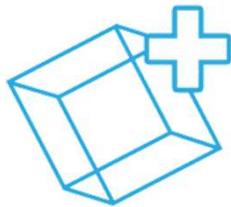
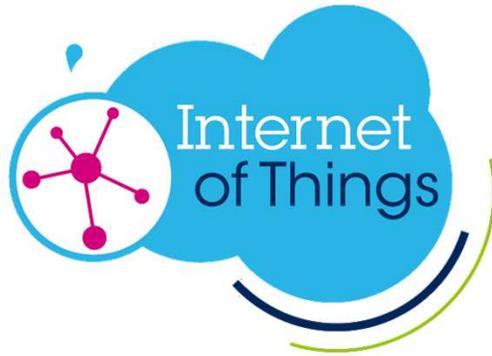


STM32 Open Development Environment

L'accélérateur de développement de produits IoT





Smart Things



Smart Home & City

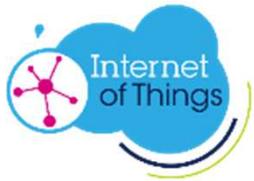


Smart Industry



Smart Driving





ST a Perfect Play in IoT



The right building blocks for IoT devices

Lower barriers for developers getting started

Lower barriers from prototyping to first product

Lower barriers to connect devices to the Cloud

Enable product & service commercialization

Building Blocks

Processing	Security
Sensing & Actuating	Connectivity
Motor Control	Power & Energy Management
Conditioning & Protection	

