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## **STM32MP2 Series**

**The second-generation of microprocessors  
enabling secure, advanced edge AI in Industry 4.0**



# STM32MP2 microprocessor series



**Robustness for complex  
industrial applications**



**Rich interfaces supporting  
the growth of connected applications**



**64-bit MPU with advanced  
compute capabilities**



**Strong security**

# Designed for highly connected applications



## Industrial & factory automation



- Gateways
- PLCs
- HMIs
- Metering
- Bar code reader

- Anomaly detection
- Pose estimation
- People / object detection
- Face recognition
- Character recognition

## Smart homes



- Gateways
- HMIs
- Whitegoods
- Door bell

- People / object detection
- Face recognition
- Voice recognition

- Secure boot
- Firmware & data encryption
- Context isolation

## Smart city and infrastructure



- Power grid
- EV charging
- Metering
- HMIs

- Traffic management
- Energy management
- Vehicle / pedestrian recognition & tracking
- People & object detection



# Robustness for complex industrial applications



## Industrial qualification combining both:

- 100% operation time for 10 years
- Junction temperature: - 40°C to 125°C

## 10-year longevity commitment renewed every year

## Flexible resource allocation between cores

- Dual or Single Arm® Cortex®-A35 up to 1.5 GHz
- Arm® Cortex®-M33 up to 400 MHz

## Advanced security for Industry 4.0







# 64-bit MPU with advanced Edge AI capabilities

## Edge AI accelerators



- NPU accelerator: **up to 1.35 TOPS**
- Flexible ecosystem to run AI on CPU, GPU, or NPU

## Multimedia capabilities for high-end use cases



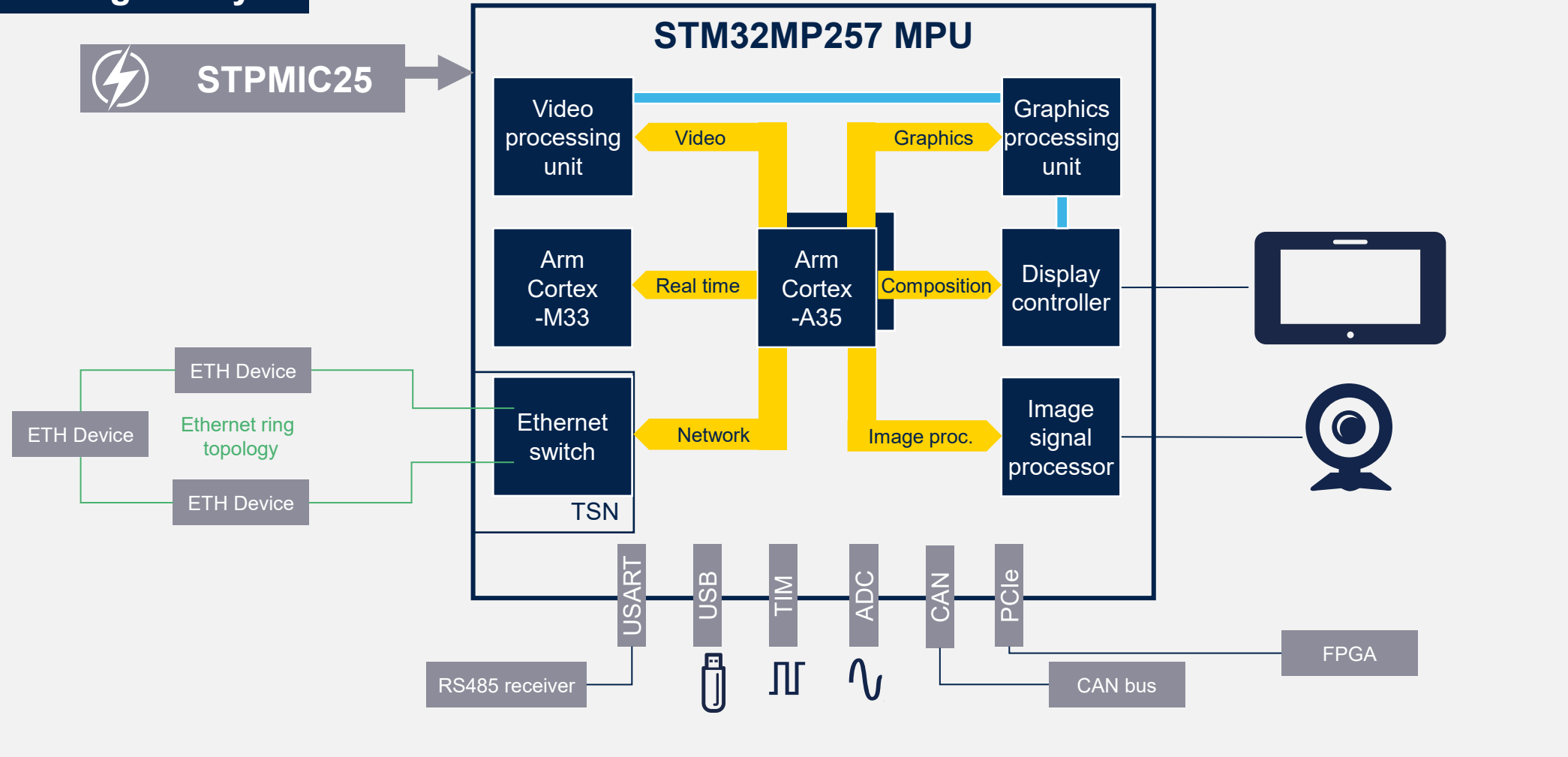
- 3D GPU supports up to 1080p resolution
- Full HD video pipe with RGB, LVDS & DSI outputs
- MIPI CSI-2 camera interface with ISP





