



etas

 HIGHTEC

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An Infineon Technologies Company

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pls
Development Tools

TRUST  SOFT

C/C++ & Rust Compiler and RTOS for Safe Applications on AURIX TC4xx

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 **HIGHTEC**

HighTec: Tools, Services, Software

Compiler:

- **Rust & C/C++**
(Based in Open-Source
GCC/LLVM)



ISO 26262 ASIL D
(since 2012)

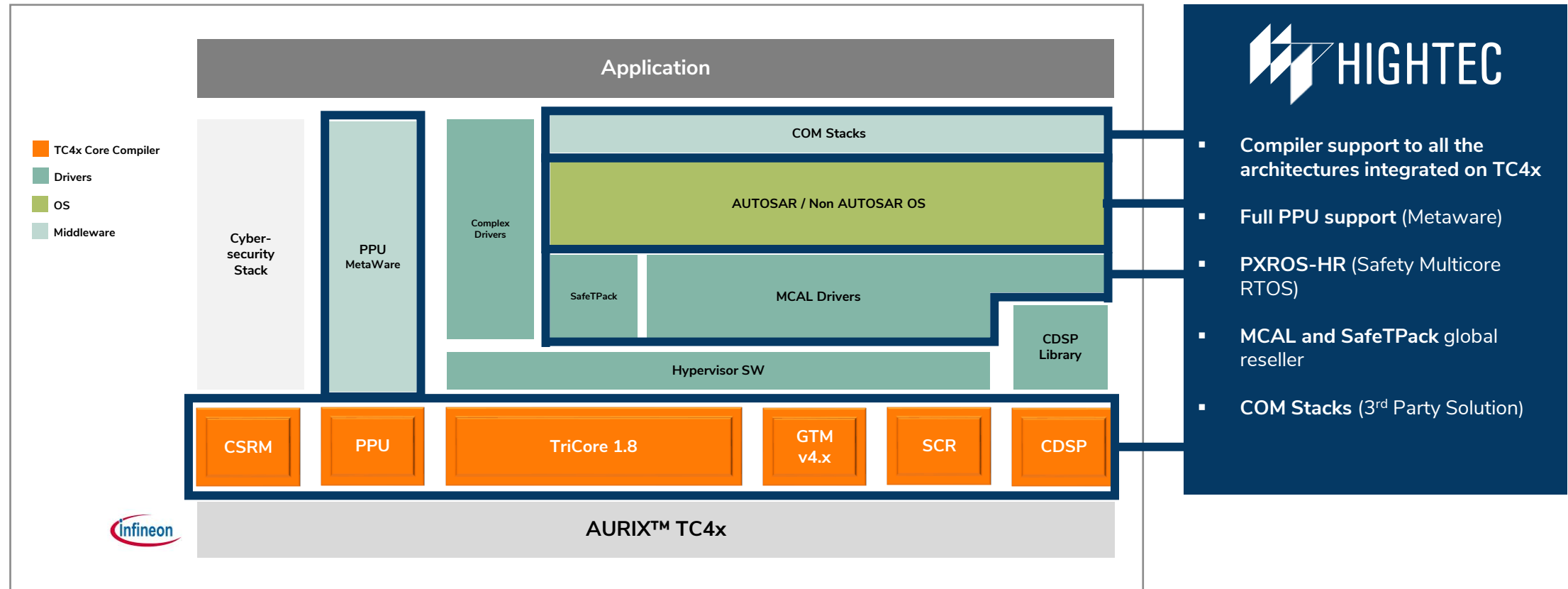


Safety Multicore OS

- PXROS-HR

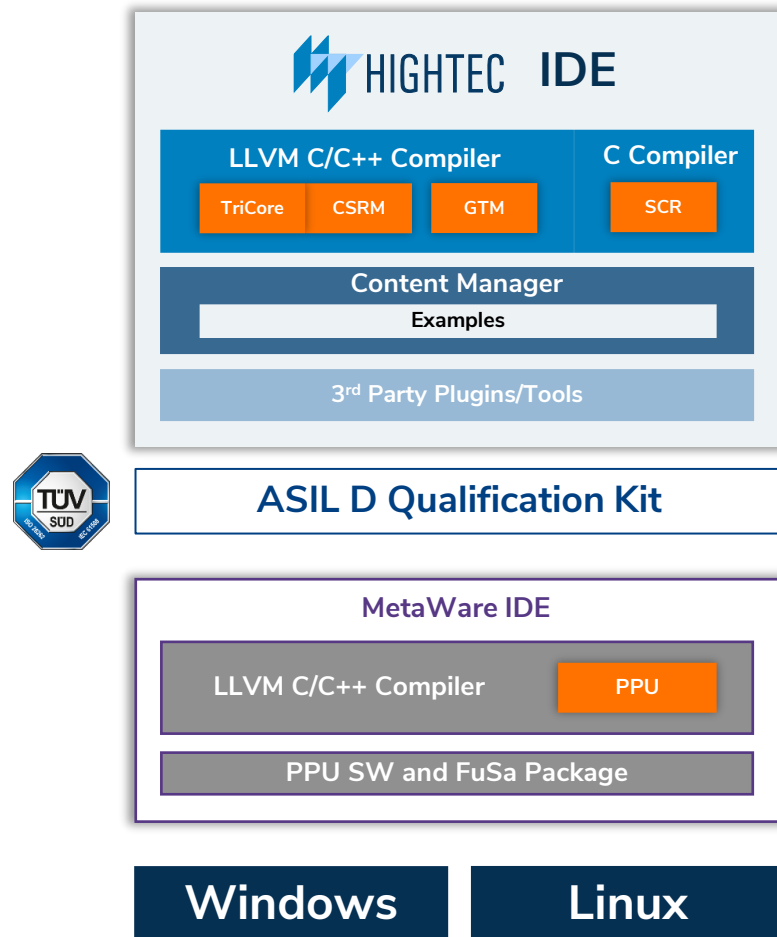
- Preferred Design House

TC4x and HighTec SW Ecosystem



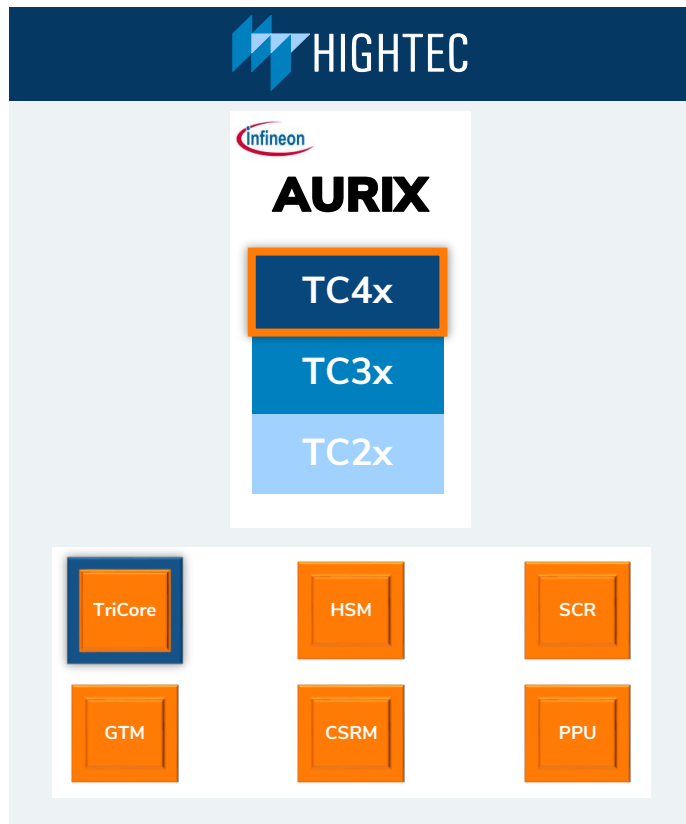
TC4x: Compiler Tools

AURIX Toolchain, IDE, Content Manager



- **Compiler** support for **all** the architectures integrated on TC4x (TriCore, CSRM, GTM, SCR, PPU)
- **Full PPU support** via Synopsys MetaWare
- **IDE** that supports all AURIX family (TC2x, TC3x, TC4x), Windows and Linux supported
- **Content manager**, providing examples (simple and advanced) for all the core architectures on TC4x and AURIX family
- **ASIL D Qualification Kit**
- **Supports the latest language standards (C++14/C++17)**

TC4x: TriCore TC1.8 C/C++



- Based on the latest **LLVM Open Source** infrastructure
- Short build times, **high code density**, fast execution speed
- ILLD and MCAL **optimizations**
- **Double precision floating point** support
- **Virtualization** – Hypervisor support
- **128-bit** load and store support



ASIL D Qualification Kit

TC4x: PPU



MetaWare IDE

- Scalar C/C++
- Vector C/C++
- Open CL C

- NN SDK

- Runtime
- Libraries (DSP, BLAS/LAPACK, MATLAB)

- IPC framework
 - Bare metal
 - AUTOSAR CDD