Stackable Boards & modular SW

STM32 Nucleo development boards

STM32 Nucleo expansion boards

Application specific SW

Audio Algorithms Sensor Fusion

Pre-integrated Software for vertical Applications

Smart Home Building automation Wearable

Integration of Cloud Provider SDKs

Microsoft Azure Certified IBM Watson IoT

amazon web services Partner Network TECHNOLOGY PARTNER

Ready to use Smartphone Apps

Partner Program

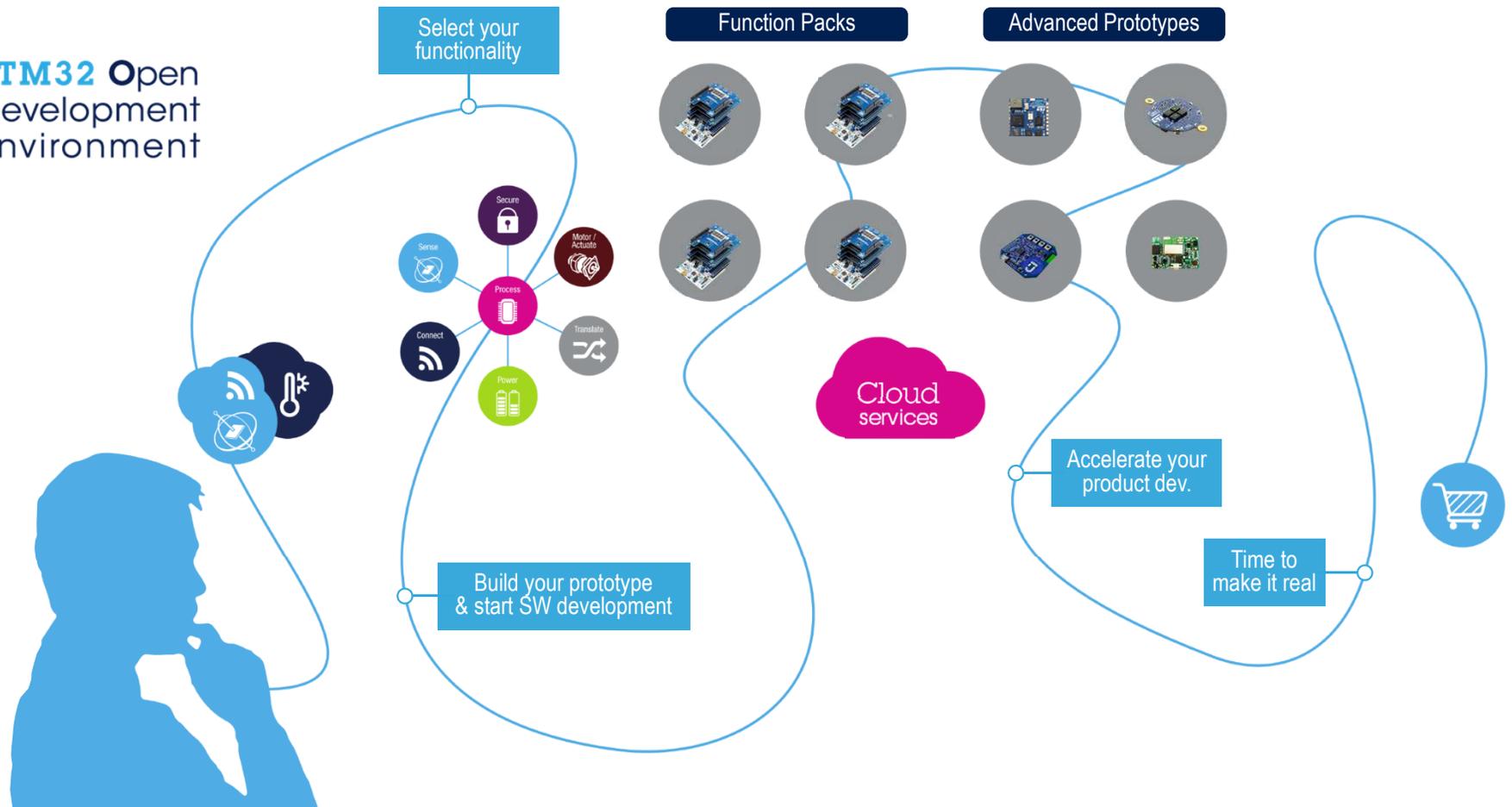
ST life.augmented

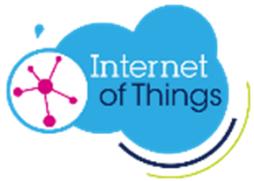
Partner Program



IoT Product Development

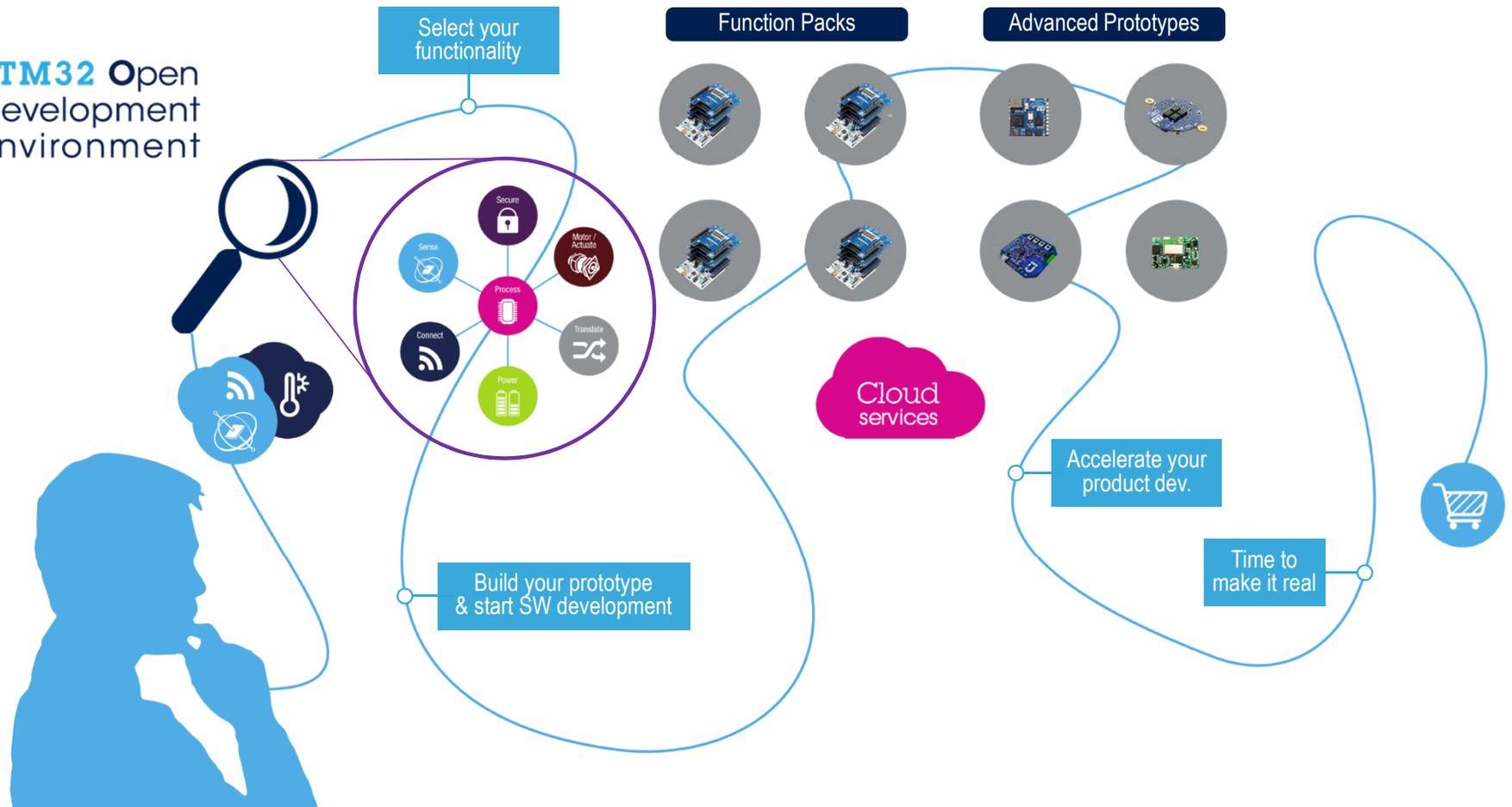
Make it Easy and Make it Fast





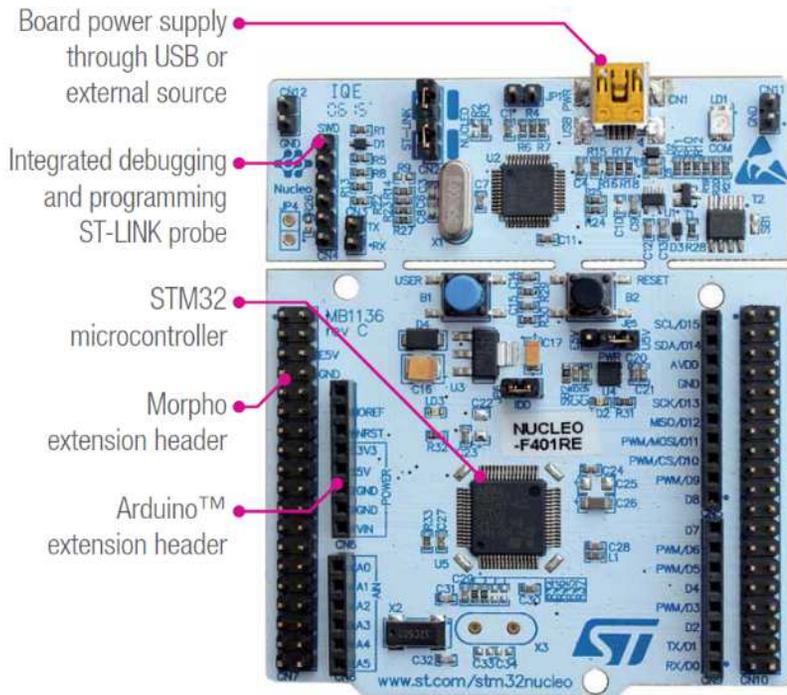
IoT Product Development

Make it Easy and Make it Fast



STM32 Nucleo Development Boards

27 development boards and growing... in two flavors (Processing & Security)