# Rich interfaces offloading the CPU for connected applications

## Industrial HMI gateway





# Enhanced security



SESIP3\*  
PSA certified Level 1\*



TrustZone® on Cortex®-A & Cortex®-M: secure boot, secure firmware updates and cryptographic operations

Secure provisioning ecosystem

Edge confidential computing thanks to resource isolation

*\*target certifications*



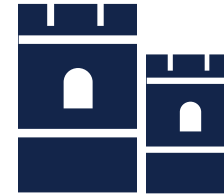
# STM32MP25 security overview



**Memory & peripheral protections**  
against illegal access control



**Secure cryptographic accelerator** for robustness against physical attacks



**Device authentication & attestation**  
during product life cycle



**Code isolation**  
for runtime protection



**Security assurance level 1**

**Software robustness**



**Security ecosystem**

Trusted execution with OP-TEE

In-factory secure secret provisioning (SSP)

STM32Cube framework for MPU  
(Signing & key generation)

and more!





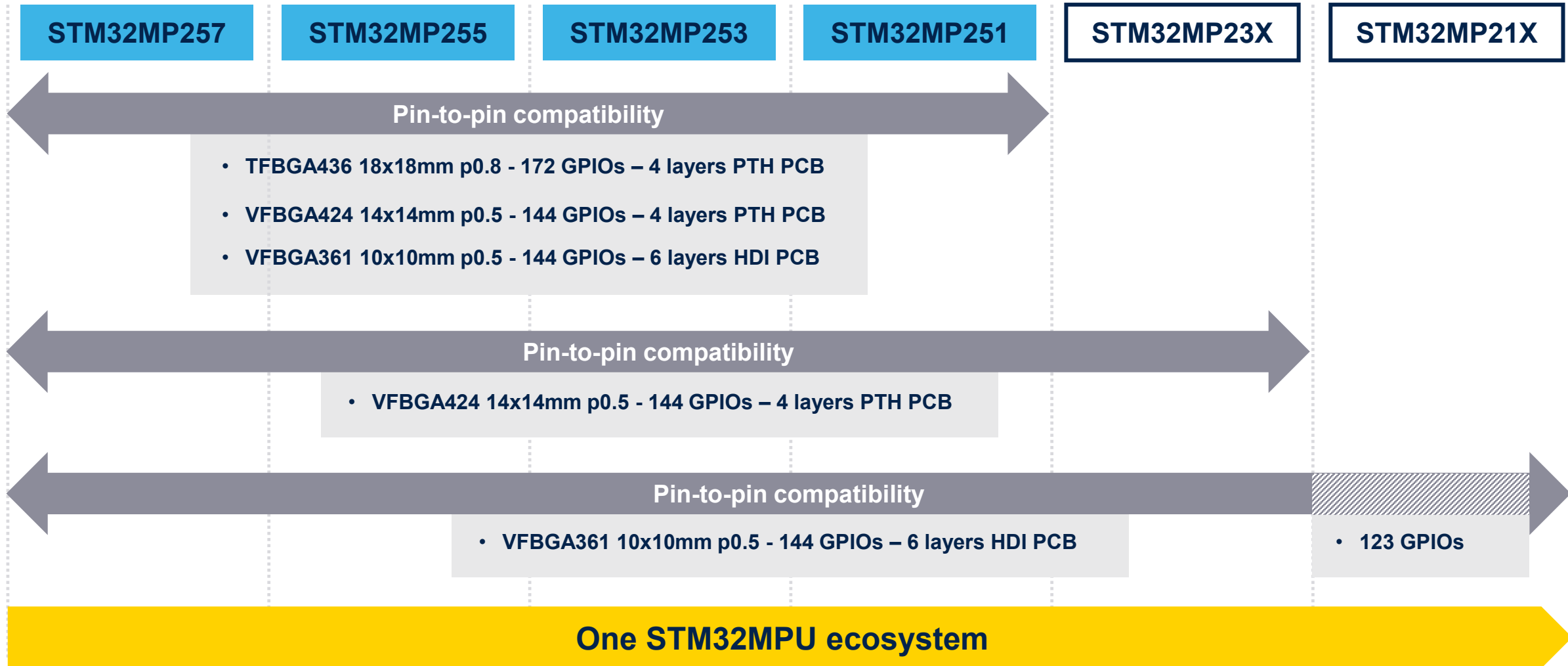
# STM32MP2 MPU series for 64-bit applications



