EFENTO

REDEFINING MEASUREMENT TECHNIQUE

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Overview

- NB-IoT, NB-IoT & LTE-M versions. Both equipped with Bluetooth LE for local data reading and configuration
- Modular design allows customization and quick development of new types of sensors for PoCs and small production batches
- Configuration over Bluetooth or remotely, from a server
- Up to 10 years battery life time
- Standard (CoAP and Protobuf) protocols speed up the integration
- Available with both micro SIM (3FF) and embedded SIM (MFF2)
- Difference based FOTA mechanism - only the difference in the firmware is sent to the device
- 40 000 measurements can be stored in device’s built in memory
- Logic on device which can limit the number of transmissions (e.g. data is sent only, if a threshold is exceeded)

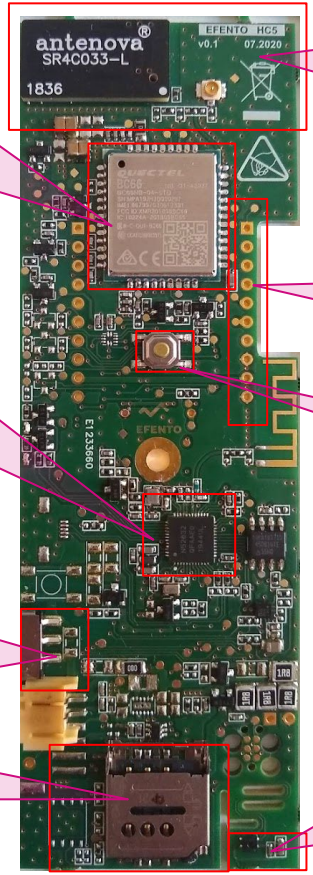
Hardware optimized for wireless sensors

- NB-IoT module supports global bands (B1/B2/B3/B4/B5/B8/B12/B13/B17/B18/B19/B20/B25/B26/B28/B66)
- Very low power consumption
- Low cost

- Bluetooth Low Energy based on Nordic Semiconductors SoC for device configuration
- NFC - optional, not used now

- Mechanical switch used to switch the device on / off

- Embedded SIM (MFF2)
- Micro SIM card (3FF)



- PCB antenna (bands 8 and 20)
- PCB dimensions guarantees the best antenna performance and increase the battery lifetime
- U.fl antenna (for other bands)

- Extension board connector allows to connect new types of sensors / interfaces

- Functional button used e.g. to trigger the data transmission

- Temperature and humidity sensor on the mainboard
- Placed far from the module, so the module's heat does not affect the measurements

