Webinar

MSP430 to MSPM0 MCUs:
All you need to know before you migrate

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Agenda

- Introduction
- Welcome, history, and background
- MSPM0 vs MSP430 - overview and key differences
- Streamlining migration with IAR
- Demo: Parallel development & migration
- Q&A

MSP products

MSP MCUs

Precision analog | Ultra-low power | Easy to use

MSP430™

16-bit

Up to 25MHz

- Broad portfolio of 2000+ orderable devices optimized for ultra-low power applications
- Integrated capacitive sensing, ultrasonic sensing, sim-sam ΣΔ ADC's, DACs, op-amps, and LCD
- Available non-volatile FRAM memory technology with near-unlimited write endurance

MSPM0

32-bit

Up to 80MHz

- Perfect blend of cost and performance for simple 8-pin up to complex RTOS-based applications
- Pin-to-pin and software compatible across 3 performance levels and 15+ packages
- Innovation in precision analog, low energy compute, small packaging, and low cost

1992: First MSP430 device released

2023: MSPM0 MCU launch at Embedded World

MSPM0 MCUs | Scalable portfolio

M0G *Best compute*

- 80MHz CPU
- CAN-FD options
- Fast 4Msps sim-sam ADCs
- Math accelerator

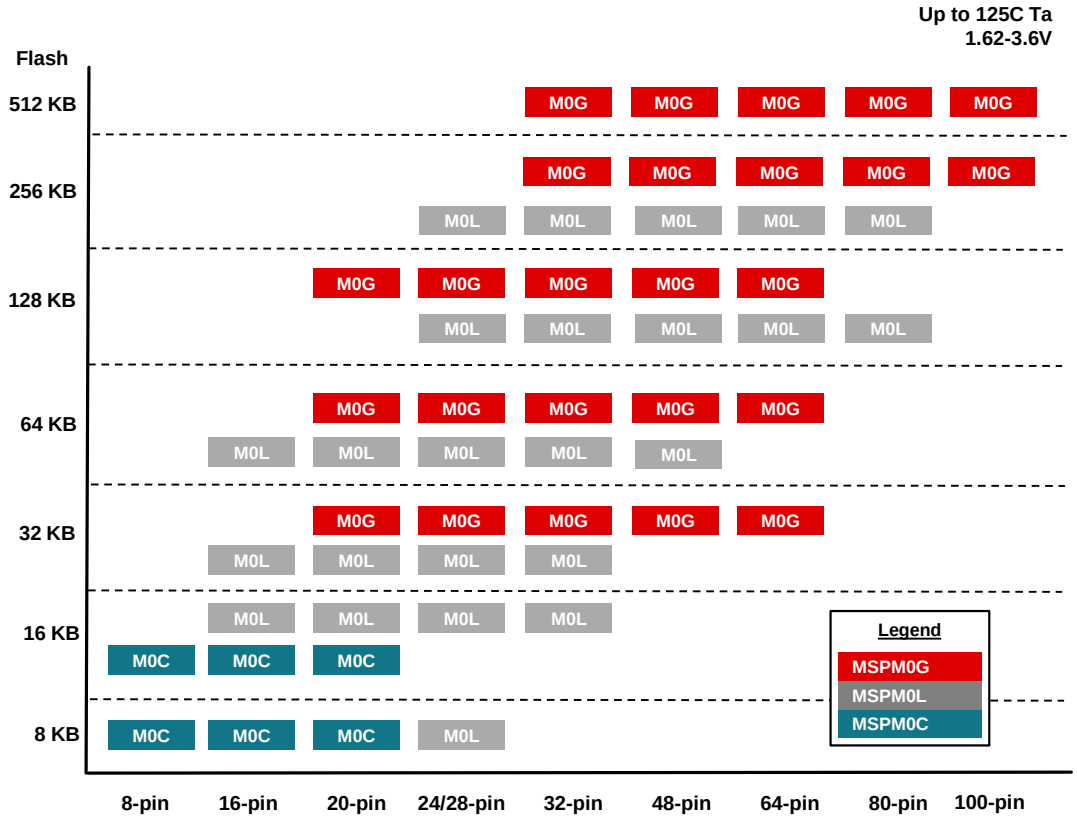
M0L *Lowest power*

- 32MHz CPU
- 71µA/MHz (CoreMark run)
- 6µA-max standby at 85 °C
- 1µA-typ standby at 25 °C