Security options  
available for all  
STM32MP2 MPUs

Product lines	Cortex-A35	CPU	Cortex-M33	Co-processor	AI NPU	GPU LVDS/DSI	FD-CAN	Ethernet	Video Hardware accelerator	PCIe Gen2 / USB3
STM32MP257	2	Up to 1.5GHz	1	400 MHz	•	•	3	3	H.264	•
STM32MP255	2	Up to 1.5GHz	1	400 MHz	•	•	3	2	H.264	•
STM32MP253	2	Up to 1.5GHz	1	400 MHz			3	2		•
STM32MP251	1	Up to 1.5GHz	1	400 MHz				1		•
STM32MP23x	2	Up to 1.5GHz	1	400 MHz	•	•	2	2	H.264 dec	
STM32MP21x	1	Up to 1.5GHz	1	300 MHz			2	2		

# A scalable offering



# STPMIC25 power management IC for STM32MP2 MPU series

**Simplify your design and optimize power consumption**



DC/DCs & LDOs for

- STM32MP2
- Memories
- External devices



[STPMIC25](#)

Optimized power consumption

BOM savings for typical applications

Small PCB footprint vs. full discrete solution

# STM32MP257 Block Diagram



Processing

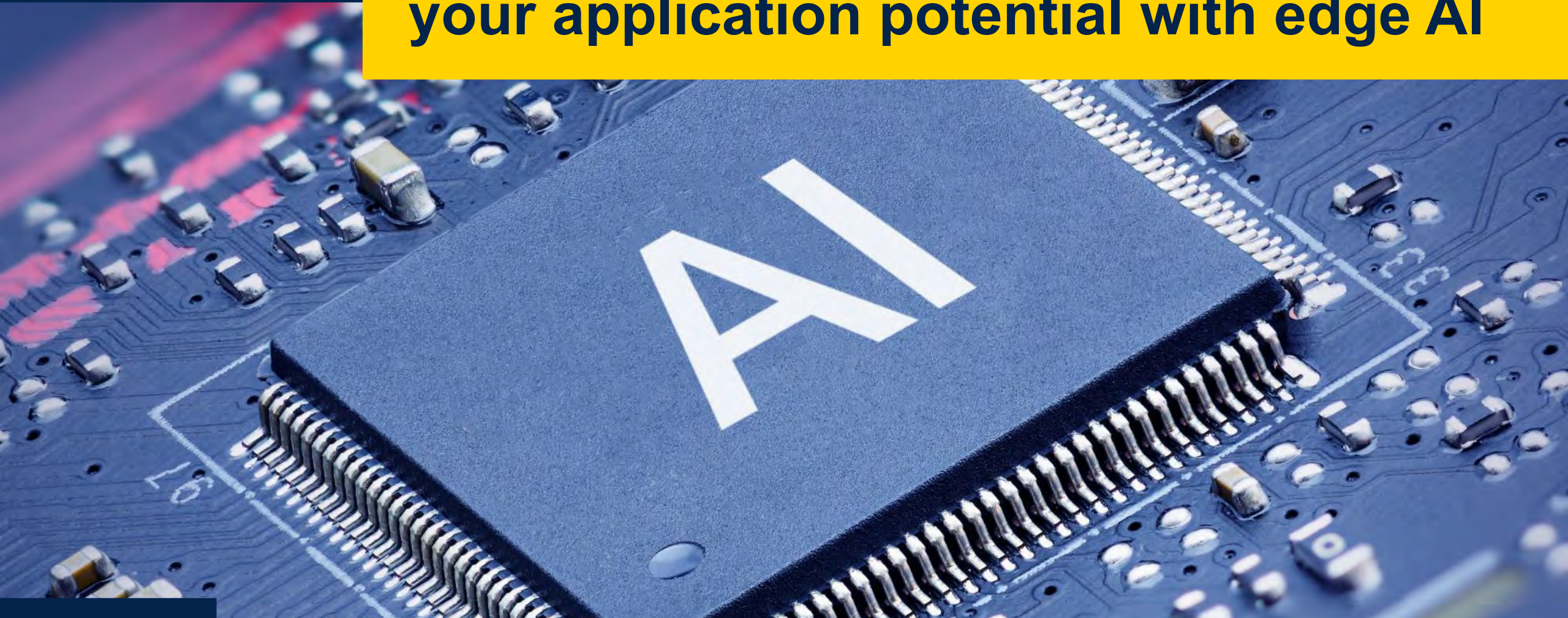
Enhanced security

Edge AI and multimedia

Connectivity



**Neural processing unit (NPU) to unlock  
your application potential with edge AI**



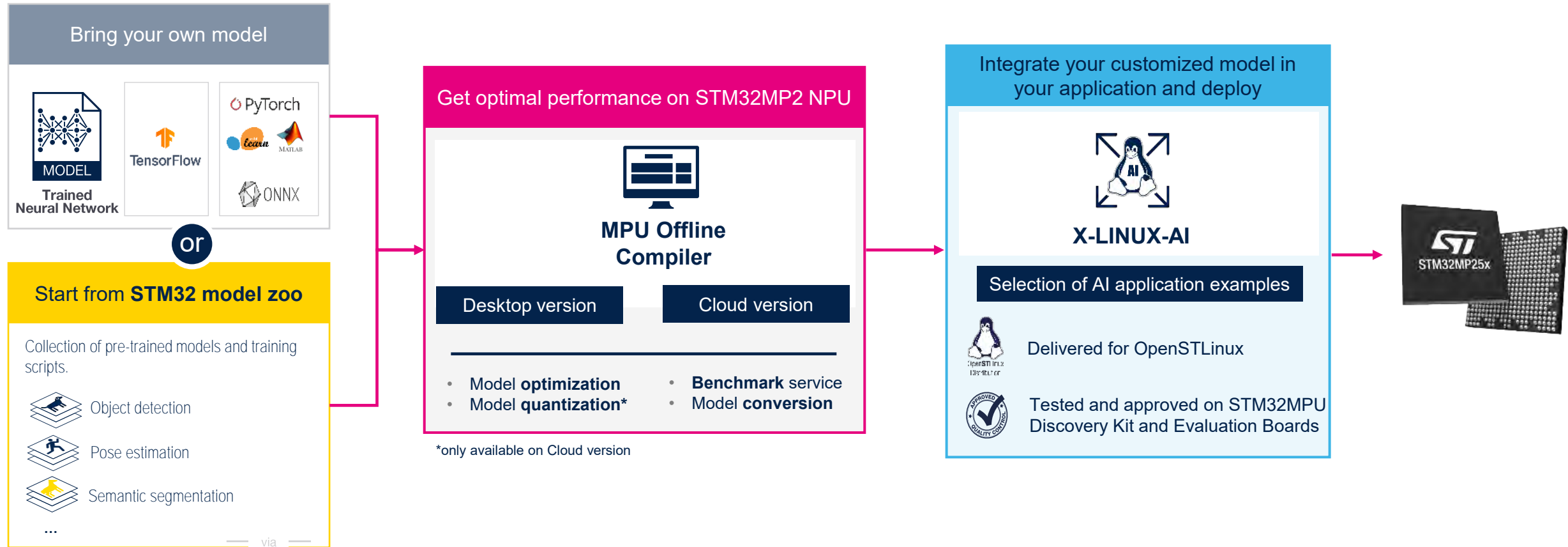
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# Seamlessly integrate AI in your STM32MP2 projects

## 1. Train

## 2. Benchmark and optimize

## 3. Create your apps and deploy



# STM32 model zoo

**A collection of application-oriented models optimized for STM32**

## Pose estimation



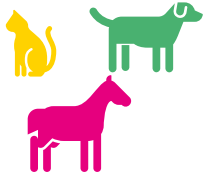
Human pose estimation

## Image classification



Computer vision

## Semantic segmentation



Computer vision

## Object detection



Computer vision



**Hosted on Github**



## Model training scripts

- Scripts to train models with your own dataset
- Generate and validate your model



