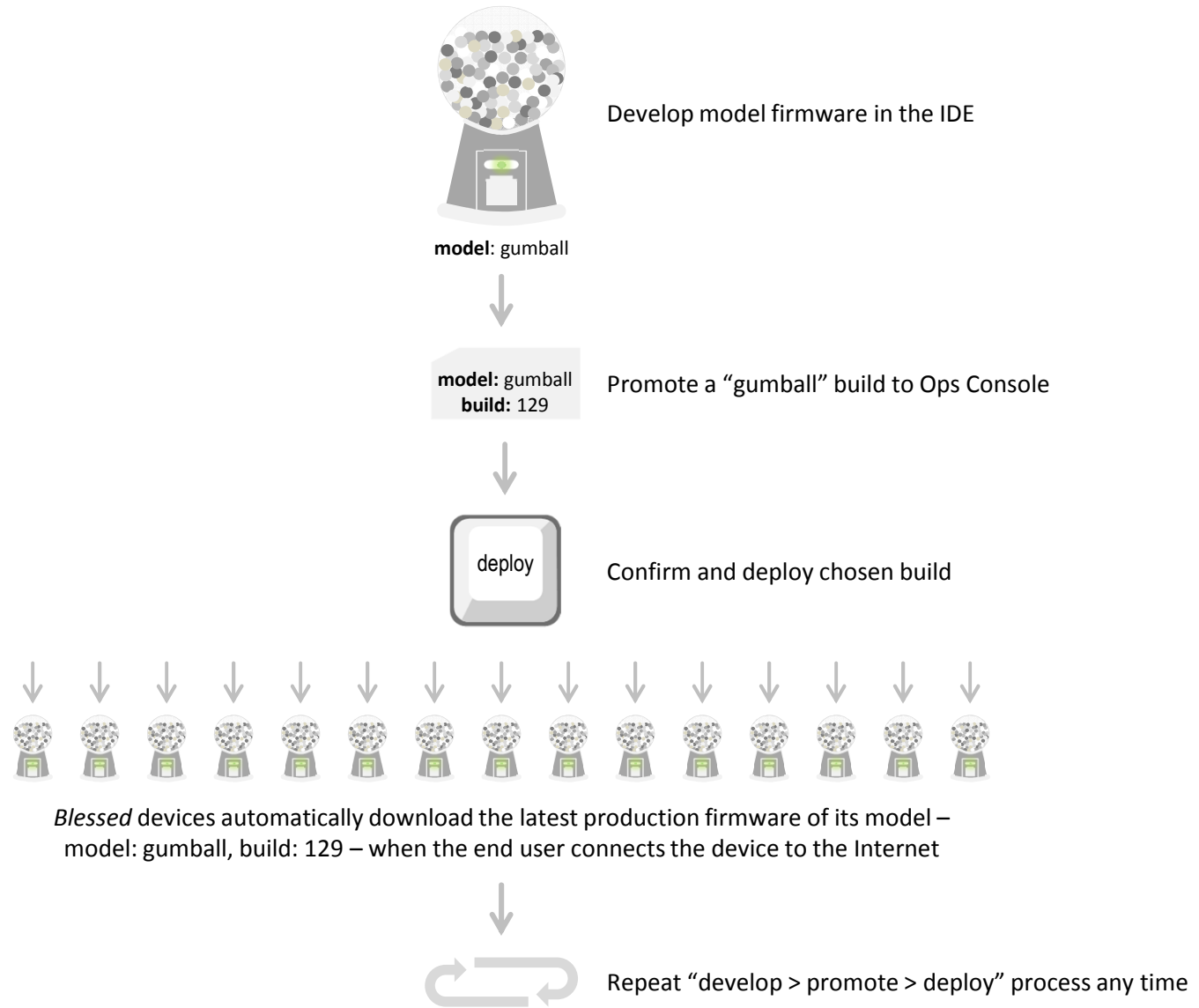




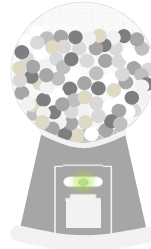
electric imp: Blessing
module

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www.electricimp.com

Blessing in context



What you need to bless devices



model: gumball

- Upon blessing, the device's unique ID is assigned to a model e.g., model: gumball, in the Electric Imp database. When the end user connects to the device to the Internet it will run the latest deployed build of that model

