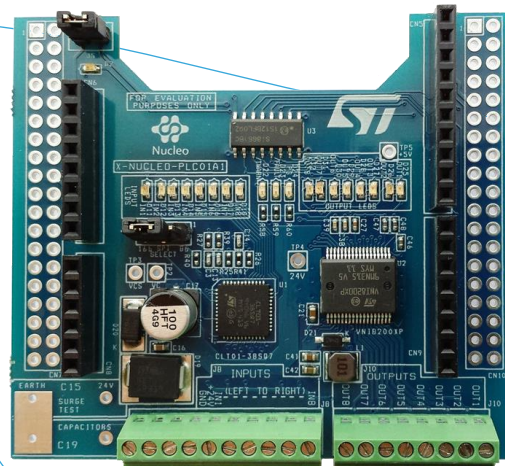


Quick start guide

Industrial input/output expansion board based on
CLT01-38SQ7 and VNI8200XP for STM32 Nucleo
(X-NUCLEO-PLC01A1)



Version 1.0 (September 02, 2015)

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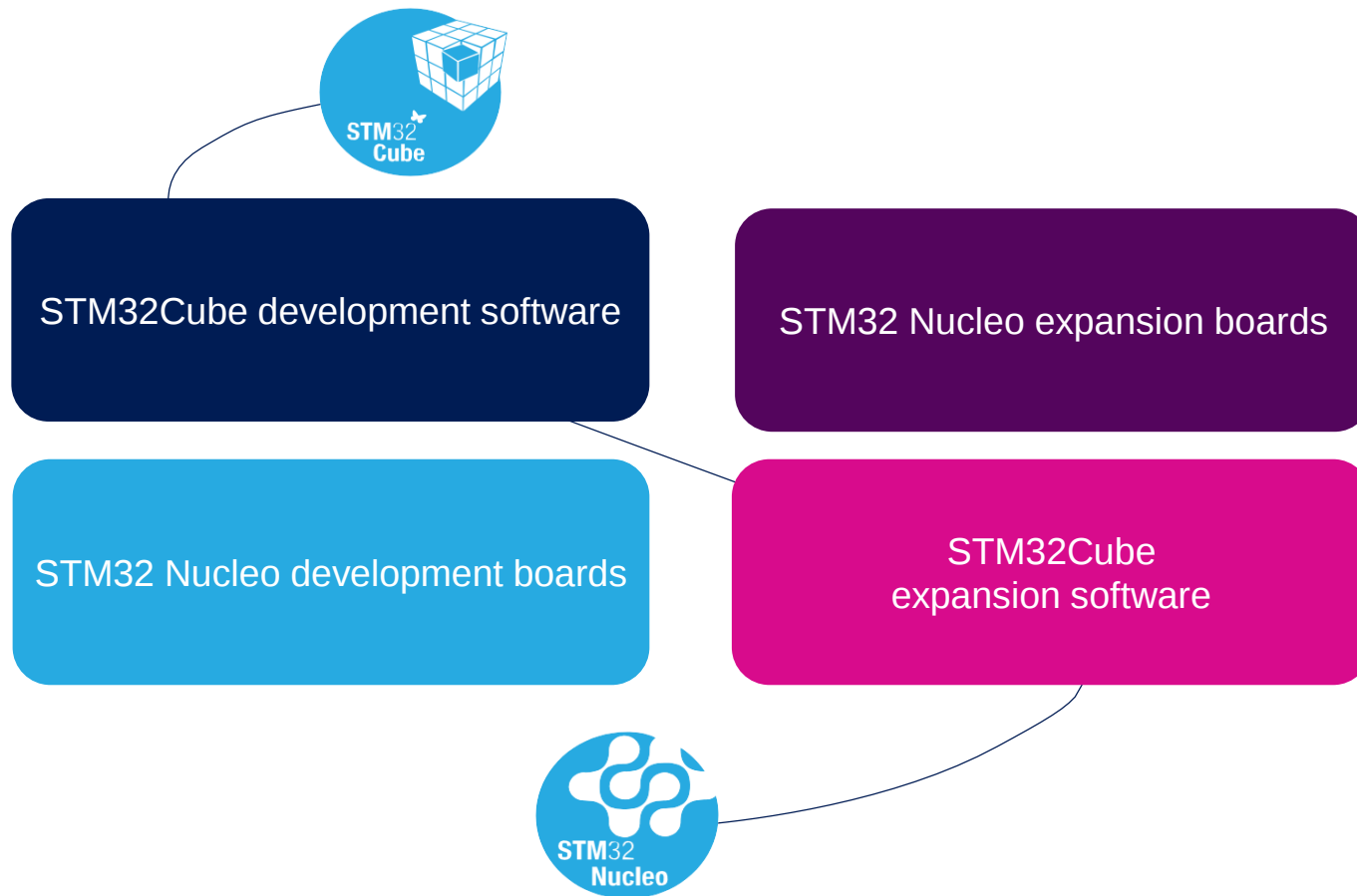
Setup & demo examples