# MPU offline compiler

## MPU Offline compiler



### Desktop version

- ✓ Model **optimization**
- ✓ **Benchmark** on local MP2 board
- ✓ Model **conversion**



STM32 Model Zoo



### Cloud version

- ✓ Model **optimization**
- ✓ Model **quantization**
- ✓ **Benchmark** on remote board farm
- ✓ Model **conversion**

### Supported AI models



### Supported AI formats

- INT8 Quantized per tensor (NPU)
- INT8 Quantized per channel (GPU)
- Dynamic Fixed Point 16b (GPU)

### AI execution engines

- NPU (preferred)
- GPU
- CPU



# X-LINUX-AI



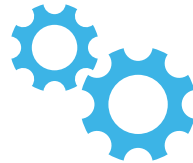
## All-in-one solution

All needed packages to bring AI to the edge



## AI frameworks and Apps

- AI frameworks to execute Neural Network models
- Selection of AI application examples
- AI model benchmark application tools for STM32 MPU



## Tooling framework

- Python3, Gstreamer, OpenCV to quickly develop applications



## STM32 MPU agnostic

Compatible with all STM32 MPU series



## OpenSTLinux Distribution

Delivered for OpenSTLinux



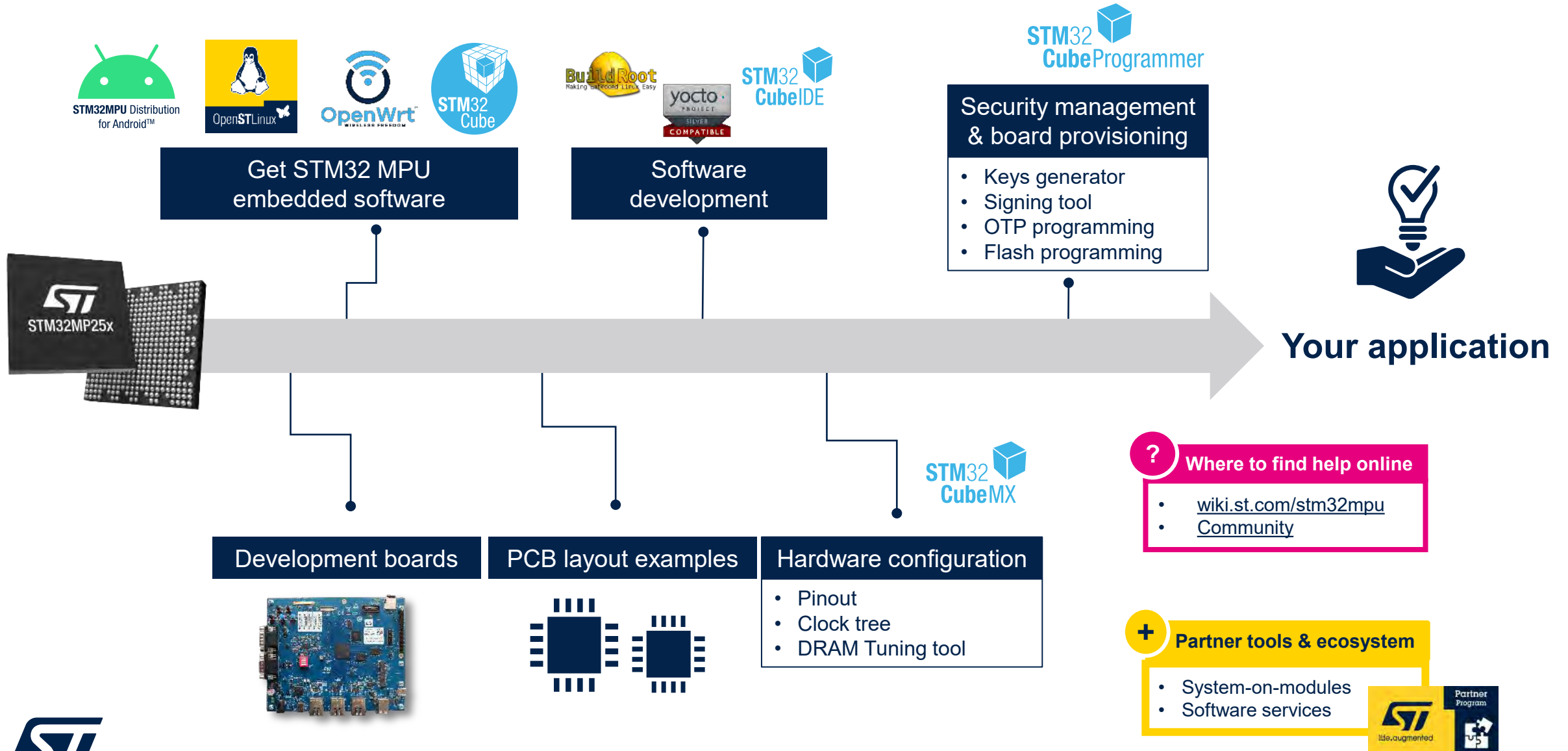
Tested and approved on STM32MPU discovery kit and evaluation boards



