

Rapid IoT + Sigfox using network emulator: Step by step

Prerequisites:

Before starting your first Sigfox project, you need the following HW:

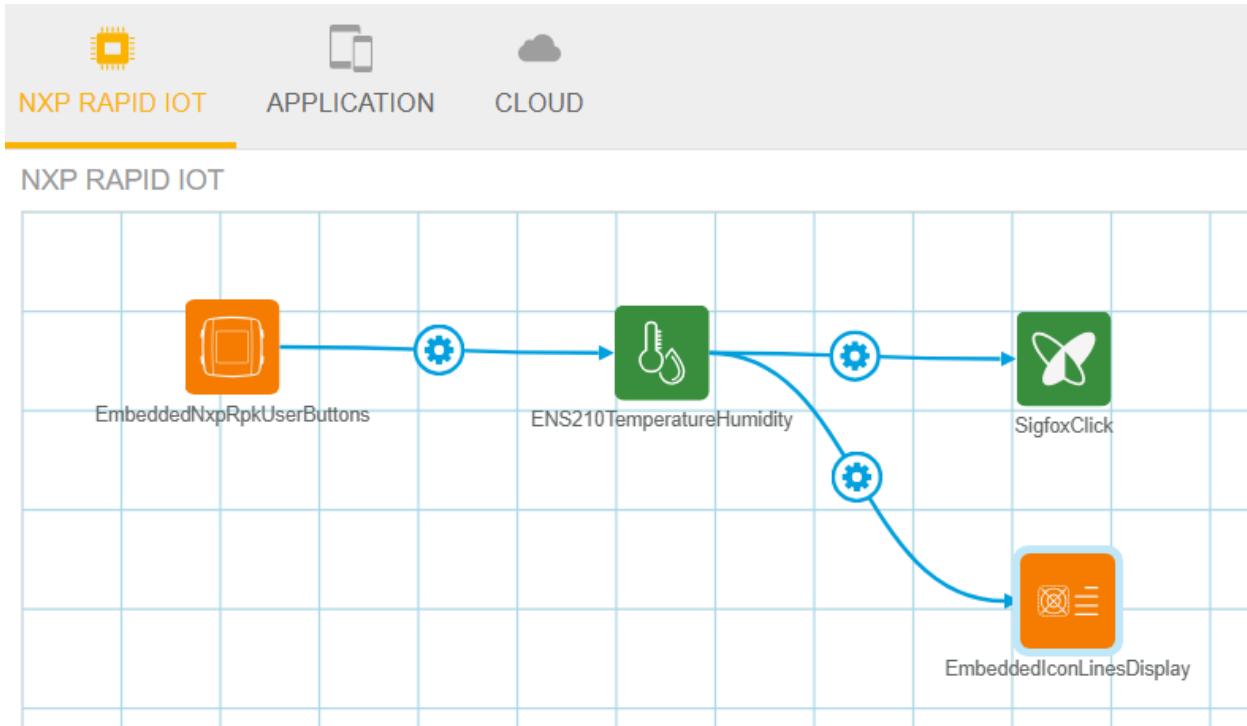
- a Sigfox SDR dongle (including the cable and the attenuator)
- an NXP Rapid IoT Prototyping Kit
- a Hexiwear Docking Station
- a Mikroelectronica Sigfox click module (REV 2.0)
- a mobile device (smartphone/tablet) with NXP Rapid IoT app installed
- PC/Laptop running Windows, administrator rights and a web browser.
 - This example was made using Windows 10 and Google Chrome web browser.

You also need an NXP account, basic experience in creating and building projects using Rapid IoT Studio, flashing and provisioning a Rapid IoT kit.