STM32 complete product range from ultra-low power to high performance



STM32 Nucleo Expansion Boards

36 expansion boards and growing... covering all the key functions



- Motion & environmental sensors
- Proximity sensor
- Microphone



- BLE
- Wi-Fi
- Sub-GHz
- NFC



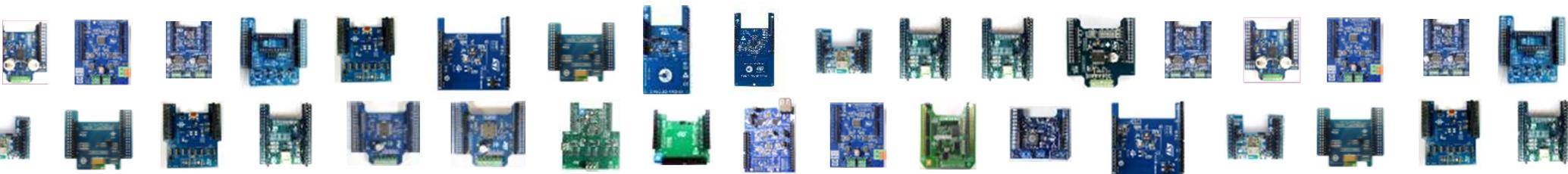
- Power management
- LED boost



- Motor drive
- Actuator



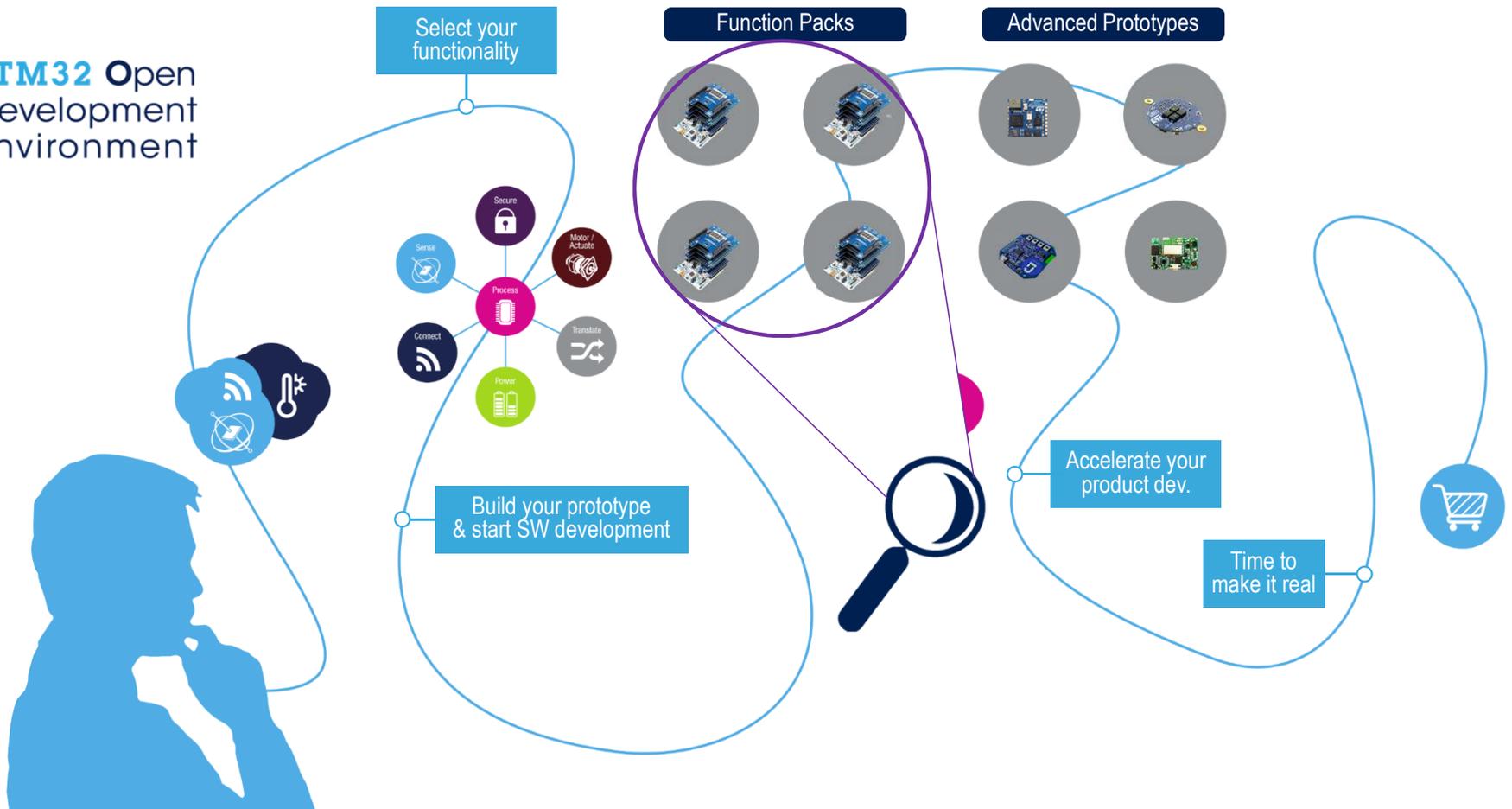
- Audio amplifier
- OpAmp





IoT Product Development

Make it Easy and Make it Fast

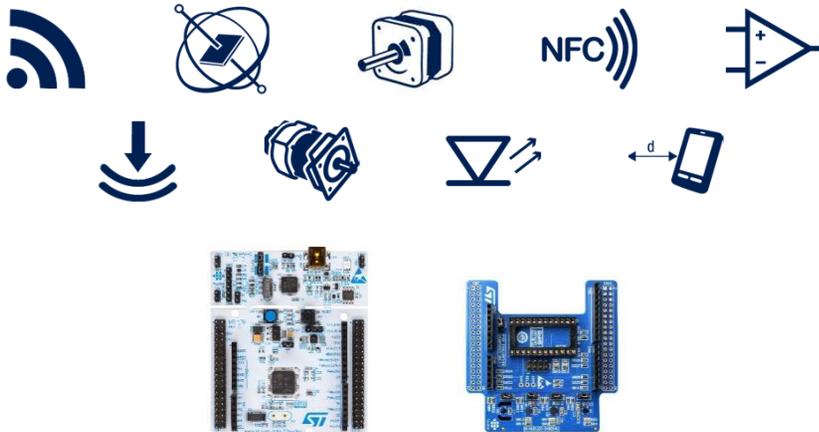


All the Software Needed to Start Application Coding from Day One

Expansion SW (X-Cube)