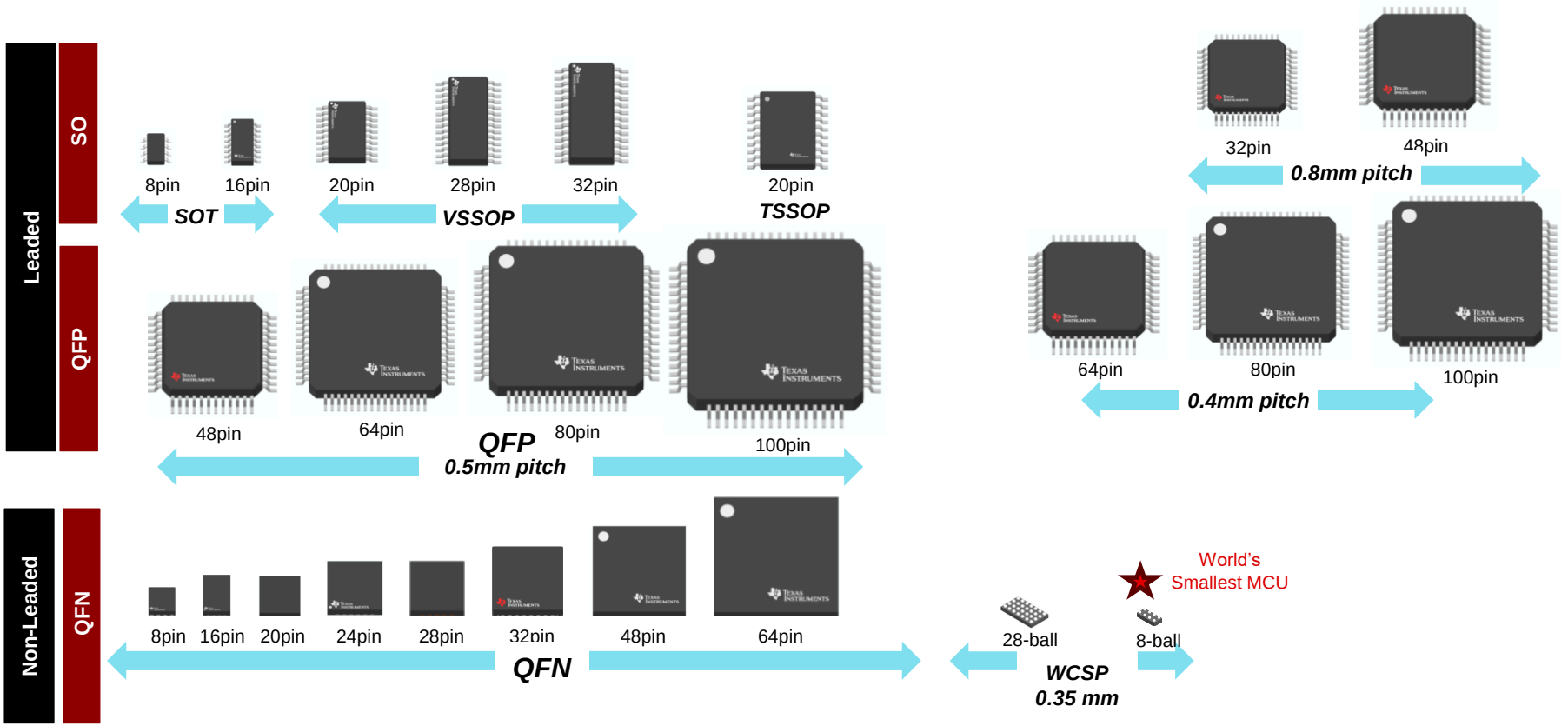
M0C *Lowest cost*

- 24/32MHz CPU
- Smallest package (1.38mm^2)
- 0.5/0.65mm pitch packages
- Pin-compatible with industry