Creating your first project using Sigfox using a network emulator:

1. Go to <https://build.sigfox.com/sdr-dongle>. Go to “SNE Getting started” section and download Sigfox Network Emulator, according to your OS.
2. For Windows: run the file downloaded at step 1 (snek.exe) and install Sigfox Network Emulator.
3. Go to Rapid IoT web page: <https://rapid-iot-studio.nxp.com/>.
4. Open Studio and create a New Project. Give it a relevant name (e.g. “Sigfox Demo”).
5. Click on the “Add Element” button on the bottom-right corner. Find in the Element Library the MikroElektronika SigfoxClick. Use the left column button to add it.
6. Add the following elements (by clicking them) in canvas: User Buttons (EmbeddedNxpRpkUserButtons), AMS ENS210 (ENS210TemperatureHumidity), Sigfox Click and Icon Text Lines (EmbeddedIconLinesDisplay).
7. Click on EmbeddedNxpRpkUserButtons in canvas, select the “Top Left Pushed” trigger and click on “Add Event”. After that click on the Temperature sensor (ENS210) to connect it. A “Read Temperature” event will be added.
8. Click on ENS210 temperature sensor, click “Add event” and click on the Sigfox Click in canvas. A “Send Payload” event will be added.
9. Click on ENS210 temperature sensor in canvas, click “Add event” and click on the EmbeddedIconLinesDisplay in canvas. A “Set Line 1 Text” event will be added. Select from the Ability dropdown list “Set Line 2 Text”.
10. Click on SigfoxClick in canvas, set the “Network Standard” field to “European (ETSI)”, turn on “Use Public Key” feature, and set both “Upstream Data Type” and “Downstream Data Type” to “Floating Point (32-bit)”.
11. Click on EmbeddedIconLinesDisplay in canvas, complete the “Page Title” field with “Temperature”, change the icon to “Applications – Thermostat”, and add to “Line 2 Default Text” the “N/A” string.

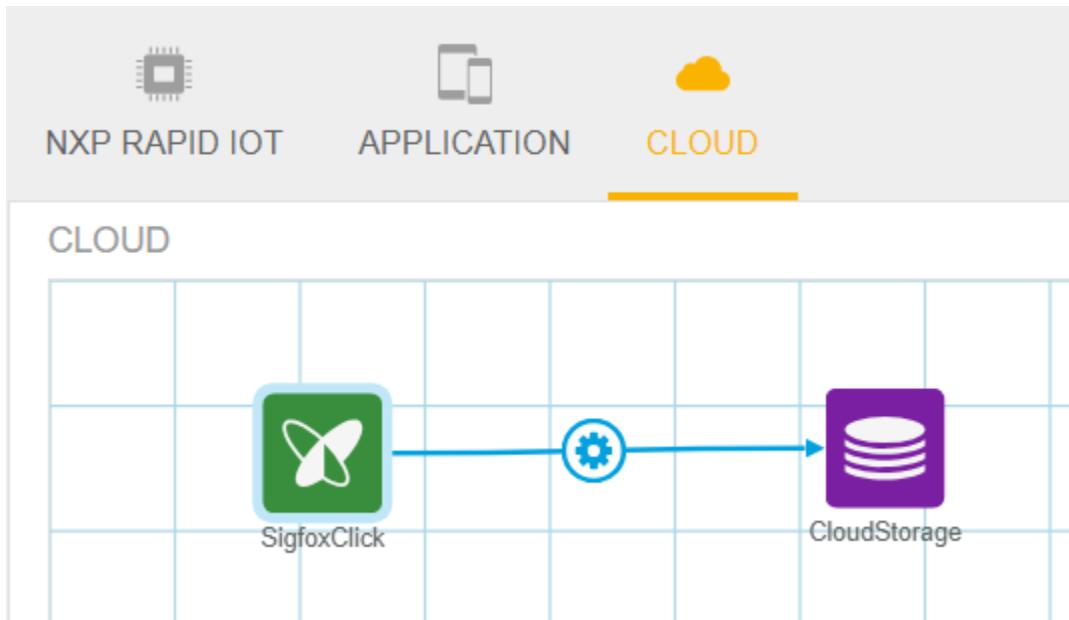
12. At this point, your project should look like this:



13. Go to Cloud screen and add “Cloud Storage” in canvas.

14. Click on SigfoxClick in canvas, click “Add Event”, and then click on CloudStorage in canvas. An “Add data” event will be added.