Modular design - power supply and interfaces

POWER SUPPLY

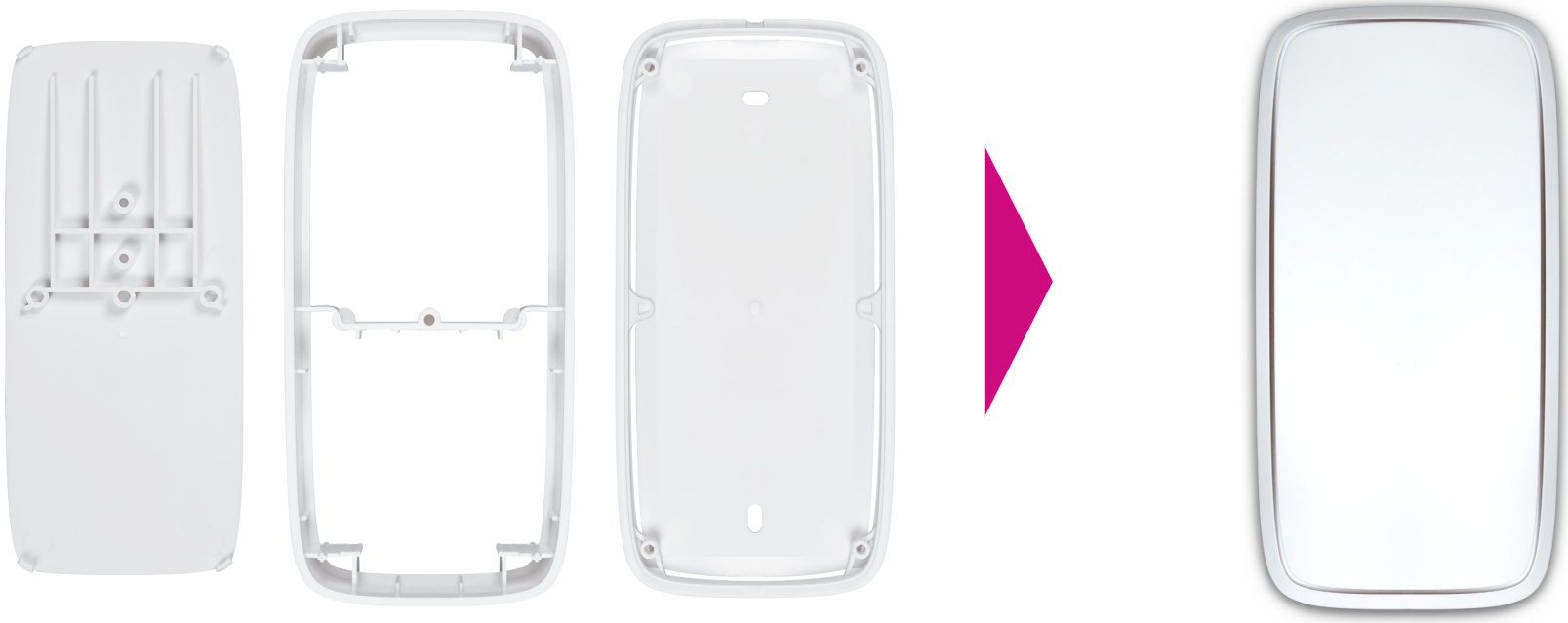
Device can be powered by:

- 2 x 3.6 V AA batteries (4200mAh)
- 3 x 3.6 V AA batteries (6300mAh)
- USB C power adapter (with 1000mAh rechargeable battery included). Device is able to detect the power source and inform, if the USB power supply is lost (detect power shortage)
- It is possible to develop other power supply options, if required

SENSORS / INTERFACES

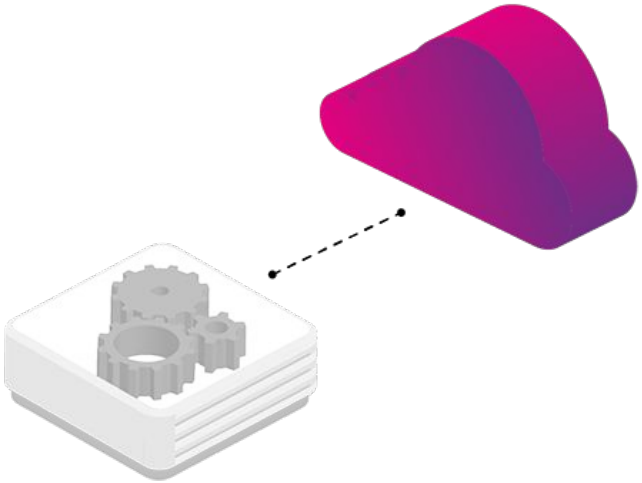
- Supports extension boards with different sensor types. Currently available extension boards: Temperature (internal sensor or probe), humidity (internal sensor or probe), air pressure, differential pressure, VOC, open/close, pulse counter, leakage
- Compatibility with MikroBUS allows us to quickly add new sensors / interfaces and produce small series of devices. After PoC we can easily scale up the production to decrease the costs. Available sensors https://www.mikroe.com/click/sensors, interfaces https://www.mikroe.com/click/interface

Modular design - enclosure



Modular design of the enclosure allows us to modify one piece only for different types of sensors (e.g. place ventilation on the front panel). The overall look of the device is the same, the modification is quick and cost effective. Enclosure design is “neutral” to match the spaces, where the sensors are used

Edge analytics



TRANSMISSION INTERVALS SETTINGS

You can set different measurement and transmission intervals for Efento NB-IoT / LTE-M sensors. If you don’t need a life data stream from the devices, they can store the measurements and send them to the server in larger intervals to increase the battery lifetime. Moreover, the data can be sent in confirmable or non-confirmable data frames. Non-confirmable data frames reduce the time needed to send the data and increase the battery lifetime

BUILT IN DATA ANALYSIS

Efento sensors analyse the data and take the decisions, if an immediate action is needed. Temperature measured by the sensor is out of the safe range? Transmission will be triggered immediately. Humidity value increases too quickly? Data will be sent to the server right away. The logic and rules can be configured by the user including setting thresholds, moving averages and checking the differences between measurements.

