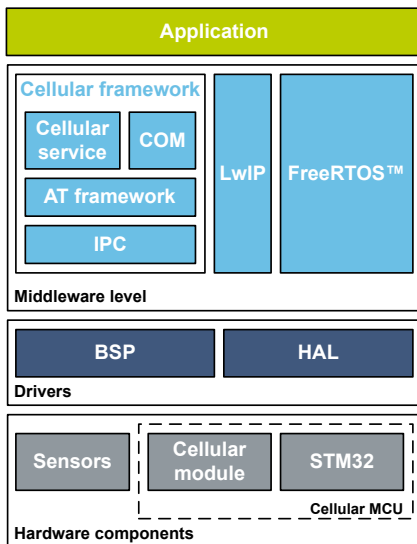


## Cellular connectivity software expansion for STM32Cube



### Features

- STMicroelectronics framework for devices based on LPWAN cellular networks
- Compatible with the [P-L496G-CELL01](#) and [P-L496G-CELL02](#) cellular-to-cloud packs with optional [X-NUCLEO-IKS01A2](#) motion-MEMS- and environment-sensor board
- Compatible with the [B-L475E-IOT01A](#) IoT Discovery board with [X-NUCLEO-STMODA1](#) (Arduino™ / STMod+ adapter) and MB1329 (STMicroelectronics modem board with the BG96 Quectel module)
- Compatible with the [B-L475E-IOT01A](#) IoT Discovery board with [X-NUCLEO-STMODA1](#) (Arduino™ / STMod+ adapter) and GM01Q-STMOD (Sequans® modem board with the GM01Q Sequans® module, referenced as [B-CELL-GM01Q](#) in STMicroelectronics)
- Compatible with the [32L496GDISCOVERY](#) Discovery board or Discovery host board contained in [P-L496G-CELL01](#) or [P-L496G-CELL02](#), and GM01Q-STMOD modem board
- FreeRTOS™ pre-integration for easy integration in a complete platform
- Easy portability across different STM32 microcontroller series thanks to the use of [STM32Cube](#) and [STM32CubeMX](#)
- BSD-like socket APIs for data plane
- TCP-UDP/IP connectivity with IP stack on host or modem
- Flexible and modular SW architecture for the easy integration of other modems
- Partial GSMA TS34/35 compliance
- PC terminal boot menu for device FW customization: API key, APN, band
- Connected-application examples

Product status link

[X-CUBE-CELLULAR](#)



### Description

[X-CUBE-CELLULAR](#) consists of a set of libraries and application examples for STM32L4 Series MCUs acting as hosts for cellular connectivity applications.

[X-CUBE-CELLULAR](#) runs on the [STM32L496AGI6](#)-based low-power Discovery board, driving an STMod+ compatible cellular-modem add-on board.

The [P-L496G-CELL01](#) 2G/3G cellular-to-cloud add-on board features the UG96 modem from Quectel (2G/3G). The [P-L496G-CELL02](#) LTE cellular-to-cloud add-on board features the BG96 modem from Quectel (LTE Cat M1/NB/2G fallback). Both modem add-on boards embed an EEPROM for saving the modem system configuration, a SIM socket, and a soldered embedded SIM in the MFF2 format, provisioned with the EMnify MVNO profile.

[X-CUBE-CELLULAR](#) runs on the [STM32L475VGT6](#)-based IoT node Discovery board, driving a cellular-modem add-on board (based on the BG96 Quectel or GM01Q Sequans® module) through an Arduino™ / STMod+ adapter.

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.