**Reduce development time & cost with  
our STM32 ecosystem**



# Accelerate your time to market





# Development tools for the STM32MP2 series

Speed-up evaluation, prototyping, and design



Evaluation board  
STM32MP257F-EV1

Available April 2024



EDT LCD Panel  
Display

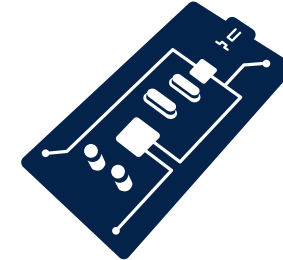


Camera module  
adapter board  
B-CAMS-IMX



DSI to HDMI  
adapter board

Available Q3 2024



Discovery kit  
STM32MP257-DK

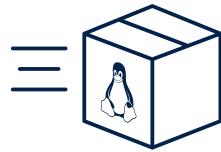


More STM32-based dev  
tools available with our  
partners



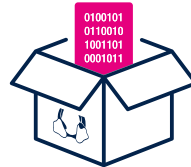
# STM32 MPU embedded software

Same Linux software for STM32MP2 series for easy project migration



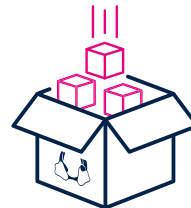
## STM32MP2 Starter package\*

To quickly and easily start with any STM32MP2 microprocessor device



## STM32MP2 Developer package\*

To add your own code on top of the STM32MP2 Embedded Software distribution

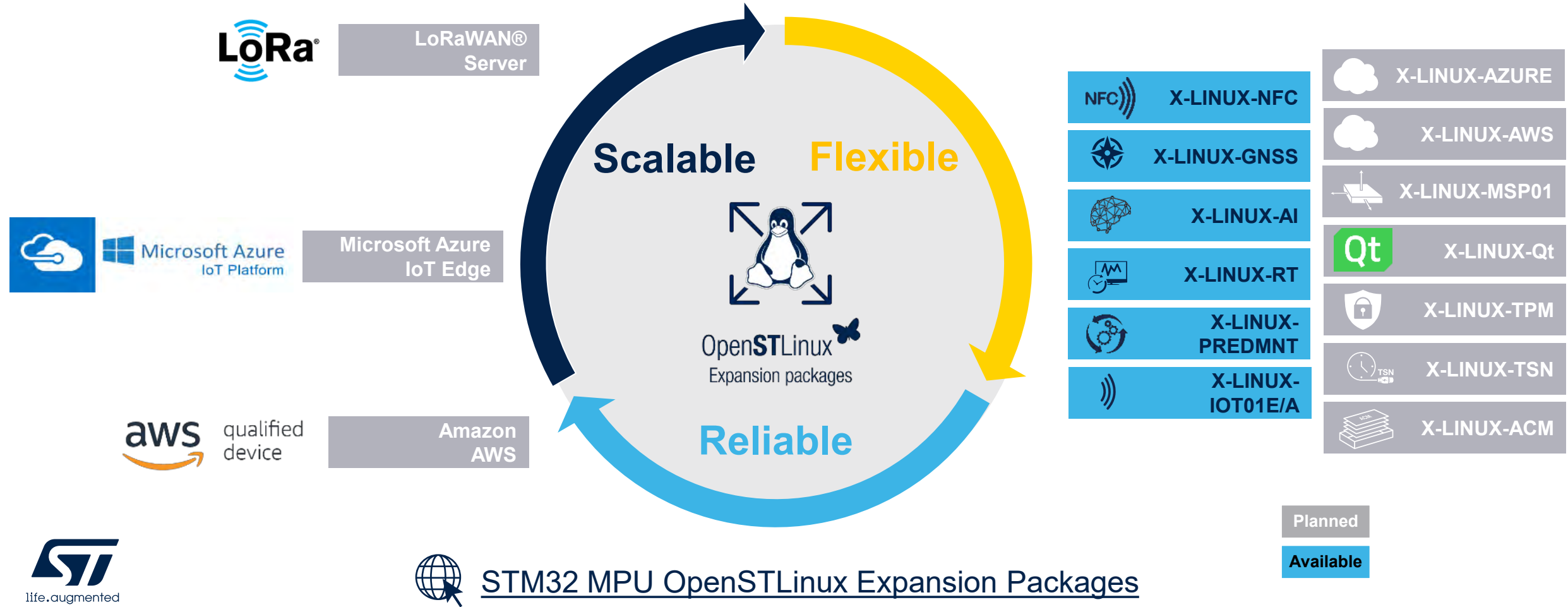