- Prototype with a single expansion board

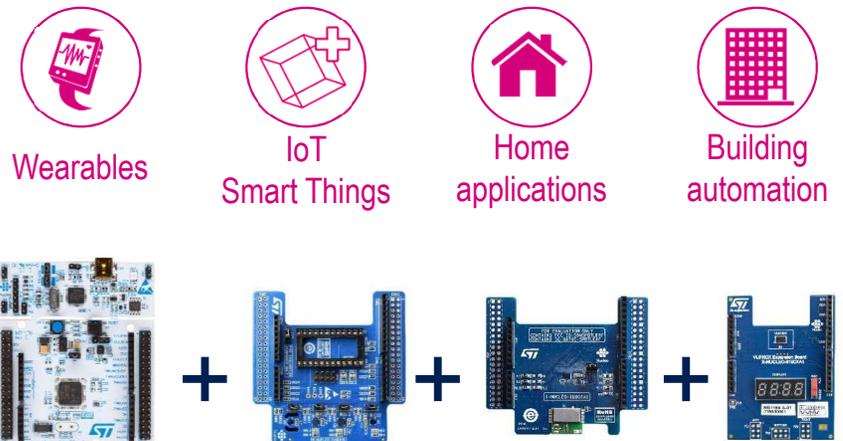
Sample applications



Function Pack

- Create advanced use cases based on multiple expansion boards

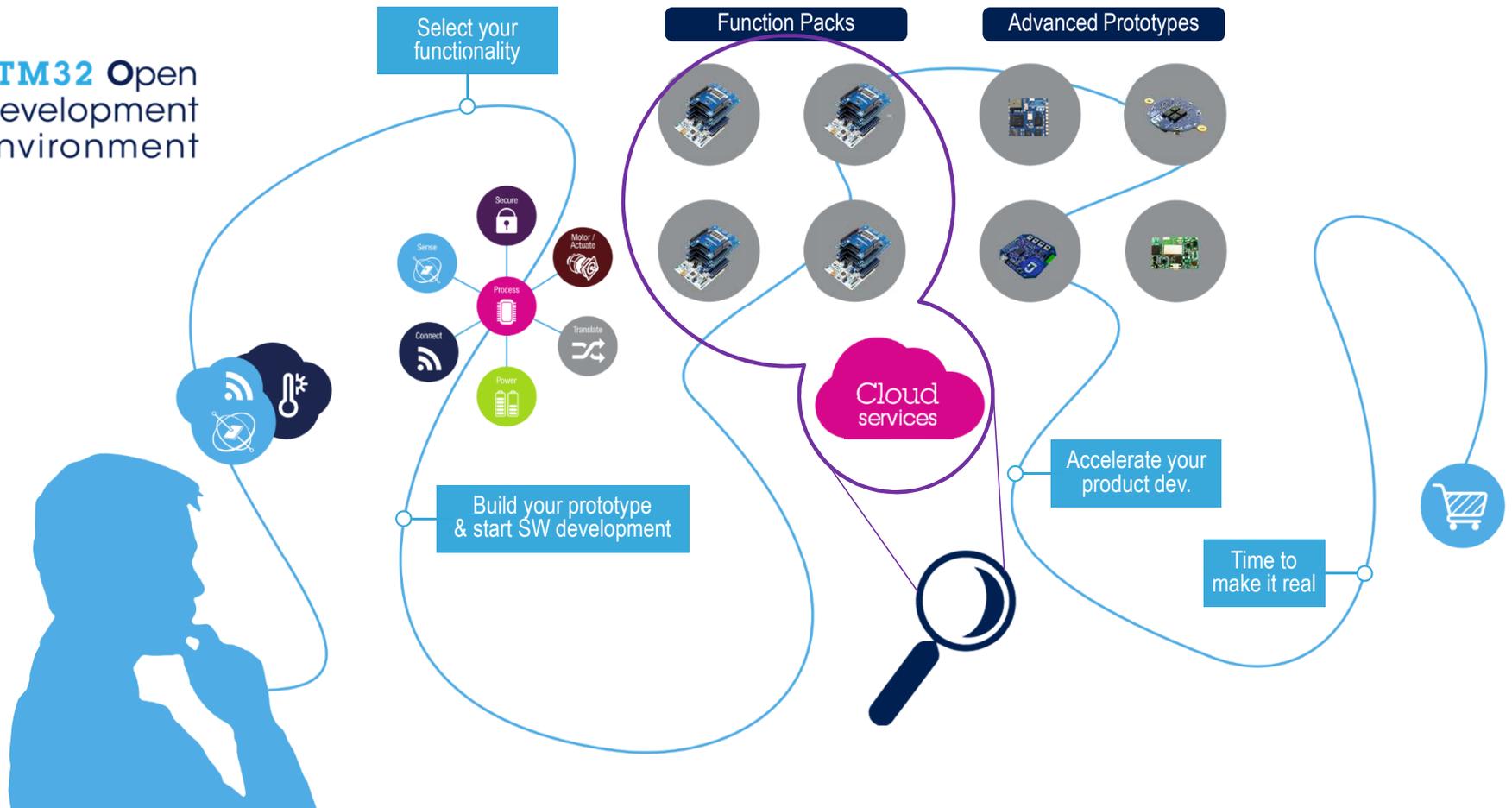
Pre-integrated application example





IoT Product Development

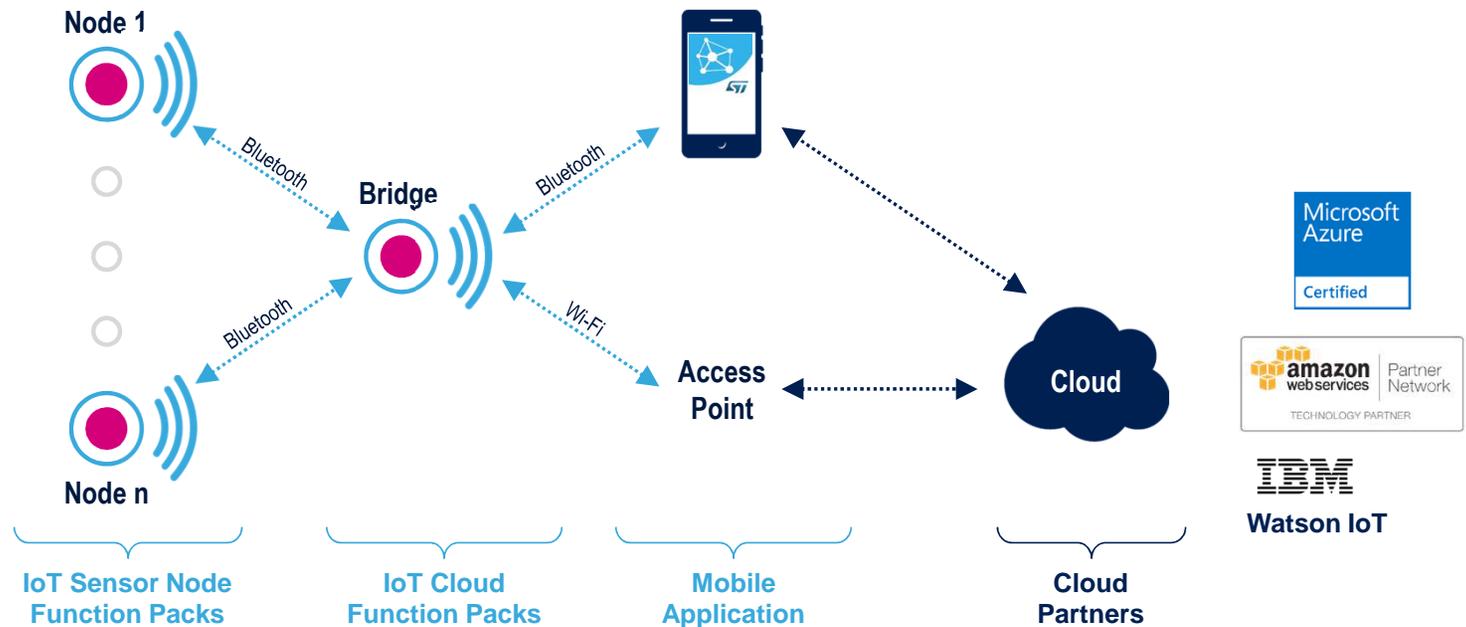
Make it Easy and Make it Fast



Cloud Connectivity out of the Box!

STM32 ODE Function Packs to access to multiple cloud IoT suppliers

Network	Functionality
Bridge	 
	  
Nodes	   
	 



Single Function Pack Example



ST SensNet



Sensor Function Packs



via Wi-Fi
access point



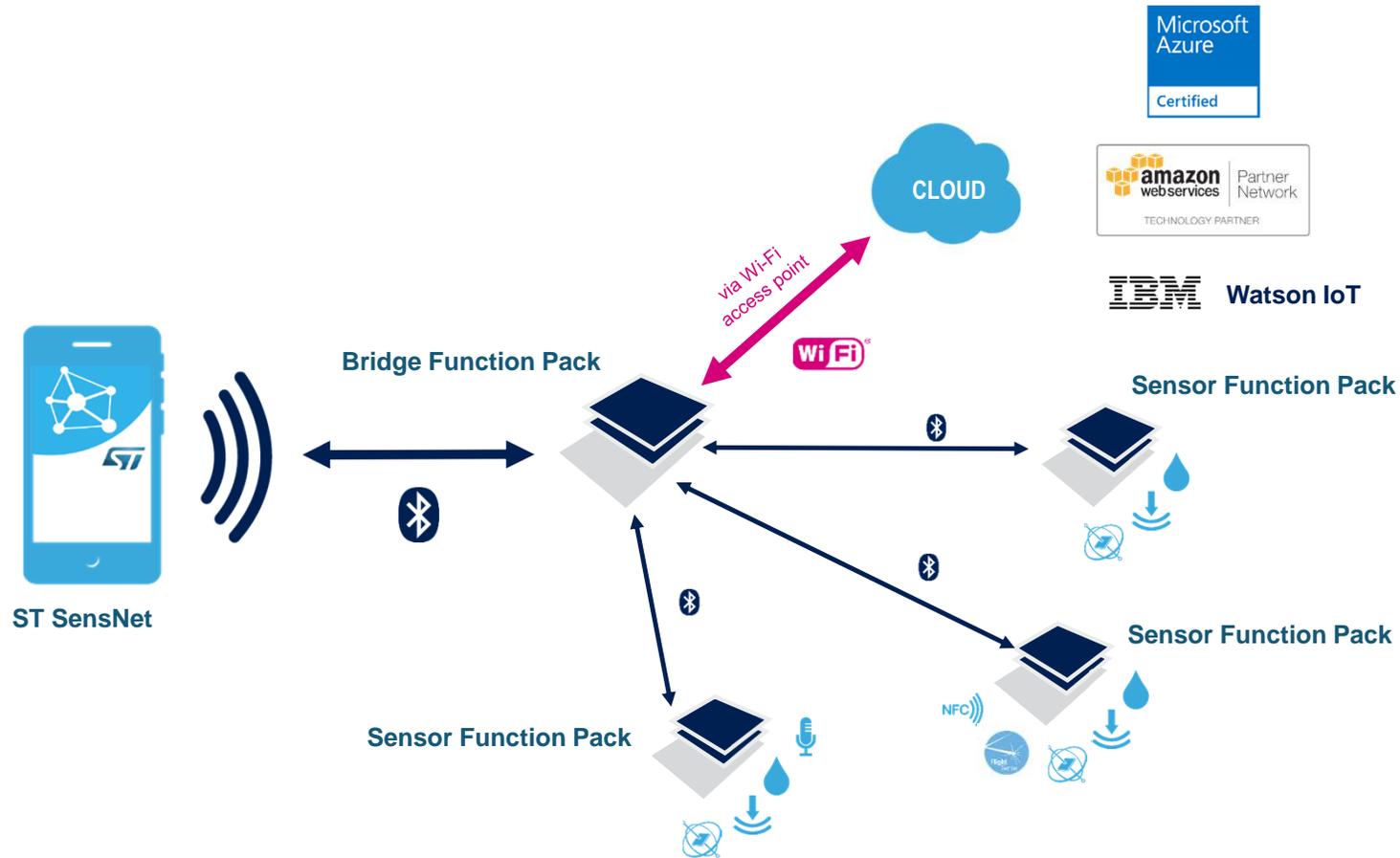
Cloud Function Packs

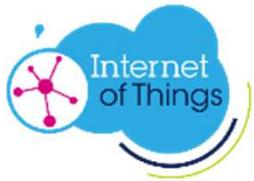


CLOUD



Multiple Function Pack Examples





Function Pack Example

FP-CLD-AZURE1

Required hardware



Motion and environmental sensor expansion board

MEMS 3D accelerometer, gyroscope and magnetometer
MEMS pressure and humidity sensors