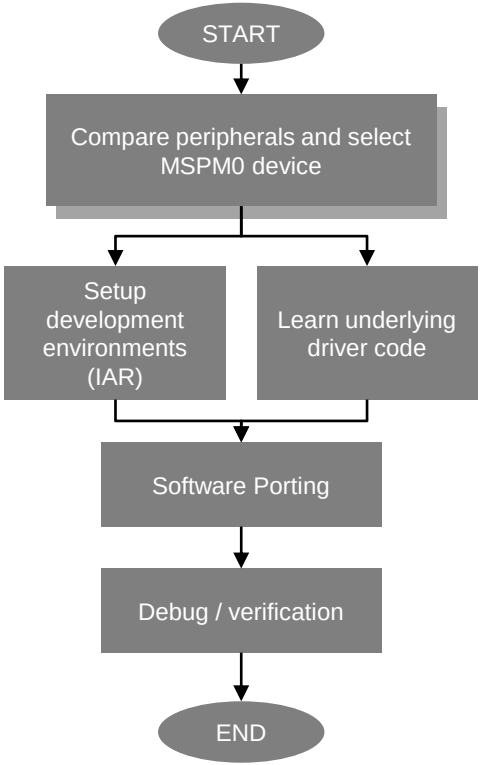
Unified software development kit & tools
Pin-to-pin compatible in 15+ packages



Ultra-small and diverse packaging portfolio

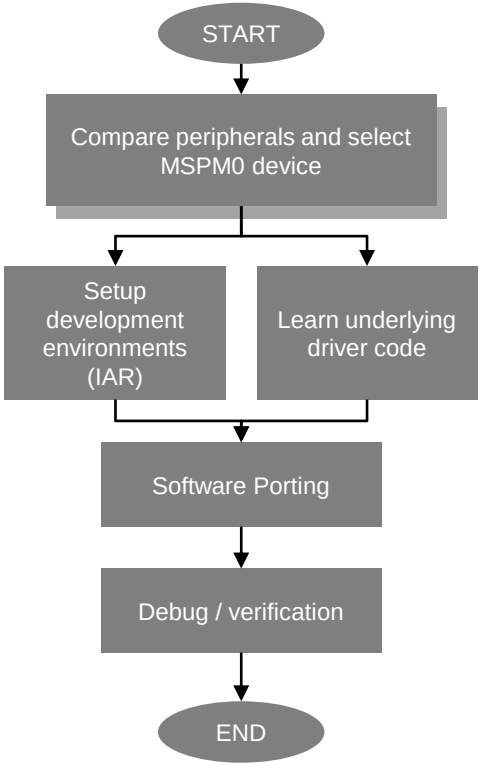


Migration considerations

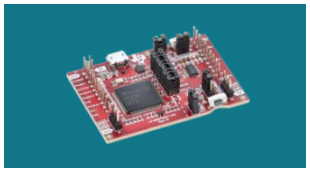


	Peripheral Comparison			
	MSP430	**MSPM0C**	**MSPM0L**	**MSPM0G**
Core	16-bit TI proprietary	32-bit ARM M0+	32-bit ARM M0+	32-bit ARM M0+
CPU	≤ 25 MHz	24 MHz	32 MHz	80 MHz
ADC (SAR)	8,10, or 12-bit	12-bit 1.7-Msps	12-bit 1.7-Msps	12-bit 4-Msps
ADC (SD)	16 / 24-bit SD	-	-	-
COMP	Supported	-	Window compare	Window compare
DAC	8/12-bit DAC	-	8-bit DAC	12-bit DAC
UART	IrDA	LIN, IrDA, ISO7816, RS485	LIN, IrDA, ISO7816, RS485	LIN, IrDA, ISO7816, RS485
SPI	≤ 8 MHz	≤	≤ 16 MHz	≤ 32 MHz
I2C	100 kHz	Fm+ 1MHz	Fm+ 1MHz	Fm+ 1MHz
CRC	CRC16-CCITT	CRC16-CCITT	CRC16-CCITT, CRC32-ISO3309	CRC16-CCITT, CRC32-ISO3309
Timer	General, PWM, capture / compare, RTC	General, PWM, capture / compare	General, PWM, capture / compare	General, PWM, capture / compare, RTC
Special features	LCD, USS, Cap-touch, USB	-	LCD	-