For blessing devices to a model, you will need:

Model factory firmware	Factory imp(s)	Factory LED fixture	Production line	HTTP callbacks*
<ul style="list-style-type: none">• Factory firmware runs on each device on the production line to test and bless the device.• The same factory firmware also runs on imps in factory LED fixtures.	<ul style="list-style-type: none">• A factory imp is used in factory LED fixtures, whose purpose is to send a special <i>factory BlinkUp</i> token to the imp modules within production devices. This token instructs the modules in the products to download and run factory firmware.• As many factory imps and LED fixtures as required can be used.	<ul style="list-style-type: none">• The factory test fixture consists of LED(s) which send the <i>factory BlinkUp</i> tokens, under control of the factory imp.• A single factory imp can drive an LED array to instruct multiple devices to run factory firmware concurrently.• The <i>factory BlinkUp</i> process runs at over 2x the speed of consumer-level BlinkUp.	<ul style="list-style-type: none">• To bless devices on the production line, the factory imp and modules in the devices will need access to the Internet via WiFi and each device will need to be powered on during <i>factory BlinkUp</i> and blessing.	<ul style="list-style-type: none">• Webhooks can be used to track device test results and blessing.

* Optional

Quick overview of how-to bless

- 1

Develop factory firmware

 - The factory firmware implements two distinct functions, one of which is selected at runtime based on which device it is running on (usually, card or module):
 - When on a card in the factory LED fixture, it sends *factory BlinkUp* tokens.
 - When on a module, it tests the device and, upon pass, blesses it.
 - You will need to use the bless and *factory BlinkUp* APIs in the factory firmware
- 2

Designate factory imp(s) and create factory test fixture

 - The factory test fixture requires a factory imp with an LED (to send the blinkup tokens), button (to initiate the transmission). This can be designed to meet your specific factory needs.
 - A minimum of 1 factory test fixture with a factory imp is needed.
 - The factory imp in the factory test fixture only needs to be BlinkedUp once via the Electric Imp app
- 3

***Factory BlinkUp* and run factory firmware**

 - Align the factory test fixture LED with the device's phototransistor and press the button on the factory test fixture to start *factory BlinkUp*. Wait for *factory BlinkUp* to finish and then the imp module in the device will download and run the factory firmware; after bless or test fail, indicated by solid green or red LED on the device, use the factory test fixture with the next device(s).
- 4

View model activity
(on-going)

 - Track the number of blessed devices per model in the Ops Console*
- 5

Ship devices; end-user BlinkUp

 - When the end user connects the device to the Internet using BlinkUp in your app, it will automatically download and run the model firmware

1 Develop factory firmware

The factory firmware is responsible for testing and blessing your new devices. It's run on the new devices when a factory imp in an LED fixture sends a factory BlinkUp token to the new device.

Factory firmware should perform any desired diagnostic tests on the device's hardware – checking peripherals can be accessed, and so on. After a successful test, it blesses the device via the blessing API, which permanently associates the unique ID of the device with your model ID – and hence ensures it will automatically load the correct firmware from then onwards.

Develop your factory firmware using the IDE.

Factory firmware		
server.factoryblinkup (ssid, pw, pin, flags) <i>API call from factory test fixture</i>	test <i>"customer defined" [firmware only]</i>	server.bless(testPass, callback) <i>API call from factory firmware</i>
Sends a special <i>factory BlinkUp</i> token from the factory imp in the factory test fixture to one or more imp module(s) in device(s). The <i>factory BlinkUp</i> token instructs the module(s) in the device(s) to download and run factory firmware for testing and blessing the device(s).	Runs diagnostic test on your device's hardware. If testPass is true, the device is blessed and the LED connected to the imp module is turned solid green for success. If testPass is false, the device is <u>not</u> blessed and the LED connected to the imp module is turned solid red for failure.	If testPass is true, permanently enrolls a devices as part of a specified model so that when the end-user connects the device via BlinkUp the device will download the latest deployed model build from your account. The LED is turned on solid green and the callback is called after the blessing has been completed. If testPass is false, turns the imp LED on solid red. No blessing is performed and the callback is not called.