STM32 Open Development Environment

Fast, affordable Prototyping and Development

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- The STM32 Open Development Environment (ODE) consists of a set of stackable boards and a modular open SW environment designed around the STM32 microcontroller family.

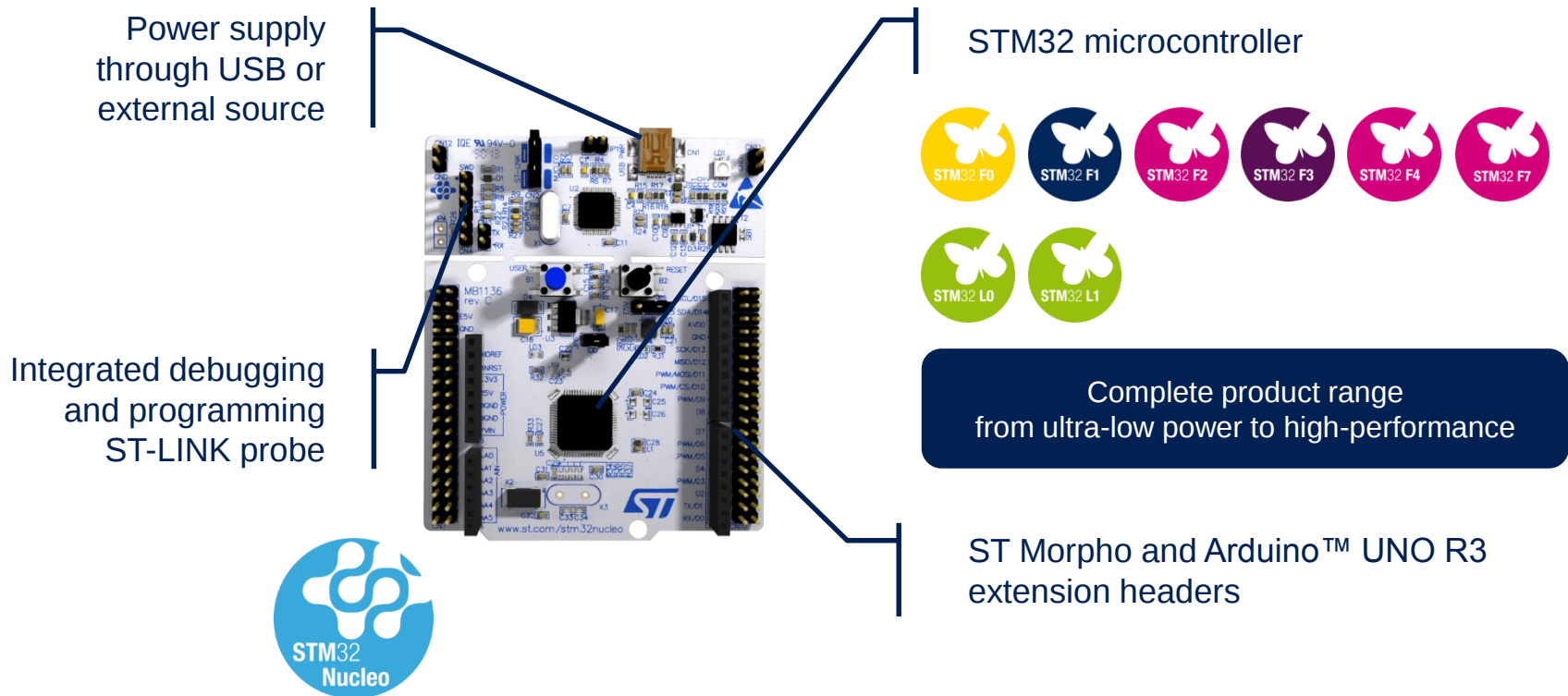


Compatibility with multiple Development environments

STM32 Nucleo Development Boards

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- A comprehensive range of affordable development boards for the full STM32 microcontroller series, with unlimited unified expansion capability, and with integrated debugger/programmer.



STM32 Open Development Environment

Software components

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- **STM32Cube software (CUBE)** - Set of free tools and embedded software bricks to enable fast and easy development with STM32 that simplifies and speeds up developers' work
 - PC-based STM32CubeMX for graphical configuration of the STM32.
 - Hardware Abstraction Layer (HAL) for easy porting from one STM32 device to another and middleware bricks for the most common functions.
 - A large number of code use examples.
- **STM32Cube expansion software (X-CUBE)**
 - All STM32 Nucleo expansion boards come with source code drivers and sample applications built on top of CUBE HAL, which provides abstracted access to board functionalities through high-level APIs.
- **Compatibility with multiple Development Environments**
 - The STM32 Open Development Environment is compatible with a number of IDEs including IAR EWARM, Keil MDK, and GCC-based environments.

