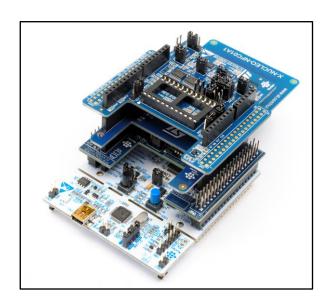# P-NUCLEO-CLD1

STM32Nucleo pack for IoT node with Wi-Fi, sensors and NFC connected to the cloud

Data brief

Features

- NUCLEO-F401RE: STM32 Nucleo-64 development board with STM32F401RE MCU, supports Arduino UNO R3 and ST morpho connectivity
- X-NUCLEO-IDW01M1: Wi-Fi expansion board based on SWPF01SA module
- X-NUCLEO-IKS01A2: Motion MEMS and environmental sensor expansion board
- X-NUCLEO-NFC01A1: Dynamic NFC tag expansion board based on M24SR
- Out-of-the-box software support to connect the device to the IBM Watson IoT cloud or to the Microsoft Azure IoT cloud, by using one of the following package:
  - FP-CLD-AZURE1: STM32 ODE function pack for IoT node with Wi-Fi, NFC and sensors, connected to Microsoft Azure IoT cloud
  - FP-CLD-WATSON1: STM32 ODE function pack for IoT node with Wi-Fi, NFC and sensors for vibration analysis, connected to IBM Watson IoT Cloud

- RoHS compliant

Description

The STM32 Nucleo pack P-NUCLEO-CLD1 is a hardware kit composed of the following boards: NUCLEO-F401RE, X-NUCLEO-IDW01M1, X-NUCLEO-IKS01A2 and X-NUCLEO-NFC01A1. The P-NUCLEO-CLD1 is supported by two software packages (FP-CLD-AZURE1, FP-CLD-WATSON1) from the STM32 Open Development Environment. Both software packages (FP-CLD-AZURE1, FP-CLD-WATSON1) contain ready to use binaries to connect in just a few minutes the STM32 Nucleo board with a web dashboard running on the cloud for sensor data visualization.

The P-NUCLEO-CLD1 used with FP-CLD-AZURE1 or FP-CLD-WATSON1 allows to transmit sensors data to the cloud and to receive commands from cloud applications. Wi-Fi parameter configuration is also greatly simplified thanks to the supported NFC connectivity. It enables connecting your device to the cloud and let you jump-start end-to-end IoT development so that you can focus on adding desired functions.

1 Kit description

The NUCLEO-F401RE board provides an affordable and flexible way for users to try out new concepts and to build prototypes with STM32 MCU. It does not require any separate probe as it integrates the ST-LINK/V2-1 debugger and programmer.

The X-NUCLEO-IDW01M1 is a Wi-Fi expansion board for STM32 Nucleo based on the SPWF01SA module. The CE, IC and FCC certified SPWF01SA module has an embedded STM32 MCU, a low-power Wi-Fi b/g/n SoC with integrated power amplifier and power management and an SMD antenna. The SPWF01SA module is also equipped with 1 MByte of external FLASH for firmware update over-the-air (FOTA).

The X-NUCLEO-IKS01A2 is a motion MEMS and environmental sensor expansion board for the STM32 Nucleo. It is designed around the LSM6DSL 3D accelerometer and 3D gyroscope, the LSM303AGR 3D accelerometer and 3D magnetometer, the HTS221 humidity and temperature sensor and the LPS22HB pressure sensor.

The X-NUCLEO-NFC01A1 is a Dynamic NFC tag expansion board for the STM32 Nucleo. It is designed around the M24SR64-Y. The M24SR64-Y device is a dynamic NFC/RFID tag IC with a dual interface. It embeds a 64 Kbit EEPROM memory. It can be operated from an I²C interface or by a 13.56 MHz RFID reader or a NFC phone.

The X-NUCLEO-IDW01M1, X-NUCLEO-IKS01A2 and X-NUCLEO-NFC01A1 support with the Arduino UNO R3 connectivity.

The FP-CLD-AZURE1 function pack directly connects your IoT node to the Microsoft Azure IoT. The software implements application level functions based on the HTTP protocol and enables communication with Microsoft Azure IoT. You can use it to prototype end-to-end IoT applications together with Microsoft Azure, and transmit real time sensor data and receive commands. The software runs on the STM32 microcontroller and includes drivers for the Wi-Fi module, sensors and dynamic NFC/RFID tag; the package bundles examples for transmitting sensor data and controlling the device via Microsoft Azure IoT.

The FP-CLD-WATSON1 function pack can connect your IoT node to IBM Watson IoT. The software includes a middleware package implementing the MQTT protocol to facilitate interaction between the STM32 Nucleo board and Cloud services. The package is further extended with pre-integrated algorithms for the processing of accelerometers data that can be used to detect vibration from devices such as motors, fans and pumps. Maximum frequencies and tear/wear conditions of the device under test are reported together with raw sensors data to IBM Watson IoT thus enabling and speeding up development of solutions for industrial condition monitoring and predictive maintenance. FP-CLD-AZURE1 and FP-CLD-WATSON1 are not included in the kit but they are downloadable from www.st.com.

2 Revision history

Table 1: Document revision history

Date	Version	Changes
22-Mar-2017	1	Initial release.

IMPORTANT NOTICE – PLEASE READ CAREFULLY