Migration considerations



HW Evaluation Boards



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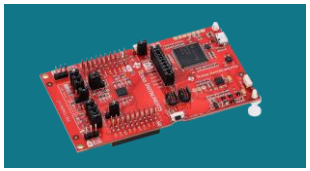

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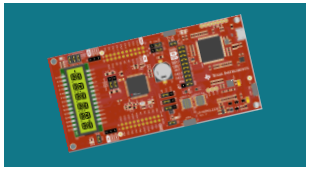

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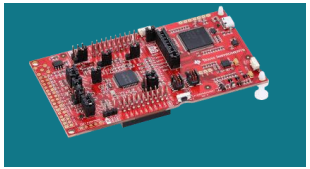

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Development Environment

TI Code Composer Studio
Build, debug, analyze, and optimize

IAR Embedded Workbench
Development toolchain
Compiler, debugger, & analysis tools

Programming & Debugging

TI XDS110
Debugger

Elprotronic C-Gang
Programmer

Segger J-LINK
Debugger / tracer

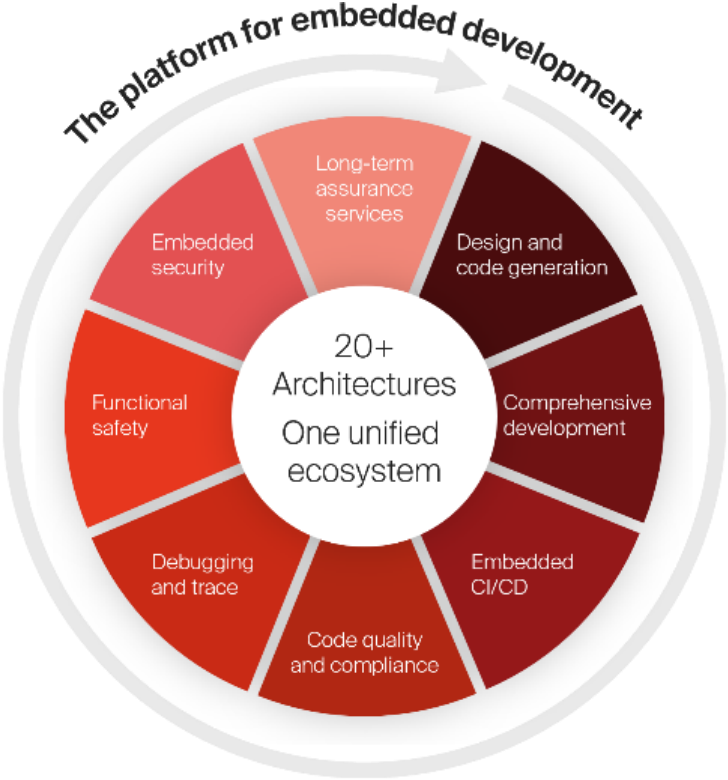
Streamlining migration with IAR

What embedded teams need for migration

- A unified, architecture-agnostic development environment
- One toolchain to work across MSP430 and MSPM0
- Pre-certified tools ready for cloud-based builds and CI/CD
- Flexibility to migrate at their own pace, without halting progress

The platform for embedded development from IAR

- IAR’s platform is built on a transformative palette of solutions, enabling:
  - End-to-end development: From design and code generation to debugging, trace, and compliance.
  - Built-in safety & security: For mission-critical applications.
  - Scalable automation: CI/CD workflows and code quality tools.
  - Optimized embedded products: Ensuring high quality and reliability.
  - One SaaS subscription gives you full access to all IAR solutions (MSPM0(Arm), MSP430,...).