X-Nucleo-IKS01A2



Wi-Fi expansion board

Wi-Fi network processor



X-NUCLEO-IDW01M1

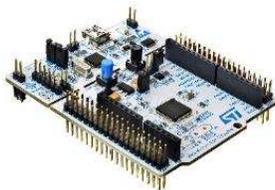


Dynamic NFC tag expansion board

Dynamic NFC/RFID tag IC



X-NUCLEO-NFC01A1



STM32 Nucleo-64 development board

STM32L4 or STM32F4 MCU



NUCLEO-L476RG or NUCLEO-F401RE

Software (free of charge)

FP-CLD-AZURE1 SW package

Azure IoT Client application

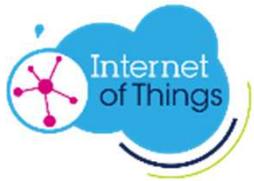


Wi-Fi, Sensor and NFC expansion software for STM32Cube
X-CUBE-WIFI1
X-CUBE-MEMS1
X-CUBE-NFC1

STM32Cube

“ST25 NFC” mobile application

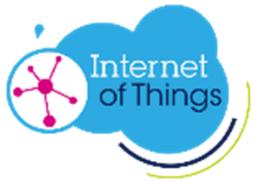




Function Pack Portfolio

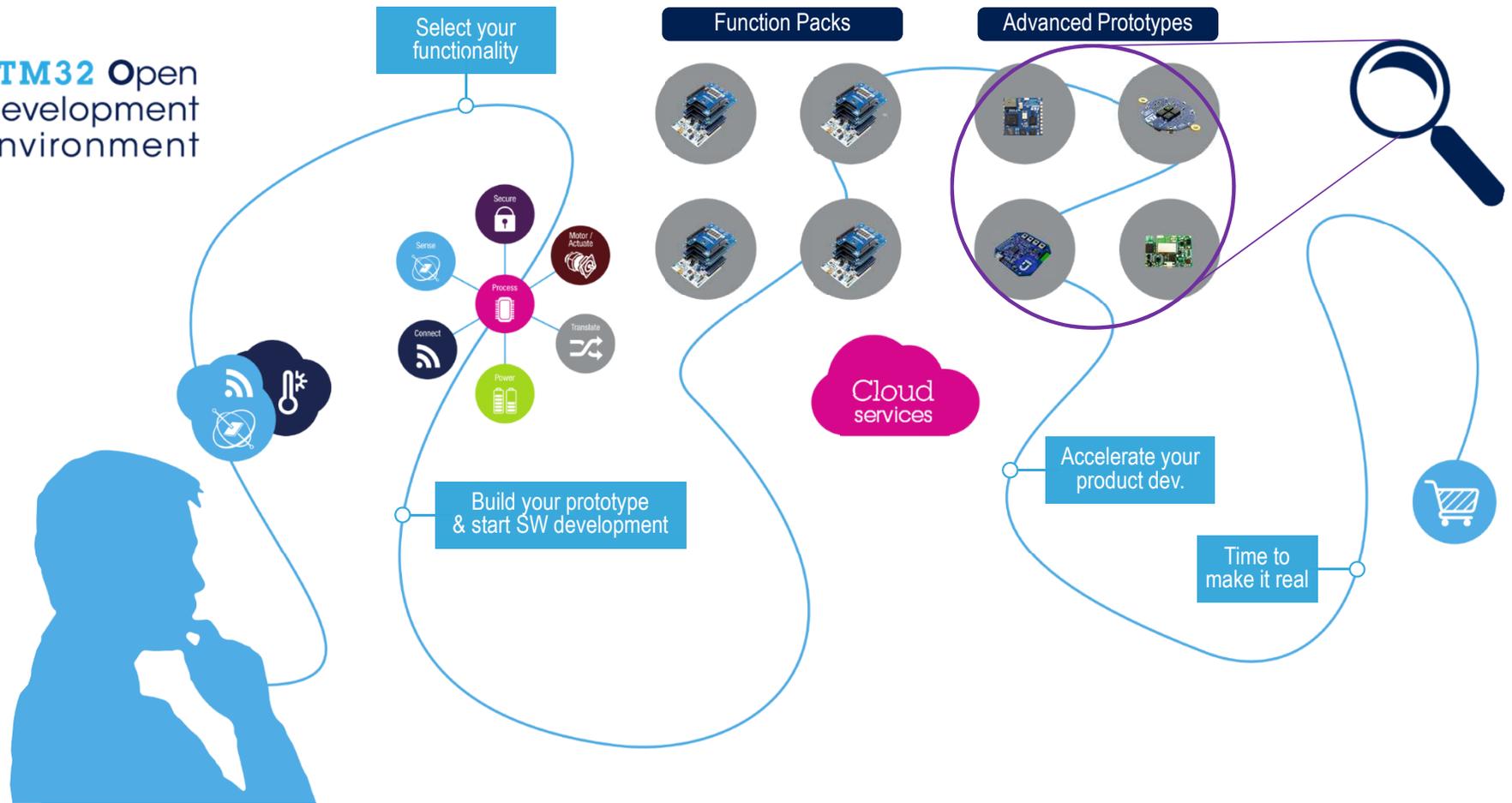
Domain	Function Packs
Local and cloud connectivity 	3 Function Packs - Wi-Fi connectivity - Microsoft, Amazon and IBM (Google to come in 2018) - NFC - Motion and environmental sensors
Sensing 	3 Function Packs - BLE connectivity - Motion and environmental sensors - ToF - Digital microphone
Safe and security 	2 Function Packs - Wi-Fi or BLE connectivity - NFC

Domain	Function Packs
Network infrastructure 	4 Function Packs - Wi-Fi and Sub-GHz connectivity - Motion and environmental sensors - ToF
Audio 	2 Function Packs - BLE connectivity - Digital microphone
Industrial 	1 Function Pack - Wi-Fi connectivity - Industrial digital input/output ICs