Notes:

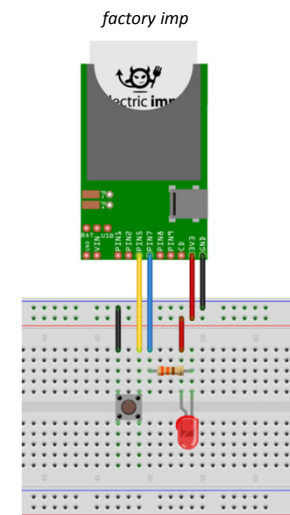
- Develop your factory firmware using the IDE.

2 Designate factory imp(s) and create factory test fixture

Factory imps are required for the factory test fixture and will run factory firmware to ensure it sends the correct factory BlinkUp token to the device's phototransistor. Contact Electric Imp with your account name, model that you want devices to be blessed to, the factory firmware name, and mac address(es) of the imp card(s) that you want to designate as factory imp(s).



	A	B	C
1	account: candyfrenzy		
2	mac address of factory imp	model	factory firmware
3			
4	0c2a69001391	gumball	gumball_Factory
5	0c2a6900019b	gumball	gumball_Factory
6	0c2a690008f7	gumball	gumball_Factory
7	0c2a690012fd	gumball	gumball_Factory
8	0c2a690008ab	gumball	gumball_Factory



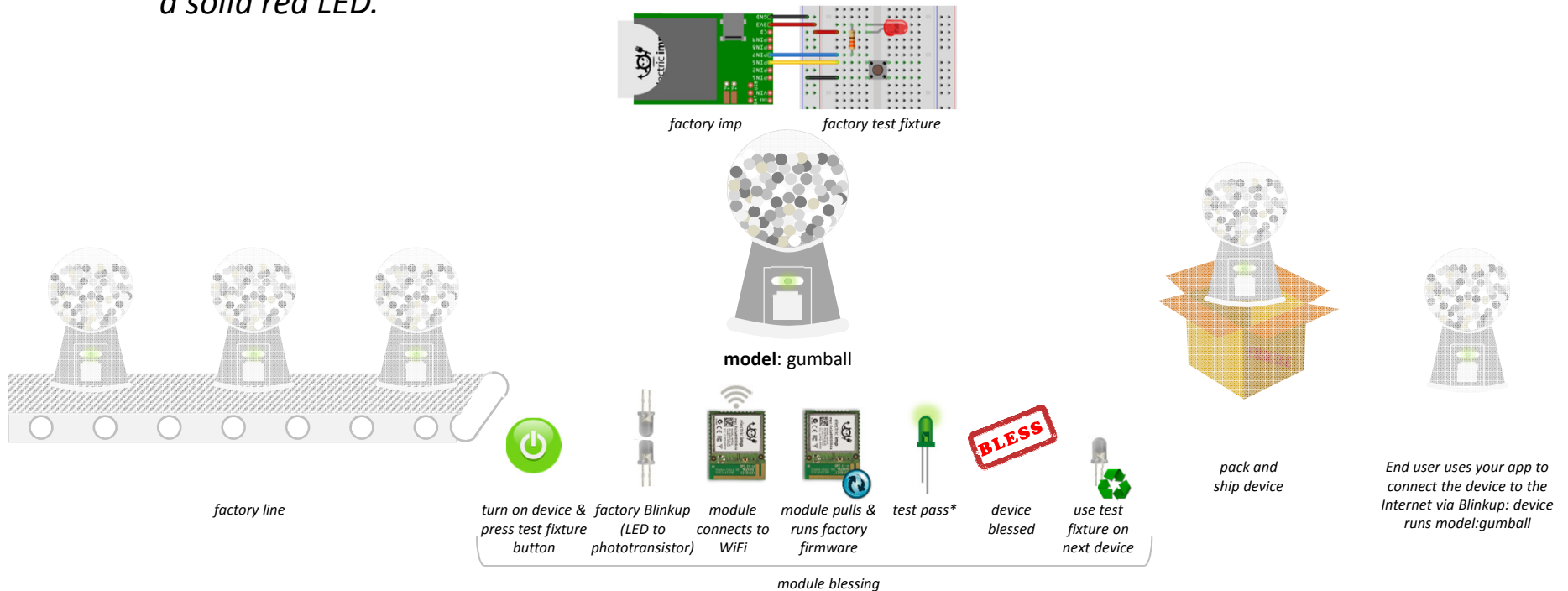
example factory test fixture

Notes:

