life.augmented

How NFC can enhance connectivity in smart monitoring

Smart monitoring insights

Smart sensors are at the core of the Industrial Internet of Things (IIoT), a term born from the connection of two major trends of our time, the fourth industrial revolution and the Internet of Things. Enabling enhanced manufacturing and industrial processes, smart sensors can be used to monitor conditions as well as to track goods along supply chains. This market is currently thriving, with an increasing need for IIoT sensors.

Over

393 Mu

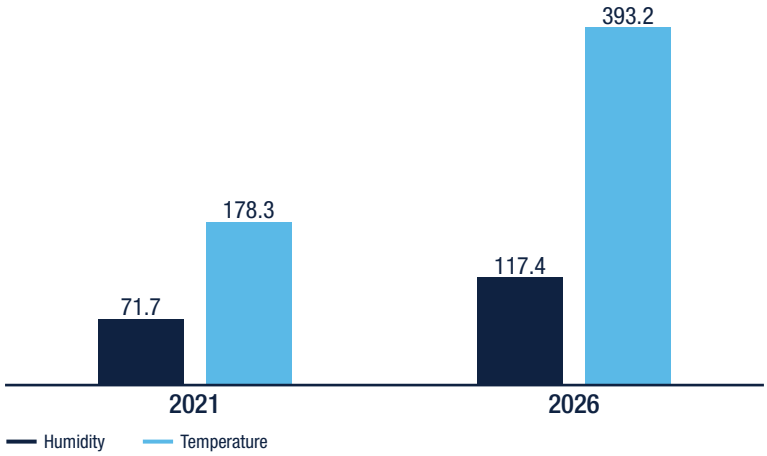
expected global smart temperature sensor market by 2026[1]

A MARKET ON THE RISE...

Thanks to Industry 4.0, all types of sensors are increasingly used every day, particularly when it comes to smart monitoring applications. Temperature and humidity sensors put together will represent in 2026 more than 500 million units shipped in the world.

Other sensors such as motion sensors (accelerometer and gyroscope) exhibit a two-digit CAGR (more than 30% for both) over the 2021-2026 period.

Sensors shipment (in million units)



...WITH A REMAINING CHALLENGE

Even if the market is currently booming, one challenge remains however: how to offer users a convenient communication means to access data as well as provide large memory capacities, a basic requirement for sensing applications.

At the crossroad of these two expectations is NFC technology.

Source: 1: OMDIA - Sensors in IoT - Report 2022

NFC: an intuitive technology

A WIDELY ADOPTED TECHNOLOGY

Today, a wide proportion of smartphones are equipped with NFC technology, therefore enabling a significant number of people throughout the world to adopt this technology.

If people currently use their smartphone NFC capabilities mainly for contactless payments and transportation, the technology can be used for a wide range of applications, including smart monitoring.

7 out of 10

smartphones will support NFC in coming years[2]

In addition to being increasingly widespread, NFC technology is standardized by the **NFC Forum**. The interoperability is thus fully ensured, making its usage and adoption convenient for all stakeholders.

All these reasons make NFC technology perfectly suitable for smart monitoring applications and can enable different use cases.

PROVIDING USERS WITH AN OPTIMIZED USER EXPERIENCE

Thanks to its “Tap & Go” approach enabled by the contactless interface, NFC technology delivers an intuitive and user-friendly way to interact with devices. People are only required to perform a very simple action: to “tap” the tag embedded in any device with their smartphone (bringing the smartphone and the tag in close proximity) to read the tag’s content.

Moreover, and especially useful for smart monitoring, NFC technology lets several players access the information contained in the tag. Data can be read using a smartphone with NFC capabilities or using an industrial NFC reader. This enables information to be exchanged at different levels.

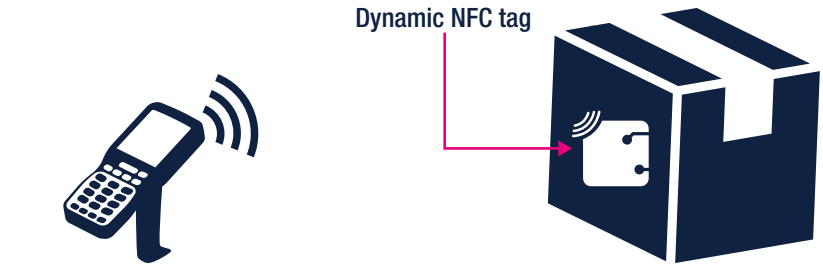
NFC TECHNOLOGY: HOW DOES IT WORK

NFC is a wireless technology enabling contactless communication between a reader and a tag or dynamic tag.

The NFC tag or dynamic tag is a passive (battery-less) electronic component that can be embedded in any product to keep track of its status.

On the other hand, there is the NFC reader used to power the tag and access its content.

Depending on the application, stakeholders can use industrial readers or their smartphones with NFC capabilities to communicate with tags.



Source: 2: ABI research: Wireless Connectivity Technology Segmentation and Addressable Markets - 3Q 2022

Convenient data logging

Thanks to dynamic NFC tags coupled with sensors, all stakeholders can easily monitor motion and environmental conditions throughout the supply chain. By simply tapping the tag embedded in their products with an NFC reader, the various players of the supply chain can quickly access the logged data.