STM32 Open Development Environment

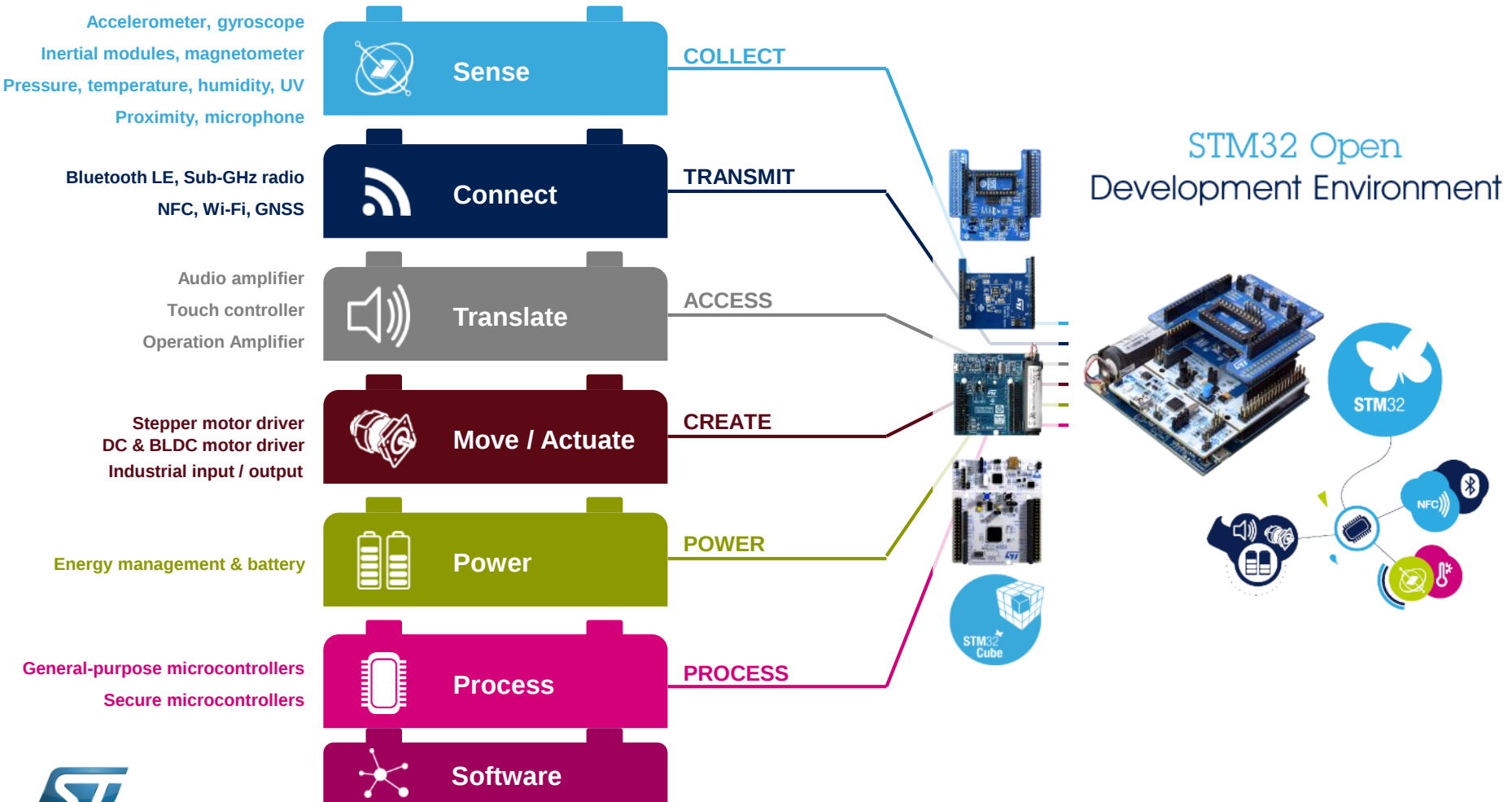
Building block approach

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The building blocks

Your need

Our answer



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Industrial input/output expansion board

Hardware overview

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X-NUCLEO-PLC01A1 hardware description

- The X-NUCLEO-PLC01A1 is an industrial input/output evaluation board designed around the CLT01-38SQ7 and VNI8200XP devices, allowing the expansion of the STM32 Nucleo boards.