## STM32MP2 Distribution package\*

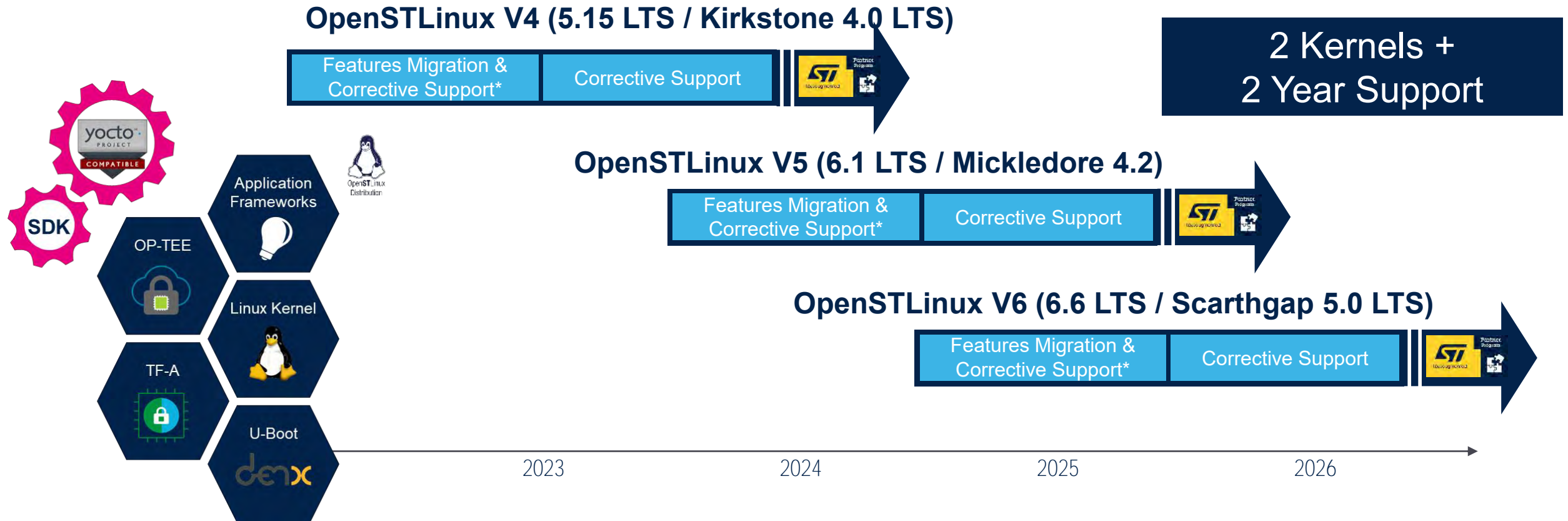
To create your own Linux<sup>®</sup> distribution as well as your own Starter and Developer packages

# STM32 MPU embedded software

Accelerate your time to market using expansion packages



# OpenSTLinux long-term Support Releases and support scheme



Software Partners proposed by STMicroelectronics

- (\*) Feature migration: new features on current Kernel
- (\*) Corrective support: issues reported during this time




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# Software development tools

STM32Cube provides the same tools across the STM32MP2 series for greater ease of use

STM32   
CubeMX

STM32   
CubeIDE

STM32   
CubeProgrammer

## STM32CubeMX

### STM32CubeMX enhanced for MPU

- Device Tree configuration
- Device Tree generation
- DRAM interface tuning tool

## IDEs Compile and Debug

### Multicore solutions

- Free STM32CubeIDE
- OpenSTLinux Developer package support
- Import DRAM tuning project

