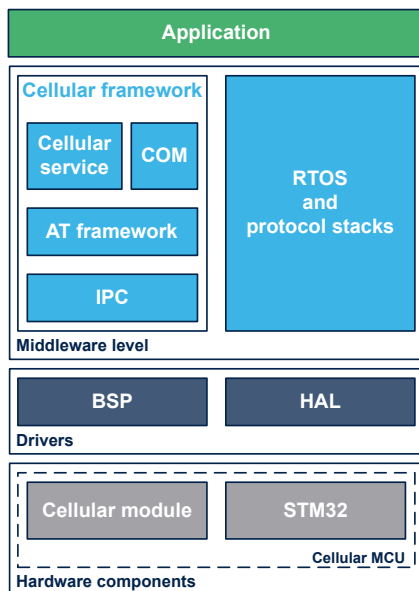


Cellular connectivity software expansion for STM32Cube



Features

- STMicroelectronics framework for devices based on LPWAN cellular networks
- Compatible with multiple STM32 boards and various modems
- RTOS pre-integration for easy integration in a complete platform: Azure® RTOS and FreeRTOS™
- Easy portability across different STM32 microcontroller series by means of the STM32Cube ecosystem and STM32CubeMX initialization tool
- BSD-like socket APIs for data plane
- TCP-UDP/IP connectivity with IP stack on host or modem
- Flexible and modular software architecture to make the integration of other modems easier
- Partial GSMA TS34/35 compliance
- Firmware customization: APN, band
- Connected-application examples

Description

X-CUBE-CELLULAR consists of a cellular middleware, a set of projects (for various hardware setups), and an application example for STM32 microcontrollers acting as hosts for cellular connectivity applications. The STM32 microcontrollers supported are chosen for their low-power capabilities.

The LTE Cat M or NB-IoT modems with possible 2G fallback connect to the STM32 boards directly through an STMod+ adapter or by means of an ARDUINO® / STMod+ adapter.

Some hardware solutions such as the B-L462E-CELL1 embed a dedicated circuit like the ST4SIM-200M to enforce security.

The X-CUBE-CELLULAR Expansion Package enables users to connect to the Internet through the cellular network by using the provided baseline, and to accelerate their end-product design cycle.

The cellular connectivity is achieved out-of-the shelf by means of a preprovisioned eSIM (Truphone®) embedded on some hardware version, or using a plastic SIM card that can be ordered from Sierra Wireless, an authorized partner member of the STMicroelectronics partner program.

Additional and regularly updated information, including supported hardware, is available from STMicroelectronics MCU wiki at wiki.st.com/stm32mcu. The release note available in the X-CUBE-CELLULAR Expansion Package provides an up-to-date list of supported hardware.



Product status link

[X-CUBE-CELLULAR](#)

1 General information

The X-CUBE-CELLULAR Expansion Package runs on STM32 microcontrollers based on Arm® cores.

Note: Arm is a registered trademark of Arm Limited (or its subsidiaries) in the US and/or elsewhere.



1.1 Ordering information

X-CUBE-CELLULAR is available for free download from the STMicroelectronics websites.

X-CUBE-CELLULAR with Azure® RTOS pre-integration is available directly from the product webpage on www.st.com.

For X-CUBE-CELLULAR with FreeRTOS™ pre-integration, refer to STMicroelectronics MCU wiki at wiki.st.com/stm32mcu.

Note: FreeRTOS is a trademark of Amazon in the United States and/or other countries.

All other trademarks are the property of their respective owners.

1.2 What is STM32Cube?

STM32Cube is an STMicroelectronics original initiative to significantly improve designer productivity by reducing development effort, time, and cost. STM32Cube covers the whole STM32 portfolio.