- The CLT01-38SQ7 and the VNI8200XP communicate with the STM32 Nucleo board through a SPI link available on the Arduino UNO R3 connector.

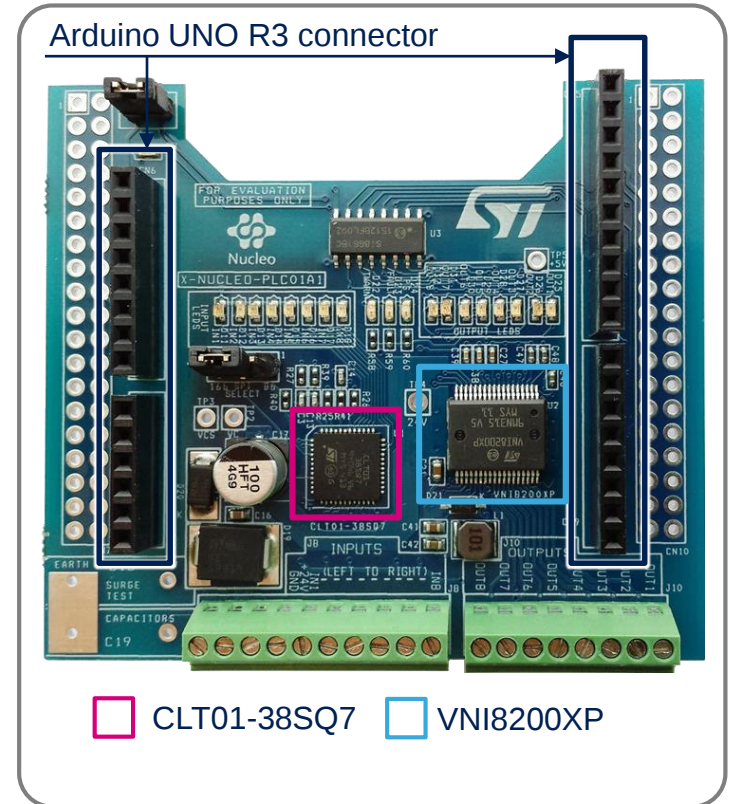
Key products on board

CLT01-38SQ7

High-speed protected digital termination array

VNI8200XP

Octal high-side smart-power solid-state relay with serial/parallel selectable interface on device



Order code: **X-NUCLEO-PLC01A1**

Latest info available at
[X-NUCLEO-PLC01A1](#)