15. Your cloud section should look like this:



16. Your project is ready to be built. Click on the hammer in the upper right corner.

17. The build should be successful and a “Project has been compiled” message should be displayed in the end.
18. Go back to “NXP Rapid IoT” page, where you have the first 4 items added.
19. Click on the “Program Firmware” button. The binary file with your project will be downloaded.
20. Flash the RPK using the binary file obtained at the previous step.
21. Set the docking station on/off button in “off” position. Plug in an Micro USB cable to power the docking station.
22. Insert the RPK in the docking station. Add the Sigfox click in slot number 3.
23. Connect the attenuator to the SDR dongle stick.
24. Connect the other side of the attenuator to the Sigfox click module using the SMA/SMA cable.
25. Insert the USB stick in an USB port of your PC/Laptop.
26. Turn on the docking station. Wait for the RPK to display the temperature screen.
27. Provision your RPK over BLE using a mobile device and the NXP Rapid IoT phone app.
28. From Devices -> Sigfox Demo (or the name you used at step 4) -> Device Settings, check and note the “Sigfox Device ID”.
29. From Profile (upper-right button) -> Overview -> Integrations, Generate an API Token. You can make it visible using the magnifier button. Copy this token or keep this page open.
30. On your PC/Laptop, start the “Sigfox Network Emulator” application. A new tab with SNE should open in your internet browser.
31. Go to Devices. Configure device 1 using “00” + the ID obtained at step 28. Give it a name and click the “Save” button.

32. Go to Callbacks. Click the “New” button to create a new callback.
33. Start editing the “Callbacks – DATA” section. In the “Url pattern” field, insert the following link:
<https://rapid-iot-studio.nxp.com/user/things/protocols/sigfox/hook/null/null/null>
34. Change “Use HTTP Method” to “POST”.
35. Add a header with the name “api_auth_token” and the value should be the token from step 29. Don’t forget to click the “Add” button.
36. Set “Content type” to “application/json”.
37. Add to “Body” the following fields:

```
{
  "device" : "{device}",
  "data" : "{data}",
  "time" : {time}
}
```

38. At this point, you should have the following configuration:

Callbacks - DATA

Type	DATA	UPLINK
Channel	URL	
Send duplicate	<input type="checkbox"/>	
Custom payload:		
URL syntax: http://host/path?id={device}&time={time}&key1={var1}&key2={var2}... Available variables: device,time,duplicate,snr,station,data,avgSnr,rssi,seqNumber,LQI Custom variables:		
Url pattern	https://rapid-iot-studio.nxp.com/user/things/protocols/sigfox/hook/null/null/null	
Use HTTP Method	POST	
Headers	header	value
	<input type="button" value="ADD"/>	
Headers	api_auth_token	08fb7754-0525-4776-a2;
	<input type="button" value="DEL"/>	
Content type	application/json	
Body	{ "device" : "{device}", "data" : "{data}", "time" : {time} }	

Callbacks - SERVICE ACKNOWLEDGE

39. Scroll to the bottom and click the Save button.
40. Go to messages screen.
41. Your configuration is ready. When clicking the SW3 button of the RPK (Top Left Button), the temperature will be measured, displayed on the RPK screen and a new message will be displayed in Messages screen of the Sigfox Network Emulator. The data is not decoded.

Device ID	Time	Sequence number	Data / Decoding	LQI	Callbacks
2941D3	Oct 26, 2018 2:58:24 PM	1533	08acd141		

42. If the symbol below callbacks is green, the measurement was forwarded into the RPK's cloud.
43. From Devices -> Sigfox Demo (or the name you used at step 4) -> Device Settings. The cloud storage usage should be greater than 0 (88 bytes for every temperature value in our case).

DEVICE CLOUD STORAGE USAGE

88 BYTES OUT OF 10.00 MB

0.0%

Select a Dataset

44. If the Cloud storage is greater than zero, we can create widgets in dashboard in order to display these values. As an example, we will create a “Data storage”, and configure it to use the values corresponding to our Sigfox project.

GENERAL			C	E	G	X
			10	grid		
Value	Server Timestamp	_id	10	grid		
27.958999633789062	2018-10-26T11:58:26.593Z	5bd30162c2045b001af2c6...				
Showing 1 to 1 of 1 entries						
« < 1 > »						

45. From this point, every time you click the Top Left Button, the temperature value will be updated on the RPK screen and a new record will be added in cloud and in dashboard.