

# [Eindhoven] Internet of Things

## The Things Network LoRaWAN workshop: Creating a working IoT solution

Saturday March 11<sup>th</sup> 13.00 – 17.00 (doors open 12.30) @ [www.designhuis.nl](http://www.designhuis.nl)  
<https://www.meetup.com/Eindhoven-Internet-of-Things/>

We have LoRaWAN gateways, we have built sensor nodes, and now we will connect the hardware and software to create a complete IoT solution. Following a step-by-step workshop guide developed by community expert Frank Beks, that will cover The Things Network LoRaWAN, Node Red and ESP8266 WiFi. We will connect the sensor, the node, the back-end cloud service, data storage and display, mobile connection and motor control.

This workshop is aimed at all community members, whether you have previously built your own TTN node or not. No hardware soldering required. **To follow the workshop you will need to bring your own hardware and software – see below for parts list and information.**

Want to join without bringing your own hardware? Everyone is welcome but it will be more fun to build. There will be a limited number of Nodes available to enable a few individuals (or small groups) to follow the workshop using their own laptops. Please contact the organizers for more information.

### Recommended hardware parts list, software and supplier options (more details below):

#### Supplier option: TinyTronics

ESP8266-12 board with battery holder	€ 8,00 (batteries not included !!)
Relay	€ 2,50
Servo	€ 4,00
OLED Display 128x64 pixels	€ 7,00
Wires female-female and male-female 10cm 1	€ 1,00

**above list as workshop bundle price € 22.00** including btw (tax)

<http://www.tinytronics.nl/shop/Things-Network-IOTSolution-Workshop>

*additional items if you didn't buy them for the previous workshop*

#### Supplier option: TinyTronics

3v FTDI adapter	€ 6,00
Mini USB cable	€ 1,50
	<b>€ 7,50</b> subtotal including btw (tax)

#### Supplier option: Ideetron

Nexus prebuilt LoRaWAN node	€ 31,25
TH06 i2c Humidity and Temperature Sensor	€ 2,45
	<b>€ 33.70</b> subtotal <b>excluding</b> btw (tax)

### Software

Every participant will need to bring his or her own laptop (or share), ideally with the following software installed:

**Arduino IDE** Please install the latest version 1.8.1

<https://www.arduino.cc/en/Main/Software>

**Arduino Sensor Libraries to download**

<https://github.com/claws/BH1750>

and i2c universal sensory library (via library manager in Arduino IDE)

**OPTIONAL Node Red (see below)**

<https://nodered.org/docs/getting-started/installation>

It is possible to use a local installation of Node Red on your laptop during the workshop using the Node Red installation link above for your operating system.

**Cloud hosting of Node Red**

One option discussed during the workshop will be hosting Node Red in the cloud using IBM Blue Mix. You can create your own account: <https://console.ng.bluemix.net/registration/>

*Note: All software will be discussed during the workshop and in the step-by-step instructions. If any steps are unfamiliar you can wait to be guided through installation during the workshop.*

## TTN LoRaWAN node

### TTN Node

We will use the TTN node built during the last workshop and described in this TTN lab story by Frank Beks <https://www.thethingsnetwork.org/labs/story/workshop-creating-a-ttn-node>

If soldering electronics is not your thing you can also join with a prebuilt node such as the Nexus: <https://webshop.ideetron.nl/Nexus>

As mentioned above, we will have a small number of nodes and sensors available to borrow during the workshop. This will NOT include the control and display hardware components.

**FT232RL 3.3v-5v TTL USB Serial Port Adapter** (to program the node and the ESP8266)  
<http://www.tinytronics.nl/shop/Communicatie/FT232RL-3.3v-5v-TTL-USB-Serial-Port-Adapter>

**Mini USB kabel - 50cm** (to connect the USB Serial Port Adapter)

<http://www.tinytronics.nl/shop/Mini-USB-kabel---50cm>

(Note: this was used to program the node during the last workshop, one is enough to program both the node and the ESP8266)

## Sensors

We will work with the sensors used in the previous workshop.

If you did not join this workshop see links below in case you wish to purchase one or both:

**TH06** i2c Humidity and Temperature Sensor

<https://webshop.ideetron.nl/TH06>

**OPTIONAL BH1750** Light Sensor

<http://www.tinytronics.nl/shop/BH1750-16bit-Digitale-I2C-Licht-Sensor-Module>

*Note the following components were not part of the previous workshop*

(Workshop bundle: <http://www.tinytronics.nl/shop/Things-Network-IOTSolution-Workshop>)

## Control

To create a complete IoT solution we will not only read sensor data from The Things Network node but also trigger the control of a motor via WiFi. For this the following parts will be needed:

**WiFi controller: ESP8266-12 board with battery holder (batteries not included!)**

<http://www.tinytronics.nl/shop/ESP8266-12-board-met-Batterijhouder>

**Relay**

<http://www.tinytronics.nl/shop/5V-relais-1-channel-hoog-actief>

**Servo**

<http://www.tinytronics.nl/shop/SG90-Mini-Servo>

## Display

The sensor data can also be directly monitored on a display (optional)

**OLED Display 128x64 pixels**

[http://www.tinytronics.nl/shop/0.96-inch-OLED-Display-128\\*64-pixels-blauw](http://www.tinytronics.nl/shop/0.96-inch-OLED-Display-128*64-pixels-blauw)

## Extras

**Wires female-female 10cm** (Wires to connect the components)

<http://www.tinytronics.nl/shop/Kabels/Prototype-draden/DuPont-Jumper-draad-Female-Female-10cm-10-draden>

**Wires male-female 10cm**

<http://www.tinytronics.nl/shop/Kabels/Prototype-draden/DuPont-Jumper-draad-Male-Female-10cm-10-draden>

**Lorna Goulden and Frank Beks**