Industrial input/output expansion board

Software overview

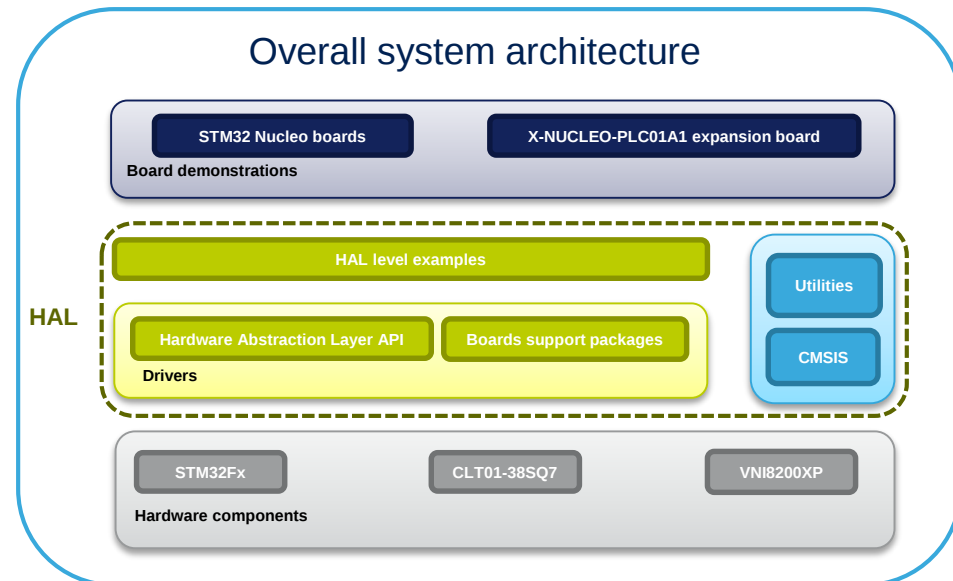
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X-CUBE-PLC1 software description

- The X-CUBE-PLC1 is a software package which provides drivers running on the STM32 microcontroller for the CLT01-38SQ7 and the VNI8200XP devices. It is expansion software for the STM32Cube tool that eases portability across different STM32 MCUs.
- Implementation examples are available for the industrial input/output expansion board (X-NUCLEO-PLC01A1) plugged on top of an STM32 Nucleo board (NUCLEO-F030R8, NUCLEO-F103RB or NUCLEO-F401RE).

Key features

- Firmware examples for building applications using CLT01-38SQ7 and VNI8200XP devices
- Easy hands-on approach for building industrial PLCs (Programmable Logic Controller) for the most common application cases
- Easy portability across different MCU families thanks to STM32Cube
- Free, user-friendly license terms



Latest software available at
X-CUBE-PLC1

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Documents & related design resources

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All documents are available in the Design Resources tab of the industrial input/output expansion board webpage

X-NUCLEO-PLC01A1: Product webpage ([Link](#))

- Gerber files, BOM, and schematics
- **DB2622**: Industrial input/output expansion board based on VNI8200XP and CLT01-38SQ7 for STM32 Nucleo – **Databrief**
- **UM1918**: Getting started with the industrial input/output expansion board based on VNI8200XP and CLT01-38SQ7 for STM32 Nucleo – **User manual**

X-CUBE-PLC1: Product webpage ([Link](#))

- **DB2617**: Industrial input/output software expansion for STM32Cube – **Databrief**
- **UM1914**: Getting started with the software package for industrial input/output in X-CUBE-PLC1 software expansion for STM32Cube – **User manual**
- Software setup file

Design Resources

Quick Links [Product Specifications](#)

Technical Documentation

Product Specifications		
Description	Version	Size
 DB2622 : Industrial input/output expansion board based on VNI8200XP and CLT01-38SQ7 for STM32 Nucleo	1.0	256 KB

User Manual		
Description	Version	Size
 UM1918 : Getting started with the X-NUCLEO-PLC01A1 industrial input/output expansion board for STM32 Nucleo	1.0	657 KB

Hardware Resources

Board Manufacturing Specification		
Description	Version	Size
 X-NUCLEO-PLC01A1 gerber files	1.0	265 KB