Built in data analysis algorithms allow users to adjust Efento sensors to their use case and reach up to 10 years of the battery lifetime

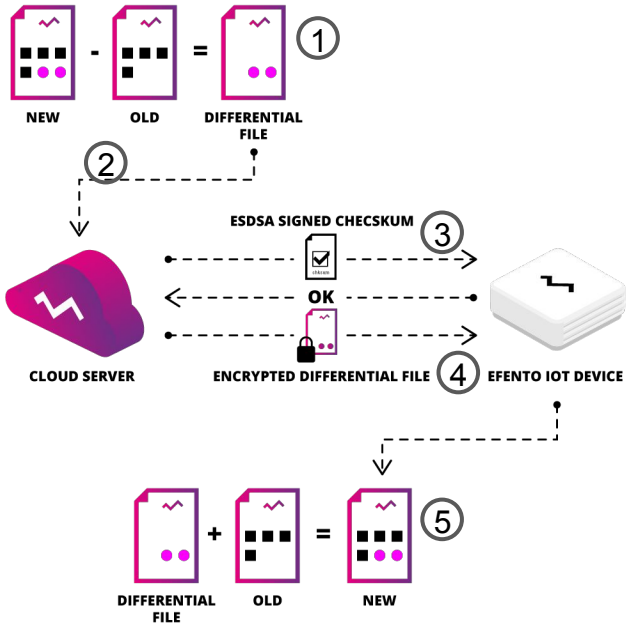
Up to 10 years of battery life

Measurement interval [min]	Transmission interval [min]	ACK period (every N messages)	Bluetooth interface	Battery lifetime [years]**			Data usage (up + down)*
				ECL = 0	ECL = 1	ECL = 2	
15	60	24	OFF	11	7.5	5	106 kB
			ON	6.2	4.6	3.5	
3	30	12	OFF	6	3.7	2.5	252 kB
			ON	4.1	2.8	2	
3	180	8	OFF	11	11	9	90 kB
			ON	8	6.3	5.1	
5	60	1	OFF	3.1	1.9	1.2	182 kB
			ON	2.5	1.7	1.1	
5	60	24	OFF	6.2	4.7	3.6	130 kB
			ON	6.2	4.7	3.6	

* Data usage indicative and does not include FOTA updates

** Battery consumption is indicative. Battery lifetime is affected by many factors including operations temperature, signal quality, number of FOTA updates, number of threshold triggered transmission and complex physics of Li-ion batteries

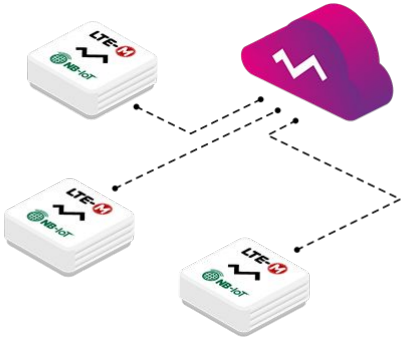
Secure and power efficient firmware updates



1. A differential file that is the difference between the new and current versions of the software is prepared by Efento
2. The differential file is sent to the cloud server and IoT devices are notified of the available update
3. The devices connect to the server, communication encryption key is negotiated. The server sends an encrypted update checksum signed according to the ECDSA algorithm. Based on the signature, the IoT device verifies the authenticity of the update
4. The encrypted transmission of updates to the device takes place
5. Device builds a new software version and calculates the updated checksum. If the checksum calculated by the device matches the checksum sent by the server, the software is updated

