL	LEAVE THIS BLANK unless you are storing your images elsewhere (Dropbox, Amazon S3, etc). The system will use this value if it's present and ignore any images in Salesforce.
Region	A Lookup Value - the Region to associate the item must already be created.
Item Id	Optional Id field. Can be left blank.

Images for items are handled separately. You can store them on a 3rd party service and use the Image URL field, or you can upload them directly to Salesforce. The instructions to upload to Salesforce follow:

Once an item is created:

- 1) If not already, open that Item in Salesforce
- 2) Click on the 'File' button located next to 'Post' and underneath 'Hide Feed' (if 'Hide Feed' is not present, click on 'Show Feed' and follow this step)
- 3) Click on 'Upload a file from your computer'
- 4) Click on 'Choose file'
- 5) Select the file on your computer, and continue
- 6) Click 'Share'
- 7) Wait for Upload to Finish
- 8) On the new post that was created, Select 'More Actions'
- 9) Click 'File Share Settings'
- 10) Click 'Anyone With a Link'
- 11) Click 'OK'
- 12) Click 'Close'

It is imperative that you change the file sharing settings to include 'Anyone with a Link' otherwise it will not work on the Android Wear Device.

We recommend all images be 400x400 pixels.

Device

Device Objects will automatically be created as new watches are added to the app.

You will need to add a Device User to the Device object once it is created in order for Save for Later to Work.

Device User

Field Name	Description
User Name	The name of the user.
Email	The email address of the user.

Saved Items

Saved Items are automatically generated by the app. There should be no need to create Saved Items in the Salesforce CMS.

Onboarding a New User to the Experience

If using the 'Save for Later' feature, an associate will need to manually enter the user's information in order to send them more content later.

1. Create a new Device User object
2. Insert user's name and email address
3. Save
4. Find the 'Salesforce ID' on the device the user will be... using
5. Navigate to 'Devices', select 'All', and select the device ID
6. Edit the User field
7. Search for the new user and insert them
8. Save

Beacons

This guide assumes a basic understanding of how Beacons work, however if you are new to using Beacons, we highly recommend familiarizing yourself by reading one or all of these guides:

[What is iBeacon? A Guide](#)

[The Ultimate Guide to iBeacons](#)

[How do iBeacons Work?](#)

[The physics of Beacon tech](#)

The beacon system used for the Barnes Wearable Project was provided by [Estimote](#), however the Watch App will work with any beacon that is using the iBeacon standard (created by Apple).

The system is organized using the Major ID of the beacons in coordination with Salesforce-defined "Regions", that in the Barnes' case represent rooms in the gallery. Each Beacon has a unique Major Number, which are then associated to one Region (a Region can contain multiple Major Numbers).

All Beacons must have the same UUID number assigned to them - that is how the watch app identifies that the Beacon signal is one it should pay attention to.

The Major number can be up to 4 digits, but in our case we only needed 2.

The algorithm used by the Watch App is designed to react quickly to changes in location, and therefore uses a fairly simple detection method. Because of this, testing is required for a successful implementation, and the strength with which the Beacons transmit may need to be changed.

A successful iBeacon integration follows these steps:

- 1) Select a single UUID to use for all Beacons
- 2) Assign all Beacons that UUID with your manufacturer's defined setup process
- 3) (Optional) Assigned ordered Major numbers
- 4) Place Beacons throughout installation, making sure to know where each beacon is placed along with their Major Number
- 5) Create Regions in Salesforce that correspond to each room / area where you want a user to receive new content
- 6) Assign each Region you create the Major numbers (individual beacons) you'd like to be associated with that Region, making sure not to put two Major Numbers in the same Region, and separating Major Numbers with Parenthesis as described in the Salesforce section of this guide.
- 7) Go back to any Items and be sure to assign each with a Region.

Watch App

The Watch App is a custom Android Wear app designed for a square screened Android Wear Watch, specifically the [Sony Smartwatch 3](#). This watch was chosen for the square face (more usable screen space for reading), and the relative affordability.

Building the app for your specific use-case will require an Android developer, but not for more than a couple hours. Once completely build the developer will deliver the app in a file with the extension .apk. This is what you will use to install the app on the watch.

The App itself is not designed to be distributed through the Google Play Store, but instead to be side-loaded onto the watch directly via USB and a command line application called the Android Debug Bridge (ADB).

If you don't have ADB installed, here are two handy guides:

[How to Install ADB and Fastboot on Mac or Windows](#)

[The Easiest Way to Install Android's ADB and Fastboot Tools on Any OS](#)

Installation

Each Watch will need to be setup with an Android phone at first. Once this initial setup is done and the watch is paired to the desired Wifi network, the Android phone should no longer be needed.

Enabling Developer Mode

- 1) Open the **Settings** menu on your watch
- 2) Open the **About** menu
- 3) Tap 7 times on the “**Build Number**” field. There will be a confirmation message that states “*You are now a developer!*”
- 4) Swipe right to go back to the **Settings** menu
- 5) Open **Developer Options**
- 6) Set **ADB Debugging** to *Enabled*

Once you have the APK you'd like installed follow these steps (for Mac):

- 1) Plug the watch into your computer with a USB cable
- 2) The first time a watch is connected, allow debugging
- 3) Open Terminal on your Mac
- 4) Type: *adb devices*
- 5) Hit enter
- 6) The watch should prompt you to allow debugging. Confirm.
- 7) Type: *adb install [INSERT PATH NAME HERE]*

HINT: [PATH NAME] can be easily determined by dragging the .apk file into your

Terminal window

- 7) Wait for the app to successfully install on the Watch

NOTE: In order to reinstall new builds of the Watch App, instead of *adb install* you can simply add a “-r” to the command, before the path name, like so: *adb install -r*

Usage

The watch App has two primary modes User Mode and Admin Mode.

User Mode

The user mode is designed to be mostly non-interactive. The user will receive notifications when there is new content on the device to view - they can swipe down to see content, Save for Later (if it's enabled), and swipe left or right to view other content (if it's enabled).

The App is designed in such a way that a user will never see content from a room they've already been in. In order to let another user go through the same experience, **the app needs to be reset each time in the admin panel**. See below for details.

Admin Mode

Admin mode is how the app is managed by your associates. To access admin mode, an admin needs to quickly tap twice on the bottom, and three times on the top of the watch display. If done successfully, you will see an "Admin Enabled" message.

Once enabled, swiping right will reveal a series of informational and control screens. Here they are:

App Info

This screen reveals various properties of the app, most notably the Watch ID that you can use to identify the device in Salesforce.

Beacon Info

This screen shows the current visible beacons, as well as a sorted list with estimated distances

Connectivity Info

This screen shows the current Wifi connectivity status

Logs

This screen shows the logs from the app, giving you a real-time view into how the app is working

Options / Reset

The options screen allows a handful of functionality:

Relaunch: The app is designed so that if a user leaves the app it relaunches itself automatically. If this is unchecked, it won't relaunch

Admin Mode: Tapping this will take you back into User Mode

Save for Later: Toggle the 'Save for Later' Feature, if you don't want users to have that option

Show More content: Toggle this to only show one piece of content per region, or all of them (via swiping)

Reset Session: To onboard a new user, reset the session

User Onboarding

When adding a new user to the experience:

- 1) Find the Watch ID in the Admin Mode
- 2) If using 'Save for Later', follow steps in 'Onboarding a New User to the Experience' at the end of the Salesforce section of this guide.
- 3) Reset the session in the Admin Mode
- 4) Turn off Admin Mode using the toggle above the reset button
- 5) Explain to a user how to swipe between content (if applicable)