 - PPU Dispatcher

FuSa Packages

Debugger / nSIM

- ❑ **Complete PPU ecosystem covered**
- ❑ **Developed by Synopsys, supported and distributed by HighTec**
- ❑ Compiler toolchain uses the **LLVM technology**
- ❑ Straightforward integration with HighTec's compiler solutions
- ❑ Libraries of **optimized linear algebra** and **math functions**
- ❑ **OpenCL C-Based** optimized implementation
- ❑ **Supporting material** with diverse complexity and applications (incl. Simulink examples)

Rust – Features

Enabled Features of Rust in Automotive



**Prevents
security
vulnerability
by design**



**No garbage
collection**
(performance,
predictable)

Performance
like
C/C++

Safe
Hardware /
Peripheral
access

**Safety
Security
Performance**

**Eliminates
runtime errors**
(borrow
checker)

The rules for memory safety,
concurrency, type safety are
checked at **compile time**

**Safe
concurrency**

TC4x: TriCore TC1.8 Rust

1st ISO 26262 ASIL D Qualified Rust Compiler for AURIX



Benefits

- ❑ Robust Safety and Security
- ❑ Reduce Development Process
- ❑ Reduces Costs
- ❑ Seamless C/C++ integration
- ❑ Future Proofing

One-Stop Vendor C/C++ & Rust





**Compiler**


**Drivers**
MCAL
SafeTPack

**Qkit**


**PXROS-HR (ASIL D RTOS)**

**Long Term Support**

**3rd Party Support**

Debuggers
Drivers
Trainings

Automotive Grade Solution - ISO 26262 & ISO 21434



Thank You



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Free evaluation versions of all
architectures within AURIX TC4x

<https://hightec-rt.com/support/license/evaluation>

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AURIX KNOWLEDGE LAB 2024

Any Questions?

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