Bill of Materials		
Description	Version	Size
 X-NUCLEO-PLC01A1 BOM	1.0	17 KB

Schematic Pack		
Description	Version	Size
 X-NUCLEO-PLC01A1 schematic	1.0	79 KB

X-NUCLEO-PLC01A1
Product webpage
Design Resources tab

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Hardware prerequisites

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- STM32 Nucleo industrial input/output expansion board (X-NUCLEO-PLC01A1)
- STM32 Nucleo board ([NUCLEO-F030R8](#), [NUCLEO-F103RB](#) or [NUCLEO-F401RE](#))
- Standard Type A / mini B USB cable
- External power supply, 24V



Setup & demo examples

Software prerequisites

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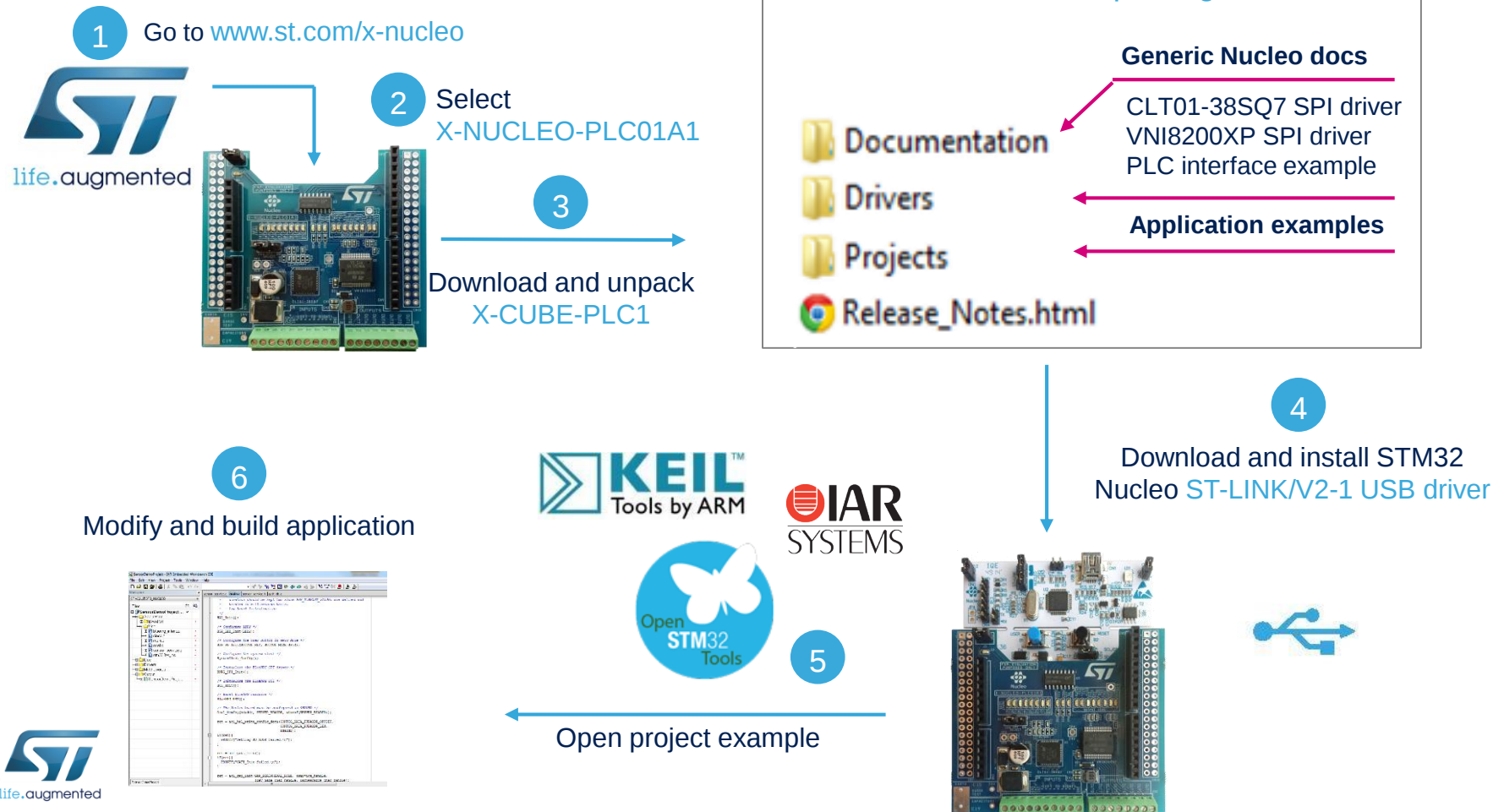
- ST-LINK/V2-1 USB driver ([Link](#))
- ST-LINK/V2-1 firmware upgrade ([Link](#))
- X-CUBE-PLC1 ([Link](#))
 - Copy the .zip file content into a folder on your PC
 - The package contains the source code example (Keil, IAR, SW4STM32) based on NUCLEO-F030R8 or NUCLEO-F103RB or NUCLEO-F401RE