Workflow: From code-creation to the assembly line

Design + Verify + Generate code

Intuitive graphical modeling
Simplify design with **IAR Visual State** for state machine-based modeling and verification.

Verification & code generation
Automate and ensure code correctness with IAR Embedded Workbench for optimized code generation.

Code + Test + Build + Debug

Superior code quality & reduced defect costs
Optimize and debug your applications efficiently using **IAR Embedded Workbench**.

Rapid debugging & extensive device support
Debug seamlessly with **I-jet** Debug Probe and utilize tools for Arm ecosystem compatibility.

Certified functional safety
Leverage **IAR Embedded Workbench for Functional Safety** to meet safety-critical requirements.

CI/CD Build + Test

Automated workflows and DevOps practices
Integrate with CI/CD pipelines using **IAR Build Tools** for automated building and **IAR C-STAT&C-RUN** for testing.

Cost control & optimized Development
Ensure optimized code and resource efficiency with IAR tools supporting build automation tools.

Certified functional safety always included
Automate safety compliance through the Functional Safety edition of IAR CLI tools.

Secure Code + Release

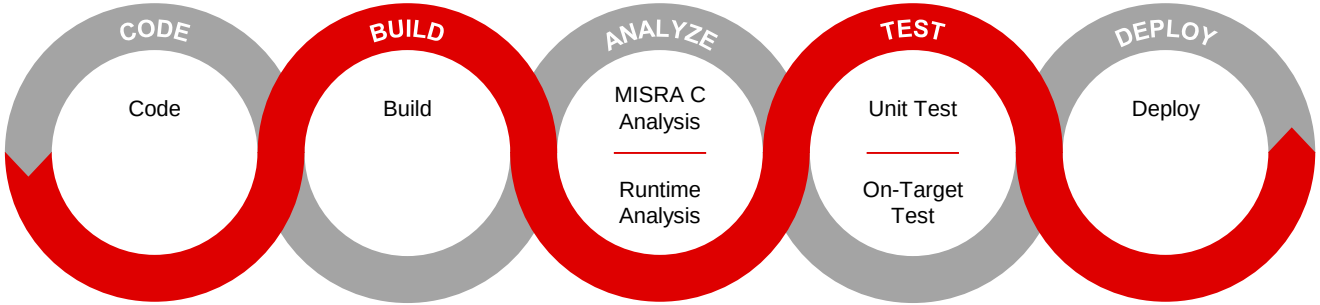
Legislation compliance
Ensure compliance with global standards and regulations, addressing both regional and industry-specific requirements.

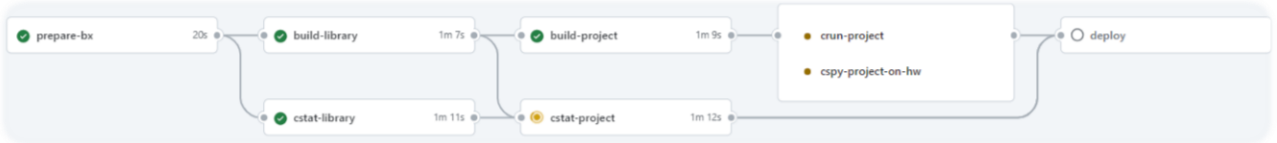
Simulation capabilities
Validate behavior with simulation capabilities integrated into **IAR Embedded Workbench before deployment.**