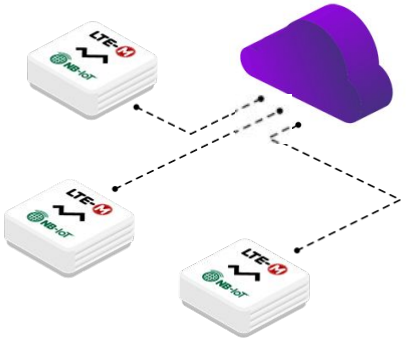
Sending only difference between device's current and new firmware file reduces the size of updates sent up to 90%. This reduces the devices' data consumption and increases the battery life

Use it with Efento Cloud or any cloud platform



EFENTO CLOUD

Efento Cloud is a powerful cloud based platform that allows you to collect and visualize data from Efento sensors, no matter if you have only a few or hundreds of them. Efento Cloud allows you to display the data on a map, as a table or on a chart, send SMS and email notifications and generate PDF / CSV reports with the data. On top of that, there is a mobile application that allows you to get access to all platform features with your smartphone or tablet. Learn more about Efento Cloud.



INTEGRATION

Efento NB-IoT / LTE-M sensors communicate with servers over standard protocols (protofbuf over CoAP). This allows you to integrate the data from the sensors directly to any cloud platform you wish. If you don’t want to do the direct integration, you can use Efento Cloud and its API to get the data and change sensors configuration. Visit our Support section to learn more about the integration.

Ready for large scale deployments

EASY INSTALLATION

Sensors are mounted on the wall with a double side adhesive tape with acrylic glue. If you don’t want to stick it with a tape, you can simply use screws to mount it on the wall.

PRECONFIGURATION

We are ready for that too. When ordering a large batch of the devices, let us know what is the configuration that you need and we will configure the devices for you. Once you get the devices, they will start operating out of the box!

TROUBLESHOOTING

The full status of the sensor (including the network status and the communication status) is available locally (through a mobile application) or remotely - device can send it to the server, for remote diagnostics.

REMOTE CONFIGURATION

All the settings of the device can be changed remotely, from the server. No matter how many devices you want to reconfigure, you can do it in a few seconds!

Tested with multiple operators in a number of countries

T-Mobile

Deutsche Telekom

proximus

Telia

Telefónica

vodafone

NOS

lmt

orange™

Singtel

Popular use cases

SHOPS

environmental monitoring, refrigerators monitoring

PHARMACIES / HEALTH CARE

Drugs / vaccines conditions monitoring, clean rooms monitoring

FOOD PROCESSING

HACCP, monitoring of transported food, monitoring of leased equipment

DISTRICT HEATING

Monitoring of conditions in flats and heating substations

BUILDINGS / INSURANCE

Leakage sensing, environmental monitoring, remote meters reading

TRANSPORT

Monitoring of logistics infrastructure (warehouses), monitoring of shipped goods, monitoring of roads conditions

New & old hardware comparison

	New hardware	Old hardware
Size	28 x 124 x 60 mm, 110 g	27 x 71 x 71 mm, 100 g
Power source	- 2 x AA batteries (4200 mAh) - 3 x AA batteries (6300 mAh) - 5V USB with 1000 mAh rechargeable battery	2 x AA batteries (4200 mAh)
Enclosure	ABS Plastic	ABS Plastic
Color	- White - any color from RAL palette available for custom order	- White - Black
Mounting options	3M tape, screws (2x), magnets	3M tape, screws (2x)
Available sensors	- Temperature (internal sensor or probe), humidity (internal sensor or probe), air pressure, VOC, open/close, pulse counter, leakage - MikroBUS makes the device compatible with MikroE sensors / interfaces (https://www.mikroe.com/click/sensors https://www.mikroe.com/click/interface)	Temperature (internal sensor or probe), humidity (internal sensor or probe), air pressure, VOC, open/close, pulse counter, leakage
Packaging	1 per box, 10 per box, 20 per box	1 per box, 10 per box, 20 per box
Price	EUR 3-4 lower compared to HC3. Detailed prices will be available by December 2020	-

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