- Any imp card can be used as a factory imp
- You should mark the card so you do not switch it with another card accidentally
- Just one factory imp and factory test fixture is required for each production line but you may designate, create and use as many as you like
 - One factory test fixture can factory BlinkUp multiple modules at one time if the LED on the factory fixture is bright enough
- Factory imps can be re-designated to a new model and new factory firmware and used again after a production run
- To connect your factory imp(s) to the Internet, insert it into the factory test fixture and power on the factory test fixture then use BlinkUp via the Electric Imp app. This needs to be done only once; the factory imp will continue to use the network it is connected to automatically.

3 **Factory BlinkUp** and run factory firmware

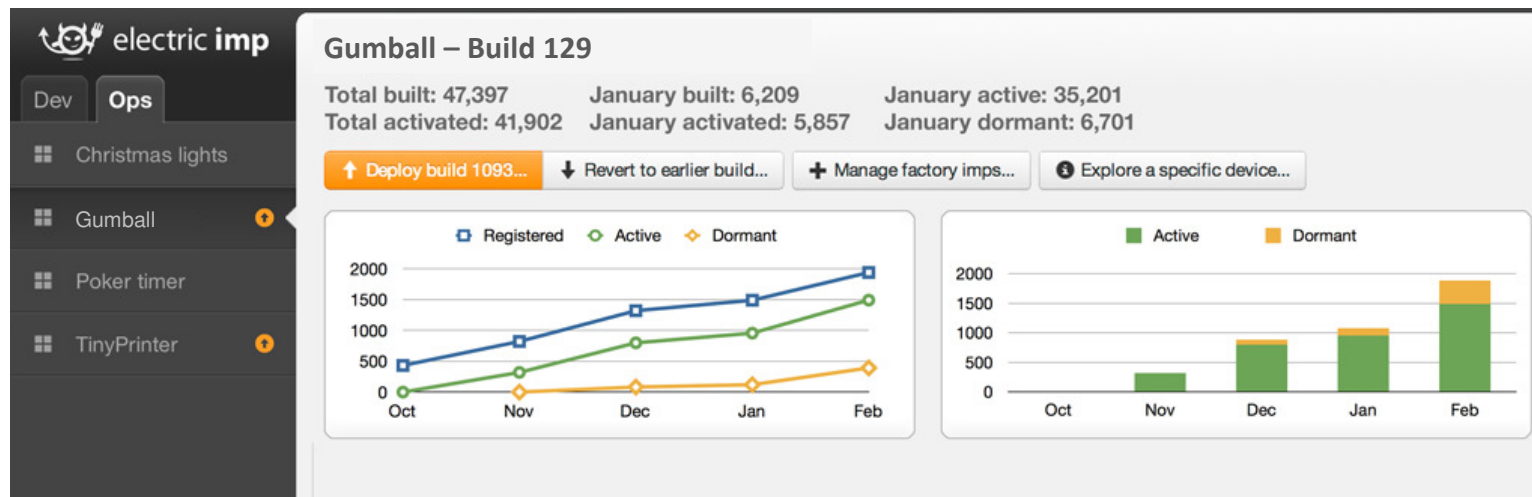
Insert the factory imp into a factory test fixture and connect it to the Internet with the Electric Imp app. For devices on the production line, align the LED on the test fixture with the phototransistor connected to the module and press the button on the factory test fixture to send factory BlinkUp. Afterwards, the module will ping the electric imp server and receive and run its model's factory firmware. If the device passes the test(s) then the device will be blessed and indicate pass by turning the attached LED on solid green. A fail is indicated with a solid red LED.



* The LED connected to the imp module will turn red if it does not pass the test

View model activity

To track blessed devices, you can view the Ops Console*. This tool allows you to view the number of devices that are built, activated, active and dormant. Additionally, the Ops Console allows you to deploy new model builds if you have firmware updates.