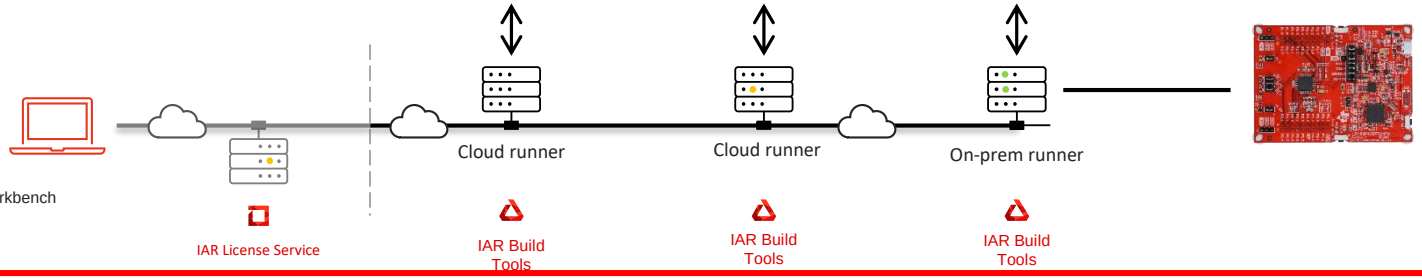
Production

End-to-end embedded security
Extend security measures throughout the production process to protect devices from vulnerabilities and unauthorized modifications.

Agile embedded CI/CD workflows for MSPM0





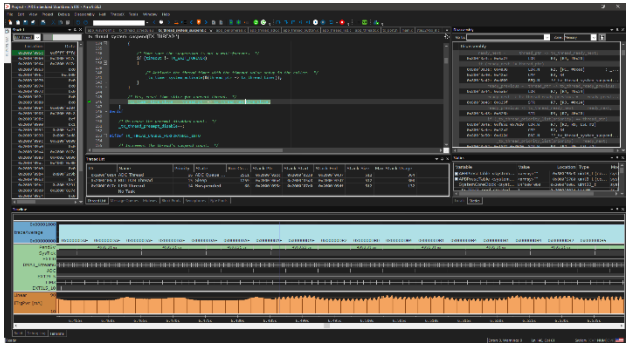


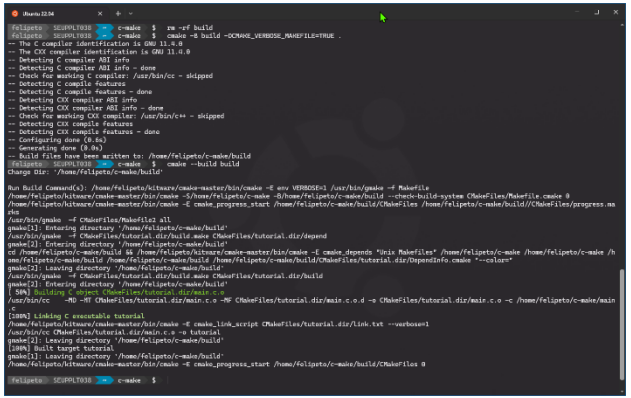
IAR Embedded Workbench

Visual Studio Code

Simplifying debugging with IAR tools

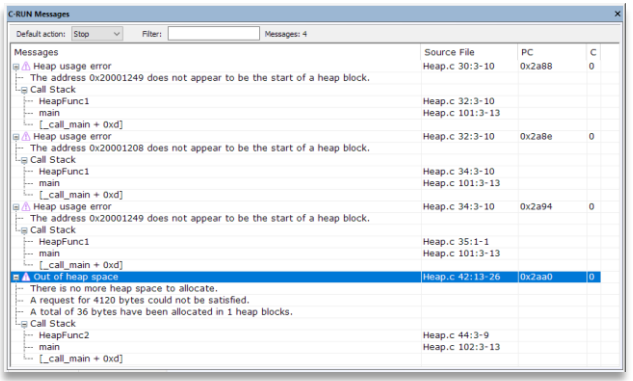
- Use IAR’s C-SPY debugger to pinpoint issues faster.
- Get real-time visibility into embedded systems.
- Capture and analyze data from multiple sources.
- Reduce manual test/debug loops and speed up iterations.