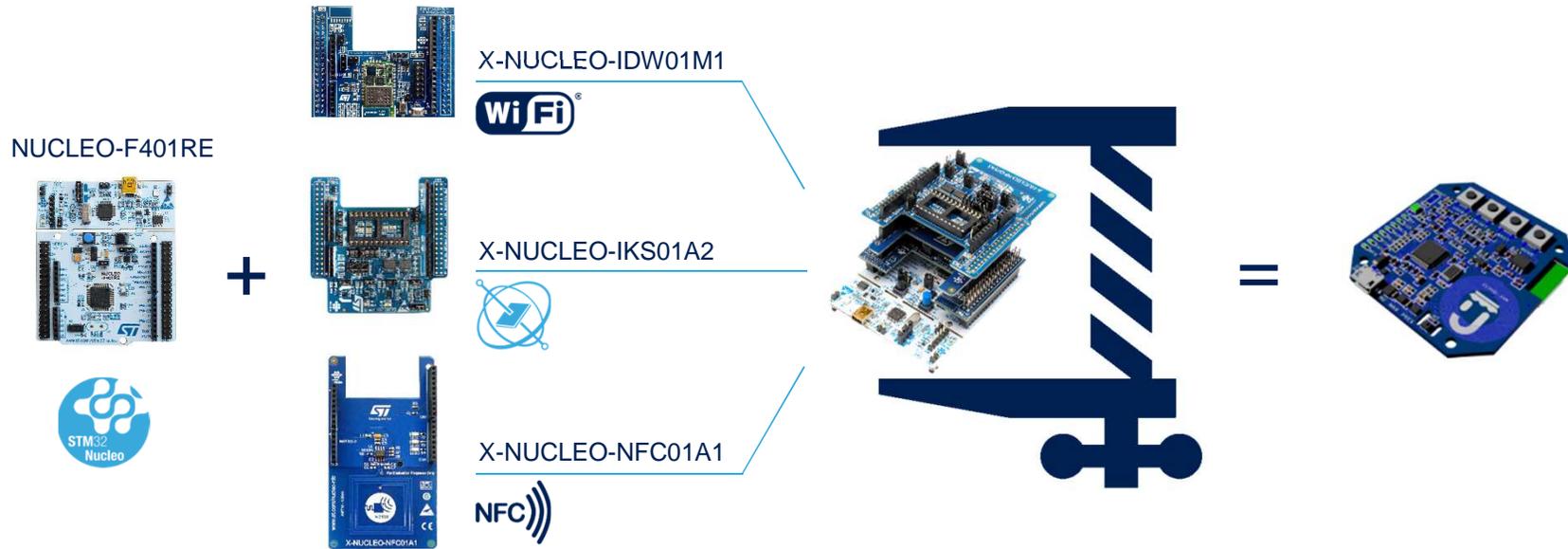
IoT Product Development

Make it Easy and Make it Fast



STM32 ODE Product Accelerators

A fast track from idea to production



Idea

Prototype



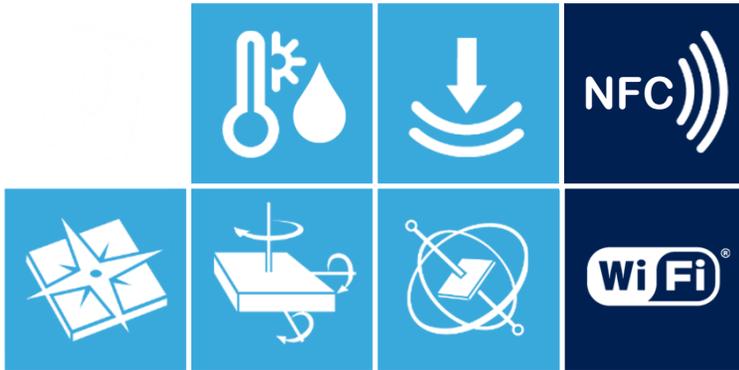
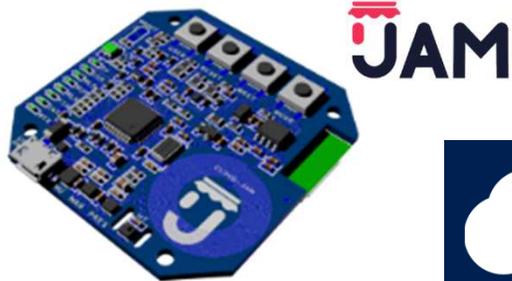
Engineering sample

Product

STM32 ODE Product Accelerators

Cloud - JAM

RUSHUP



+ Customization service



By

RushUp

www.rushup.tech/jam

What it is

Motion & environmental sensors board connected to the cloud through Wi-Fi network using SSID, password and web authentication stored in the dynamic NFC.

Nucleo boards

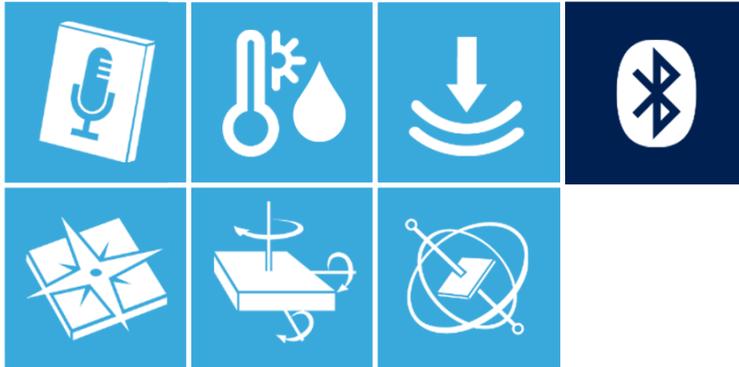
- NUCLEO-F401RE or
- NUCLEO-L476RG
- X-NUCLEO-IDW01M1
- X-NUCLEO-IKS01A2
- X-NUCLEO-NFC01A1

Available Function Packs

- FP-CLD-AZURE1
- FP-CLD-AWS1
- FP-CLD-WATSON1

STM32 ODE Product Accelerators

SensorTile



By

STMicroelectronics

www.st.com

What it is

Bluetooth Smart sensorized development kit for IoT design (motion, environmental, microphone).

Nucleo boards

NUCLEO-F476RG
X-NUCLEO-IDB05A1
X-NUCLEO-IKS01A2
X-NUCLEO-CCA02M1

Available Function Packs

FP-SNS-ALLMEMS1
FP-SNS-MOTENV1
FP-AUD-BVLINK1

STM32 ODE Product Accelerators

SensiBLE

SensiEDGE



			+ Data logger + Light color detection + Buzzer

+ Customization service

By

SensiEDGE

www.sensiedge.com

What it is

Complete platform delivering Sensor reading over Bluetooth Low Energy to smartphone and to the cloud.

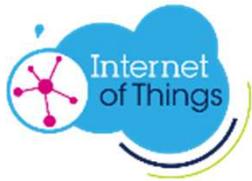
Nucleo boards

- NUCLEO-L476RG
- X-NUCLEO-IDB05A1
- X-NUCLEO-IKS01A1
- X-NUCLEO-CCA02M1

Available Function Packs

- FP-SNS-ALLMEMS1





ST Solutions for the IoT

INTEGRATION

Common SW Platform

3 Cloud Provider SDKs supported, enabling sensor-to-cloud 

131 SW packages from drivers to full application examples and Mobile Applications



Wearable



IoT Smart Things



Smart Home



Building automation



27 STM32 Nucleo development boards
Covering the broad portfolio of STM32 MCU families

36 STM32 Nucleo expansion boards (X-NUCLEO)
Offering peripheral functions



Modular Hardware

ST & 3rd party form-factor boards

Cloud JAM



SensiBLE



Bluecoin



Sensor Tile



IoT Discovery



Form factor boards



STM32 and ST Peripherals in other Ecosystems



STM32 ODE, mbed and Arduino

same HW boards leveraging 3 ecosystems

SW & programming tools

Ease of use / prototyping path

Industrialization path



<http://www.stm32duino.com/>

<https://developer.mbed.org/>

www.st.com/stm32cube

HW



STM32 Nucleo development boards

STM32 Nucleo expansion boards



Compatible integrated boards can be supported additionally (STEVAl, Discovery, 3rd party)