[built] = the number of devices that were successfully blessed on the production line via a factory imp

[registered/activated] = the number of devices as they are connected by the end user via BlinkUp

[active] = the number of devices that have connected to the Electric Imp Services in a calendar month

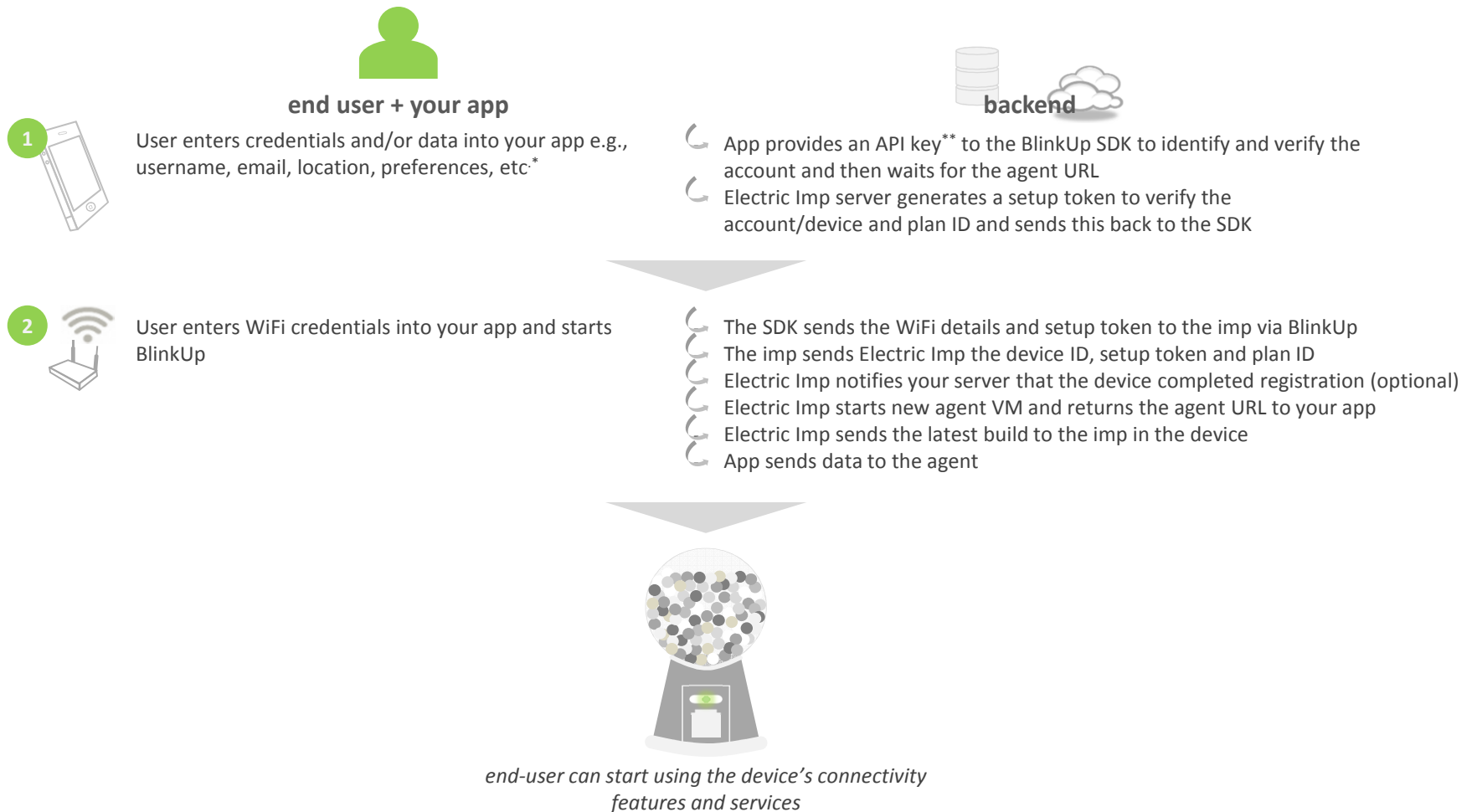
[dormant] = the number of devices that have not connected to the Electric Imp Services in a calendar month

Notes:

- If you want to use webhooks you will be able to add them in the IDE in the “Model Settings”. Until this feature is added, contact Electric Imp to set up a webhook to a specified model.

