




DT NB-IOT@ BCW

ARDUINO BASED HARDWARE WITH MULTIPLE SENSORS
READY TO USE SOFTWARE TO CONNECT TO THE CLOUD



ERLEBEN, WAS VERBINDET.

An aerial photograph of a city, likely London, with a network diagram overlaid. The diagram consists of white dots of varying sizes connected by thin white lines, representing a network topology. Several of these dots are enclosed in larger, semi-transparent white circles, each containing a red icon. The icons include a trash can, a factory, a parking 'P' sign, a medical cross, and a robotic arm. The city below is shown in a hazy, golden-hour light, with buildings and green spaces visible. The network diagram is spread across the upper and middle portions of the image, with lines connecting various points across the city's landscape.

NB-IoT fills a gap in the landscape of wireless technologies: Connecting huge amounts of sensors with need for long service periods, long range and the ability to operate without local gateway infrastructure. This enables a broad number of use cases.

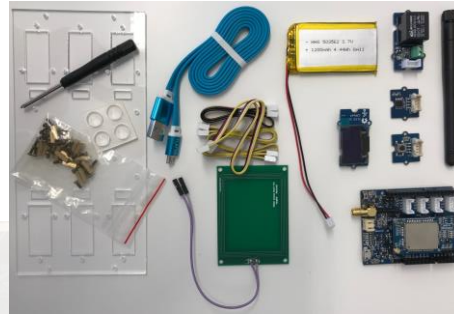
LIFE IS FOR SHARING.

BUILD YOUR OWN NB-IOT USE CASE!

Connect to the Bosch Cloud or the Deutsche Telekom Cloud of Things in a few easy steps with NarrowBand IoT

We provide you with an **Arduino-based development kit**, including a **variety of sensors** and the software blocks needed to build your own NB-IoT use case and **connect to the Bosch cloud** and/or the Telekom cloud of things **via Narrowband IoT** (LTE Cat NB1). This packages includes access to the **DT CoT Arduino library**, which enables you to get your sensor data into the cloud in a few easy steps.

In cooperation with our partner **mm1 technology**



TUINO 1 MAKERS KIT

Including Tuino 1, Quectel BC95-B8 NB-IoT module, Button, OLED Display, Temperature Sensor, relay, 868 MHz SMA antenna, NFC antenna, ...)



SENSORS AND ACTORS

6-Axis Accelerometer, Infrared Emitter, Infrared Receiver, Magnetic Switch, Rotary Angle Sensor, Base Shield, GPS Receiver, Light Sensor, Ultrasonic Ranger, LEDs

QUICK START GUIDE 1/3

Setting up the Arduino IDE

1. Download the Arduino IDE via the [Arduino website](#).
2. Once you have finished the installation, start the IDE, then go to “**File** → **Preferences**”. Now copy [this link](#) into the “**Additional Boards Manager URLs**” field and click “**OK**” to save your preferences.
3. Now go to “**Tools** → **Board** → **Boards Manager...**” and type “**Tuino 1**” into the search bar. Select “**Tuino AVR Boards by Gimasi SA**” then click onto “**Install**” to start the installation.
4. Once the installation has finished, go to “**Tools** → **Board: ...**” and select the “**Tuino 1**” from the bottom of the list.
5. Now it is time to setup the Gimasi Tuino 1. First, insert the NB-IoT SIM into the SIM card holder of the Quectel BC95-B8 NB-IoT module. Note: To access the backside of the BC95, where the SIM card holder is located, you will need to unplug the module from the Tuino 1.
6. Next, connect the 868 MHz SMA antenna to the Tuino 1, then plug in the MicroUSB cable to the Tuino 1 and connect it to your PC.
7. Now go to “**Tools** → **Port: ...**” and select the port which reads “**Arduino/Genuino Uno**” in parentheses. Check “**Tools** → **Get Board Info**”, to see if the correct board is displayed.

QUICK START GUIDE 2/3



You can find your IMSI, MQTTSN Password and CoT account information inside your Tuino 1 Maker's Kit Box.

Pushing temperature sensor data into the cloud

1. Connect your temperature sensor to the A0 pin of the Tuino 1 by plugging in the Grove connector to P2.
2. Download the temperature sensor example (“**tuino_demo_tempsensor.ino**”) from the [hackathon repository](#).
3. Open the example with the Arduino IDE, then click the upload button and wait until compilation and upload finished.
4. In the Arduino IDE, activate the serial monitor under “**Tools** → **Serial Monitor**” to see the output of the example. Make sure the baud rate is set to 9600.
5. Close the serial monitor window. Note: You should always close the serial monitor window when opening / creating a new sketch.
6. Clone the Arduino Library from (<https://github.com/cloud-of-things/dt-arduino-iot-agent>) to “**C:\Users\<username>\Documents\Arduino\libraries**”.
7. Open the “**secrets.h**” (located in “**C:\Users\<username>\Documents\Arduino\libraries\dt-arduino-iot-agent-master\examples\test-tuino1-cot-nbiot**”) and enter the IMSI of your SIM (line 11) and your password for the MQTT-SN connector (line 12).
8. Copy “**DTCoTSetup.h**” from “**C:\Users\<username>\Documents\Arduino\libraries\ dt-arduino-iot-agent-master \examples\test-tuino1-cot-nbiot**” to “**..\..\src**”.
9. Clone the Hackathon Git repository (<https://github.com/mm1technology/dt-corporate-nb-iot-hackathon>)

QUICK START GUIDE 3/3



You can find your IMSI, MQTTSN Password and CoT account information inside your Tuino 1 Maker's Kit Box.

Pushing temperature sensor data into the cloud

10. Open “**nbiot_simple_temperature.ino**” (located in the Hackathon Repository folder) in the Arduino IDE.
11. Check if the correct board and port are still selected (“**Tools** → **Port: ...**” and “**Tools** → **Board: ...**”).
12. Click the upload button and wait until compilation and upload finished.
13. In the Arduino IDE, activate the serial monitor under “**Tools** → **Serial Monitor**” to see the output of the example. Make sure the baud rate is set to 9600
14. Now log into your CoT or Bosch Cloud account to monitor the data. You can find the link to your Deutsche Telekom Cloud of Things (CoT) account inside your box, as well as username and password.
15. If you need to adjust the language settings, you can do so by clicking onto your profile picture in the upper right corner, then onto “**Benutzereinstellungen**” and selecting “**Deutsch**” or “**English**” under “**SPRACHE**” (following instructions for English).
16. Click onto “**Device Management**“, then navigate to “**DEVICES** → **All devices**” on the left side.
17. Now chose the device with the IMSI corresponding to your SIM card.
18. In the “**Device Profile**” click onto “**Measurements**” or “**Alarms**”.