- Platforms **38** platforms (biggest offer)
 - 16 STM32Nucleo LQFP64
 - 6 STM32Nucleo LQFP32
 - 7 STM32Nucleo LQFP128
 - 9 Discovery Kits
- Components **24** expansion boards
 - 19 boards got the “mbed Enabled” validation
 - 15 expansion boards’ insert cards
- “SensorTile”
- IoT discovery
 - Sharing all libraries with X-Nucleo, except Wi-Fi
- Promotion
 - Videos published on Youtube
 - 2 demos presented at mbed connect (6LowPan and BLE connectivity)



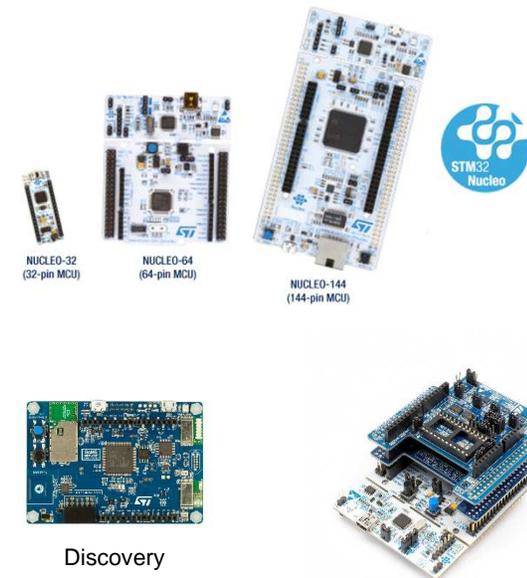
- ARM mbed (www.mbed.com) is a platform developed by ARM to support easy and quick development of applications on Cortex M-series based microcontrollers
- Two main categories:
 - Platforms → ST Nucleo boards
 - Components → ST Expansion boards
- Online compiler for easy-to-use development and fast prototyping

The screenshot shows the ARM mbed website and its online compiler interface. The top part displays the website header with navigation links like 'Hardware', 'Documentation', 'Code', 'Questions', 'Forum', and 'Compiler'. Below this, there's a search bar and a list of components, including 'X-NUCLEO-IDB05A1 Bluetooth Low Energy'. A 'Hello World' program is highlighted, showing its code and a 'Report program' button. The bottom part of the screenshot shows the 'mbed' online compiler workspace, which includes a menu bar with options like 'New', 'Import', 'Save', 'Compile', and 'Commit'. The main area displays a 'Program Workspace' with a list of programs: 'HelloWorld_IHM02A1' and 'Nucleo_blink_led'. A table below the list shows the details of these programs, including their names, tags, modification dates, and descriptions.

Name	Tags	Modified	Description
HelloWorld_IHM02A1		1 week, 1 day ago	
Nucleo_blink_led		4 weeks, 4 days ago	

Arduino VS STM32

- Most of STM32 boards are compliant with Arduino Eco-system.
- Many libraries/examples are available.





- Nucleo and Discovery boards supported
 - NUCLEO-L476RG, -F401RE, -F411RE, -L053R8, -L152RE, -F030R8, -F091RC, -F103RB, -F207ZG, -F303RE, -F429ZI, -L432KC
 - STM32VLDISCOVERY, STM32F407G-DISC1, STM32F746G-DISCOVERY, B-L072Z-LRWAN1 and B-L475E-IOT01A
- X-Nucleo boards supported
 - X-NUCLEO-IKS01A1 (+ LSM6DS3), X-NUCLEO-IKS01A2
 - X-NUCLEO-NFC01A1, X-NUCLEO-NFC04A1
 - X-NUCLEO-6180XA1, X-NUCLEO-53L0A1
 - X-NUCLEO-IDB05A1 (only Device Mode)
 - X-NUCLEO-LED61A1
 - X-NUCLEO-IKA01A1
 - X-NUCLEO-IHM02A1

Where you can find these libraries

<http://stm32duino.com/viewtopic.php?f=60&t=2902>

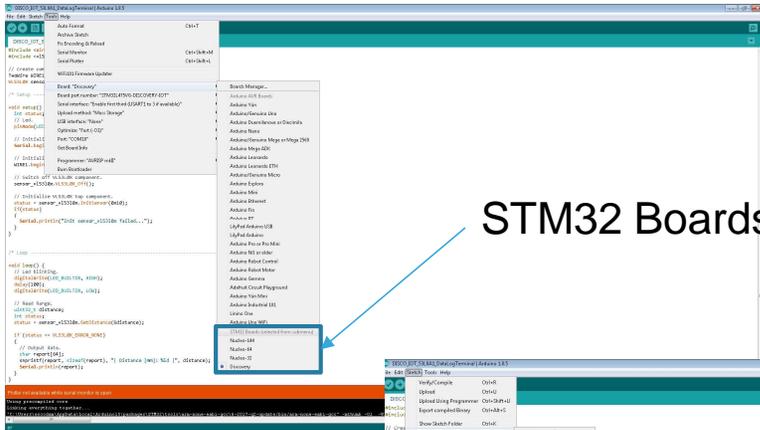
https://github.com/stm32duino/Arduino_Core_STM32