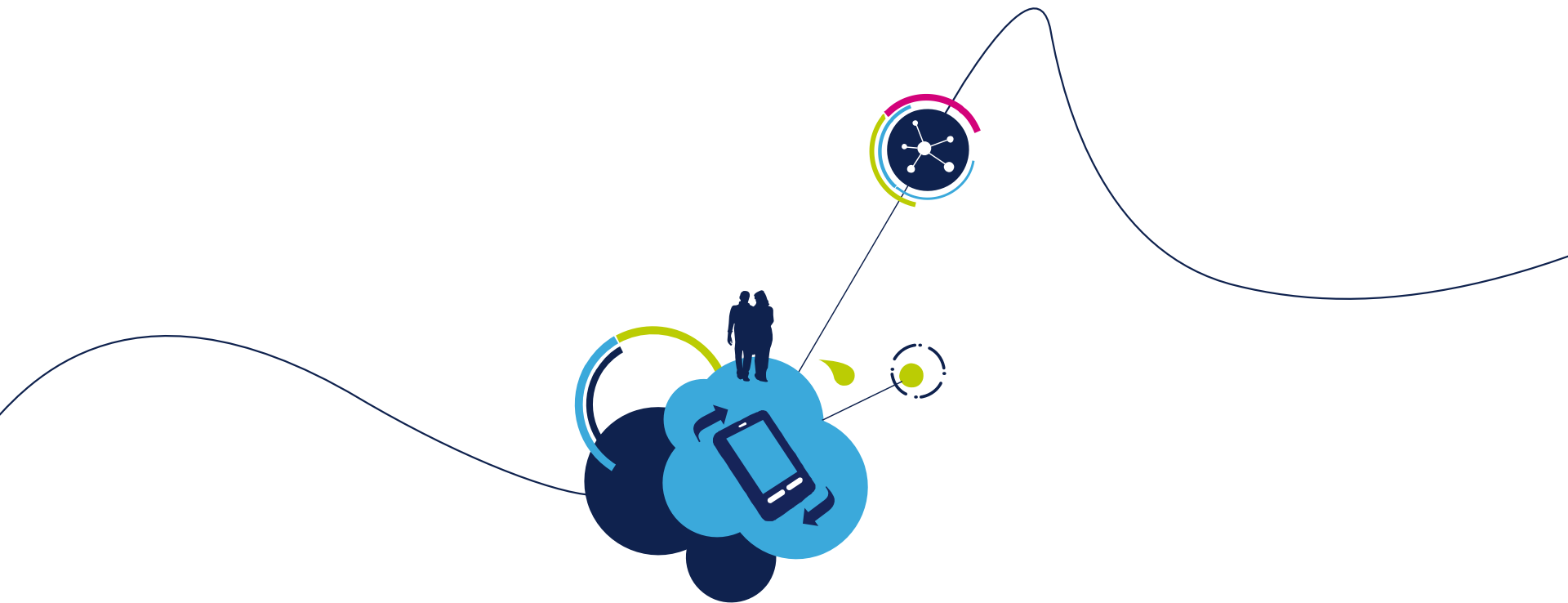
Industrial input/output expansion board

Start coding in just a few minutes with X-CUBE-PLC1

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Use NUCLEO-F030R8 or NUCLEO-F103RB or NUCLEO-F401RE with X-CUBE-PLC1 package





www.st.com/stm32code