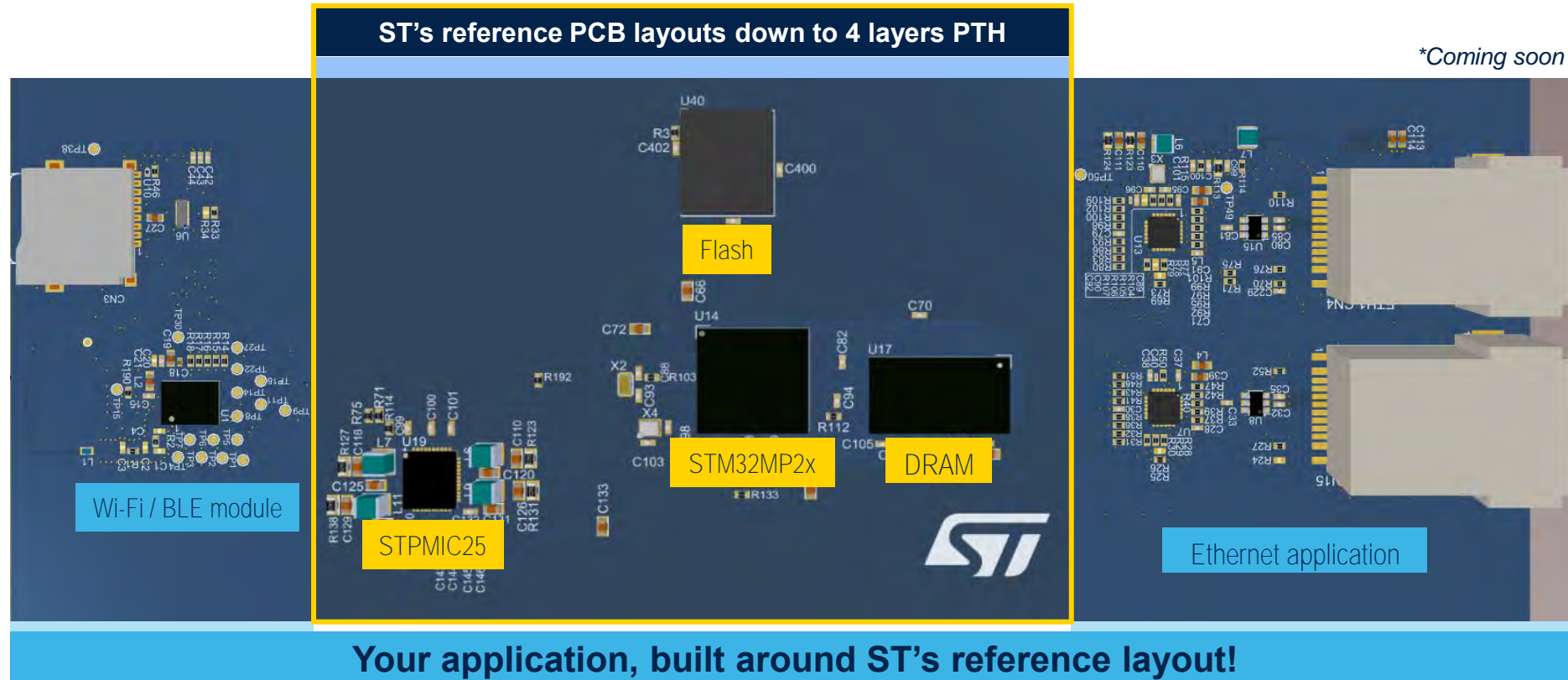
## STM32 programming tool

### STM32CubeProgrammer

- Flash, DRAM and/or system memory
- OTP programming
- Signing & key generation tools



# Plug & play solution for STM32MP2 series for project reuse



PCB layout examples\*  
based on Altium projects  
provide you with a modular  
approach to build your  
designs

- All different BGAs packages, STPMIC25, Flash and different DRAM types (DDR3L, DDR4 & LPDDR4)
- Signal integrity and power integrity checks completed
- Developers can reuse the layouts and add their own interfaces linked to their end projects

# Advanced HMI with stunning graphics

Multiples libraries to run on STM32MP2



GTK



Android™



# Enhance your added value by relying on ST and Authorized Partner solutions

A growing base of ST Authorized Partners

ST continues to invest in the most recognized open-source standards

From idea to final product, our partners help you build end-to-end solutions

Solutions for edge computing & IoT  
from sensors to the cloud

Discover our partners products  
and services





# Our technology starts with You



Find out more at [www.st.com/STM32MP2](http://www.st.com/STM32MP2)

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