## 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 [www.st.com](http://www.st.com) website.

### 1.2 What is STM32Cube?

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

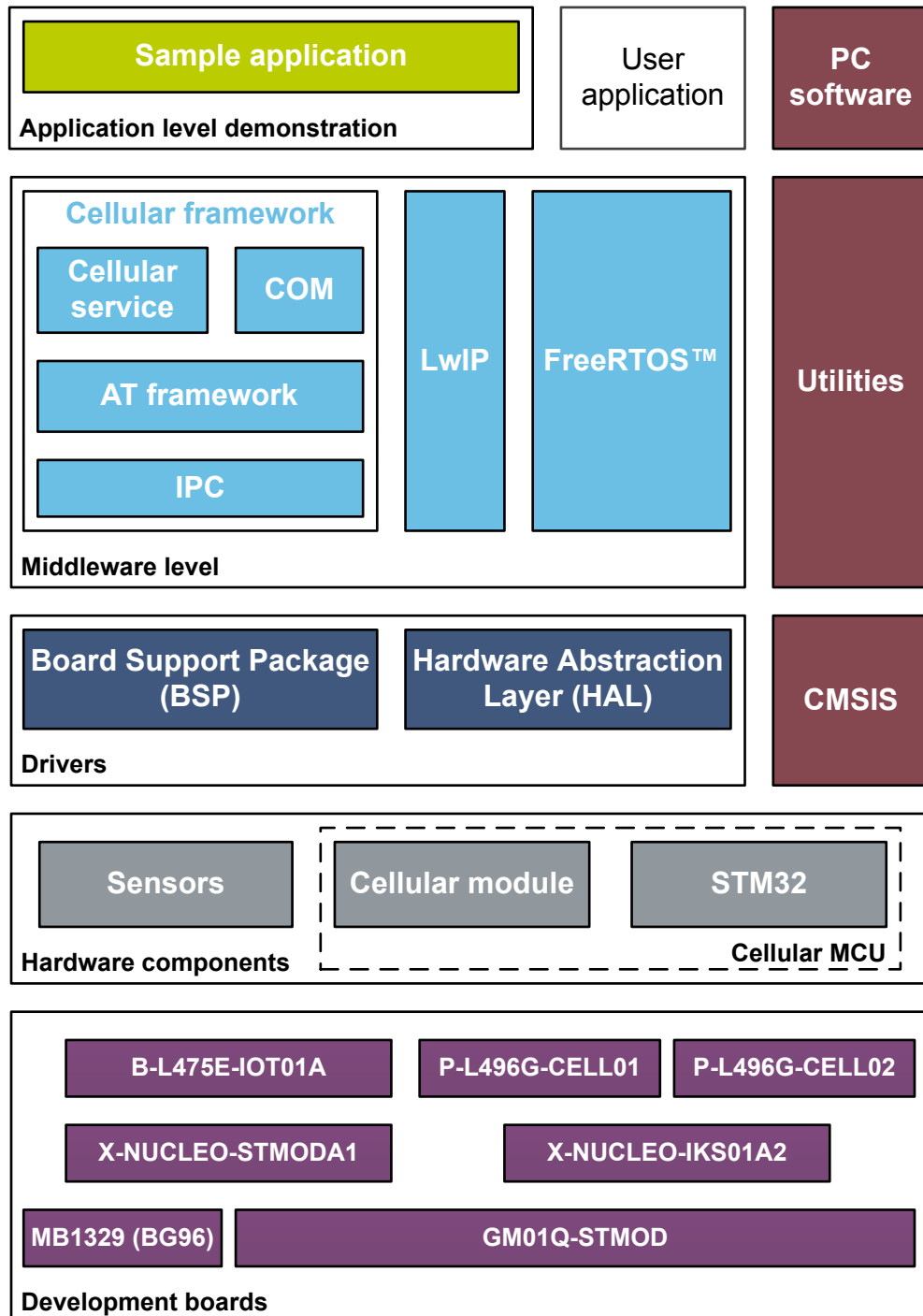
STM32Cube includes:

- A set of user-friendly software development tools to cover project development from the conception to the realization, among which:
  - [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 IP configuration, code generation, code compilation, and debug features
  - STM32CubeProgrammer ([STM32CubeProg](#)), a programming tool available in graphical and command-line versions
  - STM32CubeMonitor-Power ([STM32CubeMonPwr](#)), a monitoring tool to measure and help in the optimization of the power consumption of the MCU
- [STM32Cube MCU & 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 the HW
  - 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 & 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 *Mix Ultimate Liberty+OSS+3rd-party V1* software license agreement (SLA0048).

The software components provided in this package come with different license schemes as shown in [Table 1](#).

**Table 1. Software component license agreements**

Software component	Owner	License
Board Support Package (BSP)	STMicroelectronics	BSD-3-Clause
Cortex®-M CMSIS	Arm®	BSD-3-Clause
FreeRTOS™	Amazon™	MIT
HAL STM32 L4	STMicroelectronics	BSD-3-Clause
LwIP	2001-2004 Swedish Institute of Computer Science	BSD-3-Clause
P-L496G-CELL01, P-L496G-CELL02, B-L475E-IOT01A, 32L496GDISCOVERY, and X-NUCLEO-IKS01A2 BSP drivers	STMicroelectronics	BSD-3-Clause
STM32L4xx CMSIS	STMicroelectronics	BSD-3-Clause
Cellular framework	STMicroelectronics	Ultimate Liberty (source release)
Project examples	STMicroelectronics	Ultimate Liberty (source release)

## Revision history

**Table 2. Document revision history**

Date	Version	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 <a href="#">Section 1.2 What is STM32Cube?</a>

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