Arduino for STM32

Everything relating to using STM32 boards with the Arduino IDE

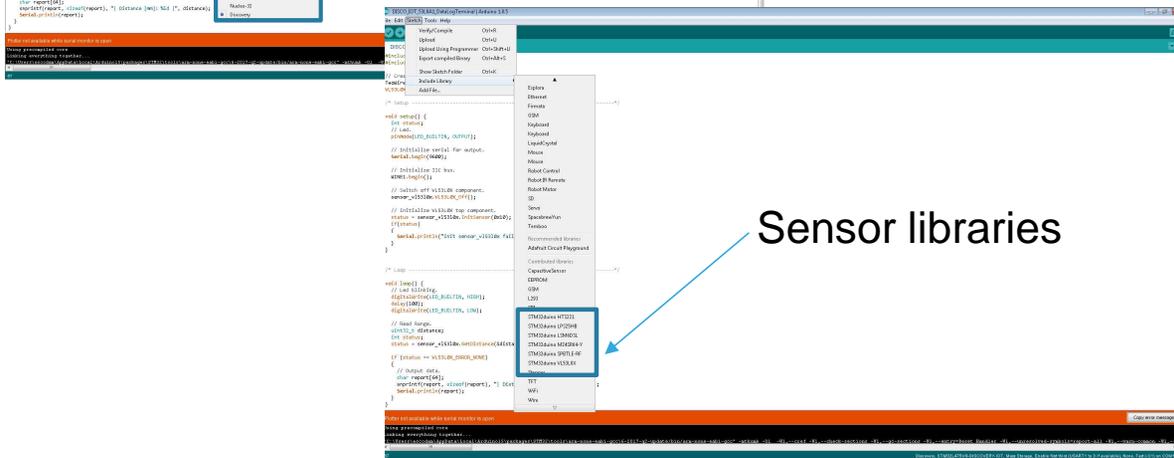
Arduino for STM32



STM32 Boards

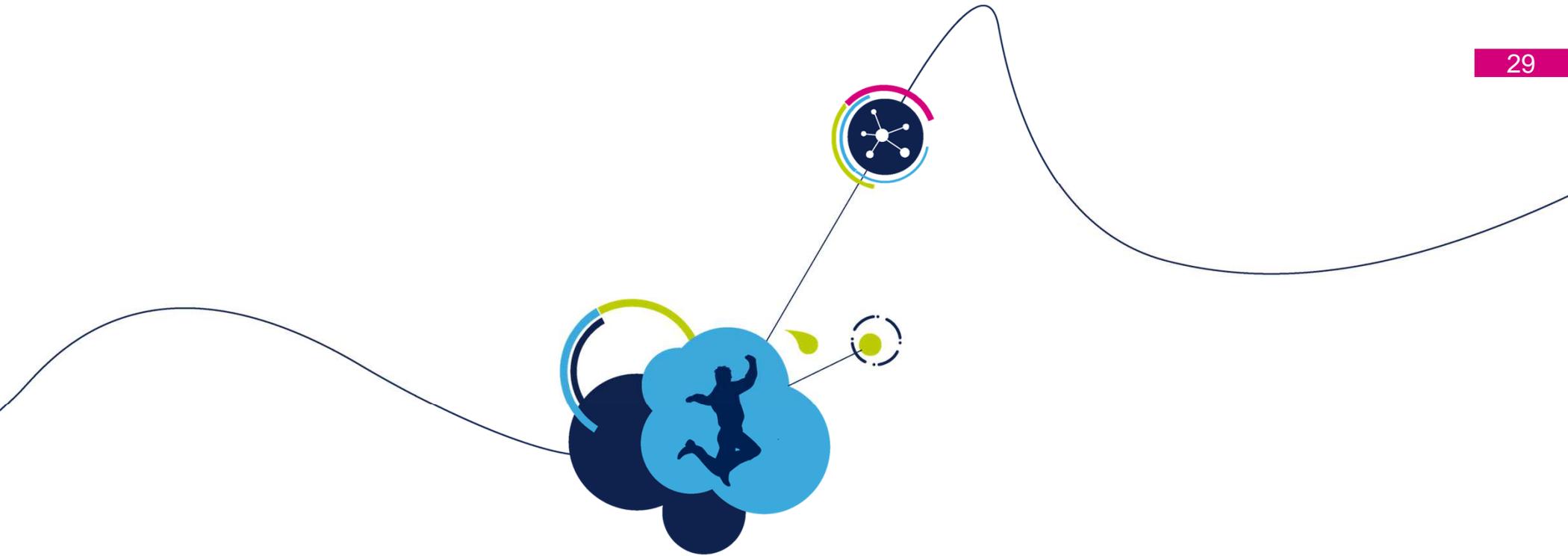


B-L475E-IOT01AX board ready for IoT



Sensor libraries

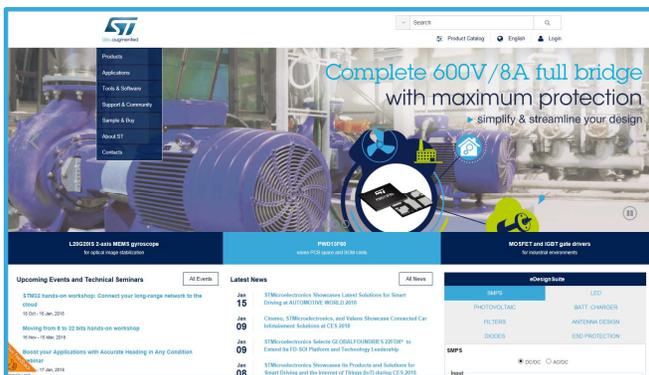




Stay connected with ST...

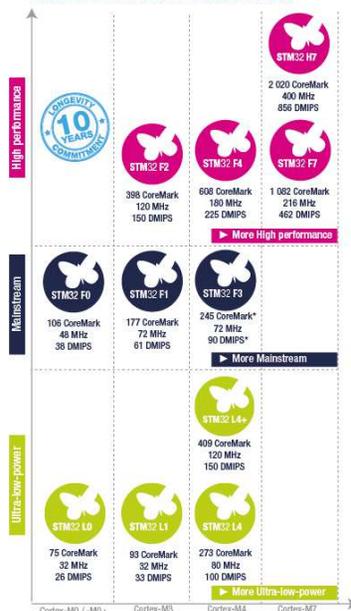


STM32 apps & social media



www.st.com

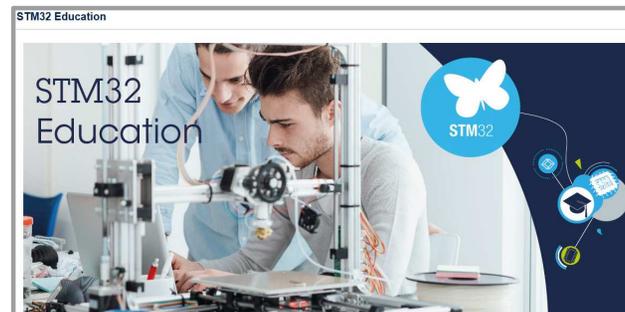
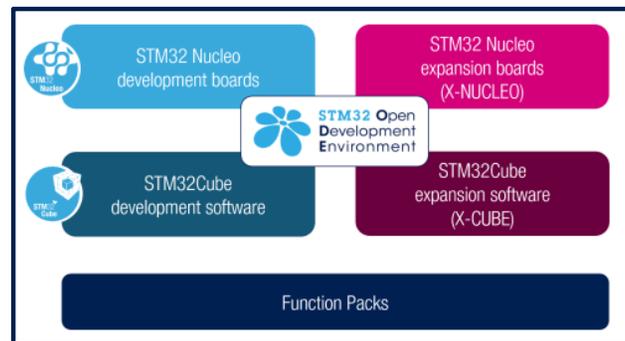
STM32 32-bit ARM Cortex MCUs



*from CCM-SRAM

STM32 Ecosystem

- Software tools**
 - STM32CubeMX Configuration and initialization tool
 - Integrated Development Environments (IDE)
 - STM Studio Monitoring tool
 - More software tools
- Embedded software**
 - STM32Cube embedded software
 - STM32Cube embedded software expansion
 - More embedded software
- Hardware tools**
 - STM32 Nucleo development boards, Discovery kits, Evaluation boards
 - STM32 Nucleo expansion boards
 - ST-LINK In-circuit debugger/programmer
- Join the STM32 Community! community.st.com/stm32



<https://community.st.com>



facebook.com/stm32



youtube.com/STonlineMedia

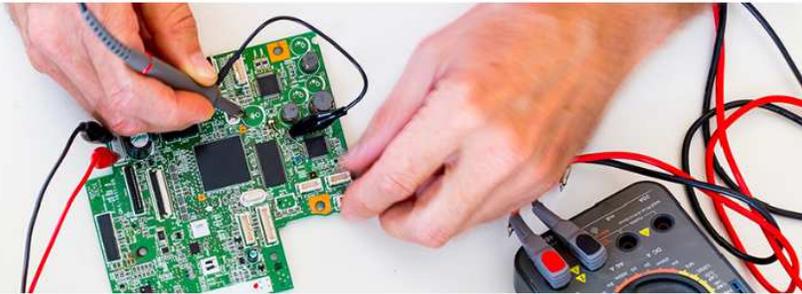


twitter.com/@ST_World



Welcome to the ST Community

NEW HERE? GET STARTED



Help the Community

Answer community members questions, write helpful content, vote on polls

Share your Activities

Share your projects, your events, your videos on ST products

Contribute your Knowledge

Write tutorials, tips & tricks, and courses

Need Help?

search by product name or topic



STM32 MCUS COMMUNITY



AUTOMOTIVE MCUS COMMUNITY



MEMS & SENSORS COMMUNITY

UNANSWERED QUESTIONS

- Energy Harvesting - SPV1050**
1 minute ago in Power Management and Motor Control
- BUTTON MODE EXTI**
8 minutes ago in STM32 MCUs Forum
- HAL timer and ISR priority**

by lohmann.andrew.001

by Leo Leo

NEWEST MEMBERS

- Ivan Zilic**
Joined Dec 8, 2016
- Sang Min Kim**
Joined Dec 8, 2016
- Tuan Kozlov**

Thank you!