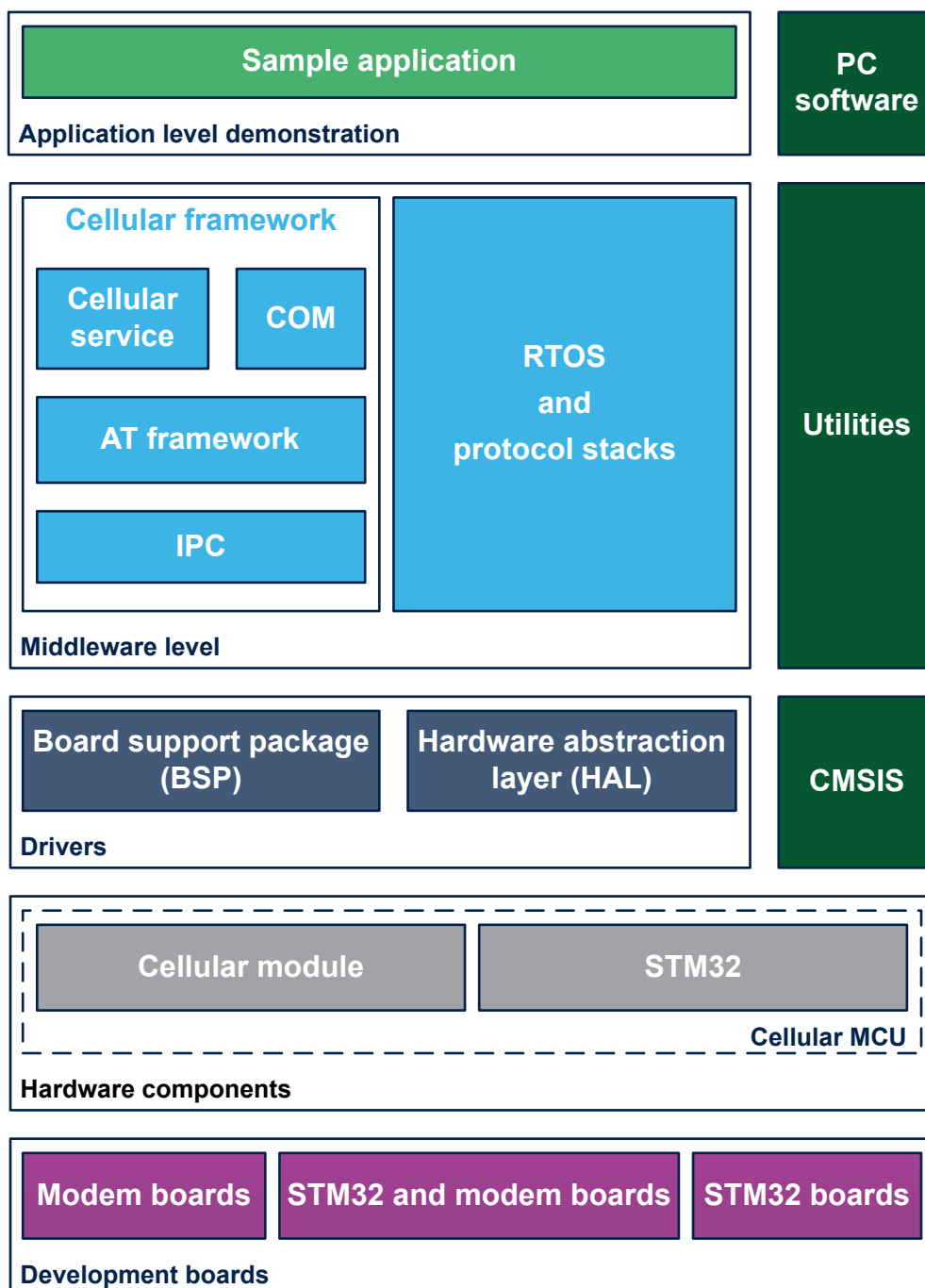
STM32Cube includes:

- A set of user-friendly software development tools to cover project development from conception to realization, among which are:
 - STM32CubeMX, a graphical software configuration tool that allows the automatic generation of C initialization code using graphical wizards
 - STM32CubeIDE, an all-in-one development tool with peripheral configuration, code generation, code compilation, and debug features
 - STM32CubeProgrammer (STM32CubeProg), a programming tool available in graphical and command-line versions
 - STM32CubeMonitor (STM32CubeMonitor, STM32CubeMonPwr, STM32CubeMonRF, STM32CubeMonUCPD) powerful monitoring tools to fine-tune the behavior and performance of STM32 applications in real-time
- STM32Cube MCU and MPU Packages, comprehensive embedded-software platforms specific to each microcontroller and microprocessor series (such as STM32CubeL4 for the STM32L4 Series), which include:
 - STM32Cube hardware abstraction layer (HAL), ensuring maximized portability across the STM32 portfolio
 - STM32Cube low-layer APIs, ensuring the best performance and footprints with a high degree of user control over hardware
 - A consistent set of middleware components such as FAT file system, RTOS, USB Host and Device, TCP/IP, Touch library, and Graphics
 - All embedded software utilities with full sets of peripheral and applicative examples
- STM32Cube Expansion Packages, which contain embedded software components that complement the functionalities of the STM32Cube MCU and MPU Packages with:
 - Middleware extensions and applicative layers
 - Examples running on some specific STMicroelectronics development boards

2 Software architecture

The top-level architecture of the X-CUBE-CELLULAR Expansion Package is shown in Figure 1.

Figure 1. X-CUBE-CELLULAR architecture





3 License

X-CUBE-CELLULAR is delivered under the [SLA0048](#) software license agreement and its Additional License Terms.

Revision history

Table 1. Document revision history

Date	Revision	Changes
22-Jun-2018	1	Initial release.
2-Nov-2018	2	Extended support to B-L475E-IOT01A with X-NUCLEO-STMODA1 and MB1329.
12-Feb-2019	3	Extended support to B-L475E-IOT01A with X-NUCLEO-STMODA1 and GM01Q-STMOD, and 32L496GDISCOVERY with GM01Q-STMOD. Updated <i>Table 1</i> .
22-May-2019	4	Updated STM32Cube description in <i>What is STM32Cube?</i>
11-Oct-2019	5	Added <i>Network</i> middleware into the cover picture, <i>Figure 1</i> , and <i>Table 1</i> .
21-Apr-2020	6	Updated <i>What is STM32Cube?</i> and <i>Software component license agreements</i> .
21-Apr-2021	7	Extended support to the B-L462E-CELL1 and B-L4S5I-IOT01A boards. Focused the document scope on cellular communication: <ul style="list-style-type: none"> Updated the cover picture and <i>Figure 1</i> Updated <i>Features</i>, <i>Description</i> and <i>License</i>
1-Feb-2022	8	Extended the RTOS pre-integration to Azure® RTOS: <ul style="list-style-type: none"> Updated the cover picture and <i>Figure 1</i> Updated <i>Features</i>, and <i>Ordering information</i> Updated <i>License</i> with the Additional License Terms.

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