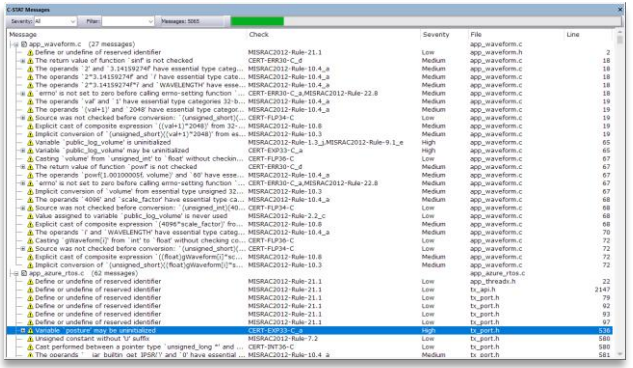




Improving code quality from day one

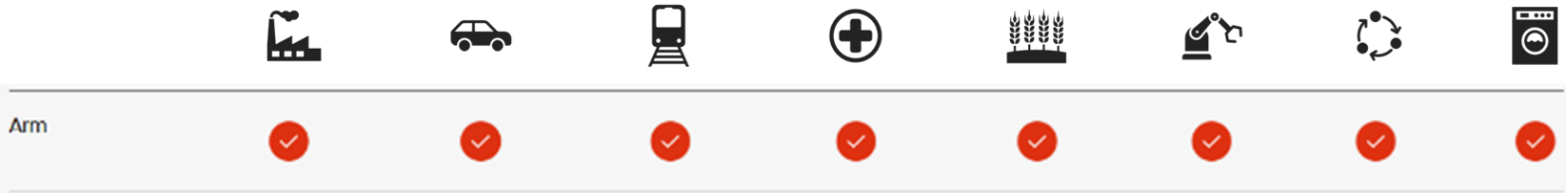
- Apply coding standards like MISRA from the start.
- Static and runtime analysis helps catch issues early in the cycle.
- Automate code checks during commits or builds.
- Improve maintainability and ease certification efforts.





Relevant functional safety standards

- Support for ISO 26262, IEC 61508, IEC 62304 and more for MSPM0 (Arm)
- This alignment will support:
  - Reproducible, auditable builds integrated directly into CI/CD pipelines.
  - Faster validation cycles and reduced risk of human error in safety-critical deployments.



Parallel development strategies and project migration checklist

Parallel development & gradual migration

- Maintain MSP430 & MSPM0 projects side-by-side
- Use HAL & BSP for module isolation
- SysConfig-generated configs integrate into IAR
- Gradual migration: port drivers, test, expand
- Supported debug probes:
  - MSP430: MSP-FET (JTAG or Spy-Bi-Wire).
  - MSPM0: IAR I-jet, XDS110 or SEGGER J-Link (SWD).
  - Update connections: MSP430 uses 14-pin; MSPM0 uses 10-pin JTAG or 20-pin TI.
  - Use EnergyTrace (MSPM0) for power profiling if needed.

Recommended checklist for migration

- ✓Set up IAR Embedded Workbench/IAR Build Tools with MSP430 and MSPM0 support.
- ✓Use MSPM0 SDK + SysConfig for project setup.
- ✓Map MSP430 peripherals to MSPM0 equivalents.
- ✓Validate memory access, apply wait states if needed.
- ✓Update interrupt/event handling for event manager.
- ✓Switch debugger to I-jet/XDS110/J-Link, verify connections.
- ✓Run full debug and validation cycles, including analog interfaces (ADC, COMP, OPA).

Demo migrating MSP430 projects to MSPM0

Summary

The IAR Platform is your migration accelerator

- Integrated code quality, security, and safety standards
- CI/CD-ready build environment with automation support
- Advanced debugging, profiling, and power analysis
- Flexible strategies for gradual, parallel migration
- Full support for MSP430 and MSPM0 projects side by side

Be the best and build what’s next

- Learn how the IAR platform accelerates your migration journey and CI/CD transformation.
- Experience the full IAR ecosystem, from MSP430 to MSPM0, with integrated tools for quality, safety, and automation.
- Experience the full platform. Contact us and request your trial now.

Q&A

With TI and IAR experts

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