5 End-user BlinkUp

The device will automatically download the latest deployed build of its model firmware when the end user connects the device to the Internet with BlinkUp in your app.



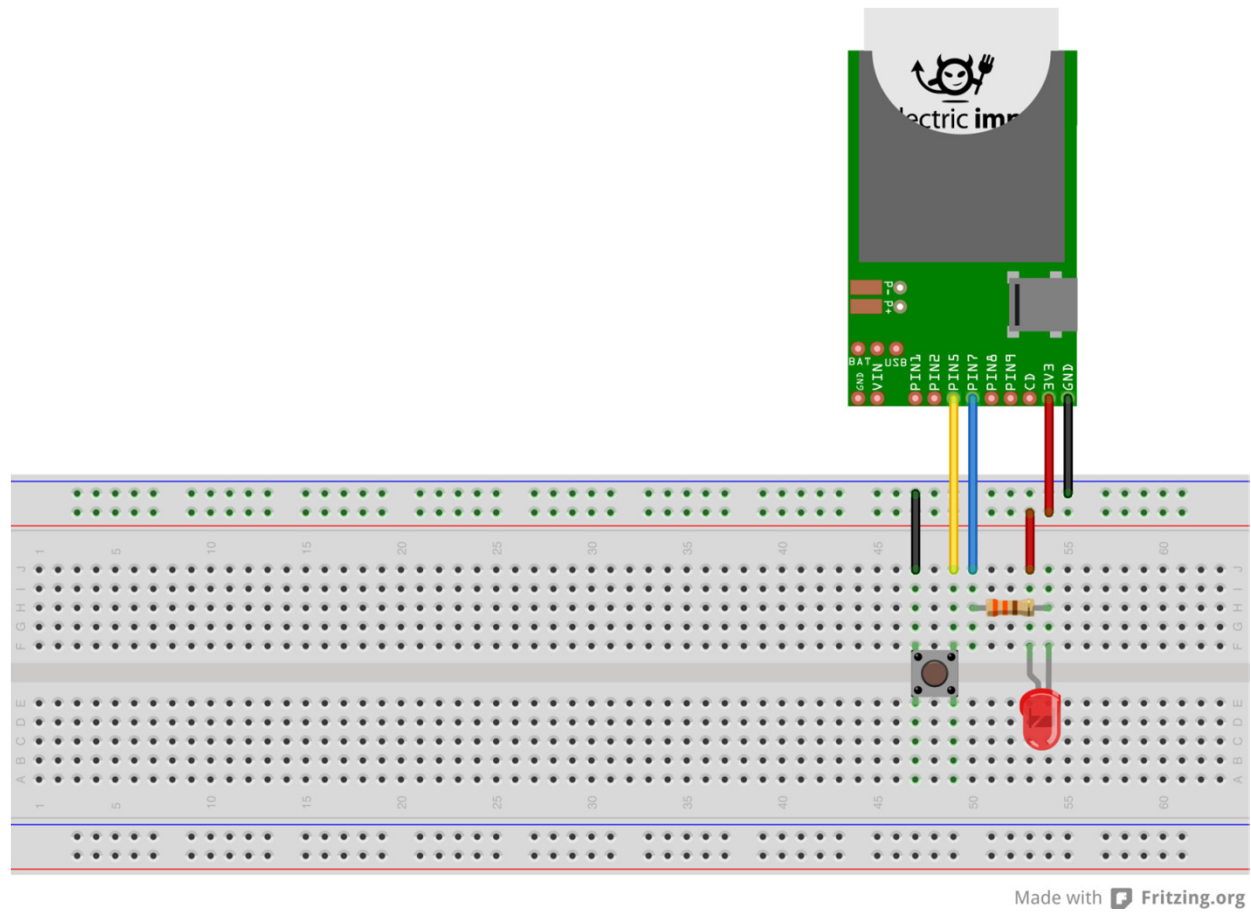
* personally identifiable information (PII) stored on your server(s); PII will not be stored on Electric Imp servers

** Electric Imp will provide an API key when the SDK is sent to you that will be associated to your Electric Imp account



appendix

Factory test fixture: breadboard example



Factory test fixture: simple schematic