This makes it possible to know a product's status and detect any threshold breach, whether it is for temperature, humidity or other conditions. In addition, with up to 64 Kbits of high density memory, dynamic NFC tags can log a large amount of data.

ADDITIONAL BENEFIT: BACKUP SOLUTION

Embedding NFC tags in smart monitoring devices also provides a backup solution when its battery runs out of power. Thanks to the batteryless capabilities of the NFC tag, sensor data can still be recovered using an NFC reader or smartphone.

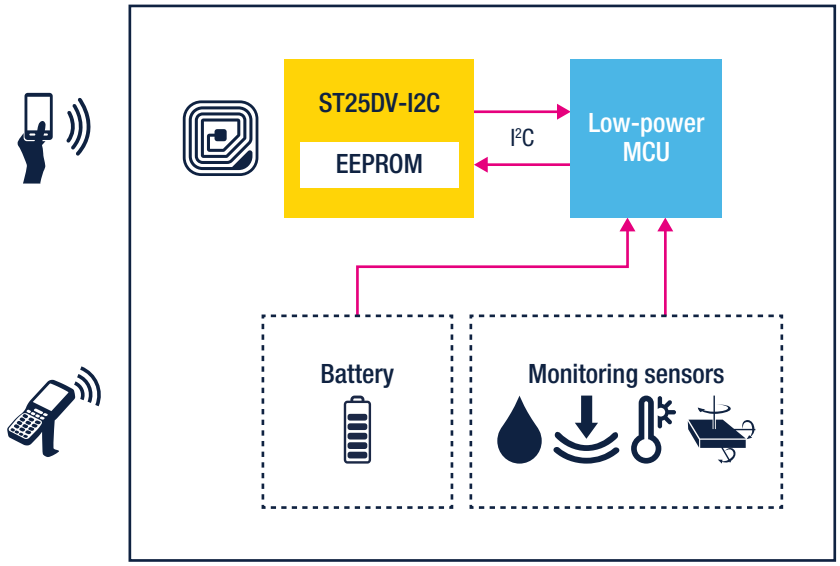
BENEFITS OF NFC SMART MONITORING

- Convenient data logging
- Easy issue detection
- Supply chain visibility
- Product quality & safety
- Consumer's trust
- Simple & robust

ST's NFC solution for conditions monitoring

COMBINING NFC AND SENSORS: HOW DOES IT WORK?

A typical monitoring system consists of motion or environmental sensors connected to low-power MCU, a battery (optional) and an NFC dynamic tag (in this case, an ST25DV-I2C), making it possible to easily retrieve sensor data.



WHAT MAKES ST'S DYNAMIC NFC TAGS PARTICULARLY SUITABLE FOR SMART MONITORING

- **NFC Forum Type 5:** thanks to its long-range operating capabilities, our dynamic NFC tags offer users a convenient and intuitive user experience.
- **Memory density:** from 4 to 64 Kbits of EEPROM, password-protected, with best-in-class cycling (1 million write cycles), long data retention (40 years) and up to 125 °C operating range.
- **Energy harvesting:** this feature lets devices function without requiring a battery, which is particularly useful in case of failure or if devices run out of battery.
- **Low-power capabilities:** dynamic NFC tags work at low-power, which allows them to be well integrated into devices running on battery.
- **Fast Transfer Mode:** all stakeholders can quickly and easily update device firmware thanks to a 256-bytes dedicated buffer.

GETTING STARTED WITH ST25D FOR SMART MONITORING

Bring the benefits of NFC for smart monitoring into your environment/lab by ordering our **ready-to-use NFC dynamic tag sensor and processing node evaluation board** (STEVAL-SMARTAG2).

The STEVAL-SMARTAG2 is an NFC-enabled sensor node with MEMS motion and environmental sensors, an ultra-low-power STM32 microcontroller, and an ST25DV64KC dynamic NFC tag for communication with NFC readers, such as tablets and smartphones.

REDUCE DEVELOPMENT TIME AND COST WITH RELATED SOFTWARE PACKAGES

To help developers improve time to market as well as reduce development costs, ST offers a comprehensive set of ready-to-use software:

- The **STM32Cube function pack** (FP-SNS-SMARTAG2) includes complete firmware to access sensor data from an IoT node with a dynamic NFC tag.
- An **Amazon Cloud-based dashboard** (DSH-ASSETRACKING) provides a highly functional and intuitive interface tailored for the collection, visualization and analysis of asset tracking positions as well as sensor data.
- The **STAssetTracking mobile app** (STAssetTracking) for Android and iOS lets you remotely configure a BLE, NFC or Sigfox asset tracking node from a compatible mobile device with Bluetooth or NFC connectivity.

ADDITIONAL RESOURCES

ST25DV dynamic NFC tag
[product introduction]

NFC dynamic tag sensor evaluation board (STEVAL-SMARTAG2)
[product page]

ST25 NFC for Manufacturing
[learning resources]

ST25DV-I2C dynamic NFC tag series
[product portfolio]

NFC design considerations for an improved User Experience
[whitepaper]

life.augmented

Order code: BRWP2307NFCSM

For more information on ST products and solutions, visit www.st.com

life.augmented