



**Adesto**

WHITEPAPER

# SmartEdge™ Platform – Embedded Software

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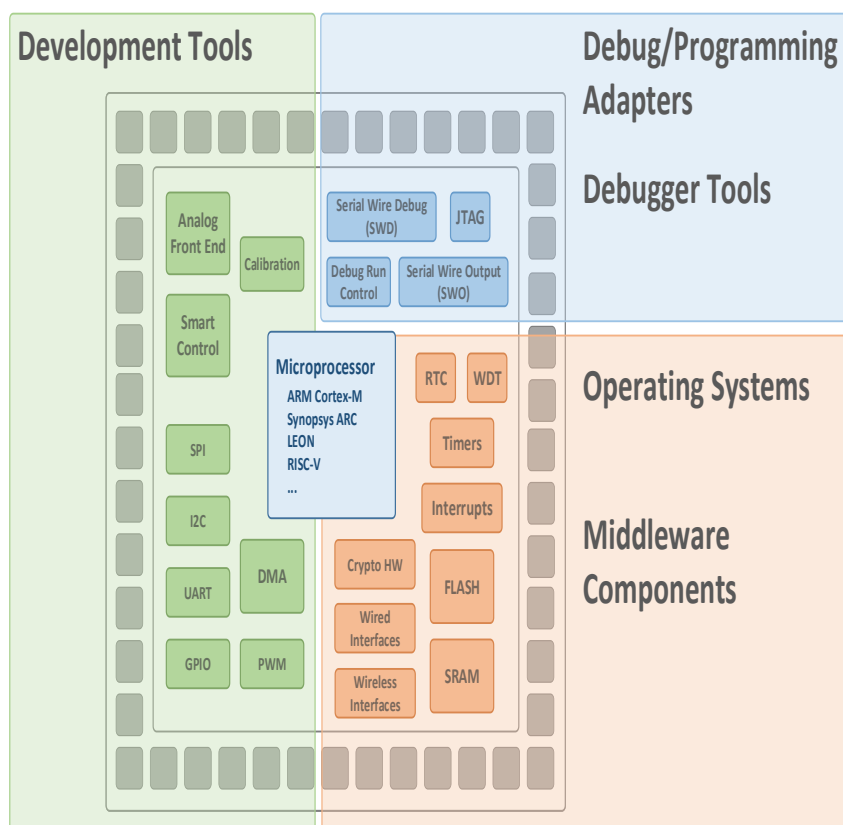
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## Introduction

The purpose of this white-paper is to act as a reference for the numerous aspects related to Embedded Software needs on the SmartEdge™ platform. It details the numerous contemporaneous development tools, debug tools and middleware components.

## Overview

The diagram below shows the Embedded System Software Developer's view of a smart edge Platform.



There are many tools, operating systems and components available to address the needs of the embedded software ecosystem. These consist of both commercial and non-commercial versions and it is common that the commercial versions typically come as a contiguous suite tied to a fixed set of tools, operating systems and/or components. e.g. If you are using the ARM Keil RTX Operating System then you are tied to the ARM  $\mu$ Vision Keil IDE, ARM Keil ULINK adaptor and the ARM Keil  $\mu$ Vision debugger.

Adesto have a good understanding of the hardware dependencies of an embedded software ecosystem. Adesto have working partnerships with IP vendors so can deliver the required hardware capabilities to ensure a client's particular embedded software ecosystem needs are met.



## Development Tools

Development Tools typically consist of an Integrated Development Environments (IDEs) that exposes a Graphical User Interface (GUI) for Code Development, Code Compilation, Binary Deployment and Debugging.

### Integrated Development Tools

Some common IDEs are:

- ARM Keil  $\mu$ Vision IDE
- Synopsys MetaWare Development Toolkit
- Segger Embedded Studio
- Green Hills MULTI IDE
- Wind River Workbench
- QNX Momentics Tool Suite
- Eclipse IDE

### Compilers

Some common compilers are:

- ARM Compilers
- Synopsys MetaWare Compilers
- Green Hills Optimizing Compilers
- Wind River Diab Compiler
- GNU Compilers
- LLVM Compilers

### Software Components

It is becoming increasingly common for devices targeting the Industrial IoT to run its application(s) on an Operating System (OS) instead of bare metal. Embedded Linux and Real-Time Operating Systems (RTOS) are a common choice of OS for microprocessor based embedded systems.

An RTOS typically enables the most efficient use of a microprocessor and optimizes overall task management. It is also common for an RTOS to provide support components such as Bootloaders and File Systems.

### Real-Time Operating Systems

Some common RTOS are:

- ARM Keil RTX
- Synopsys MQX
- Segger embOS



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- Green Hills INTEGRITY
- FreeRTOS
- Micrium uC/OS
- Express Logic ThreadX
- Wind River VxWorks
- QNX Neutrino

## **Middleware Components**

Middleware Components are typically delivered as highly integrated, fully optimized and verified software packages allowing speed up of software development. Middleware Components typically cover the following areas:

- Connectivity
- Communication Protocols
- Networking Stacks
- Crypto and Security

## **Debugging**

### **Debug/Programming Adapters**

Adapters are typically required to connect the Embedded System Software Developer's system to the device's debug interfaces (JTAG, SWD, SWO) for binary deployment, debug and programming. Some common adapters are:

- ARM Keil ULINK
- Ashling Opella-XD
- Segger J-Link
- Lauterbach PowerDebug
- Green Hills Probe
- Tin Can Tools Flyswatter

### **Debugger Tools**

The Debugger Tools are typically exposed by the Integrated Development Environment, some common Debugger Tools are:

- ARM Keil  $\mu$ Vision Debugger
- Synopsys MetaWare Debugger
- Segger Ozone
- Lauterbach TRACE32
- Green Hills TimeMachine
- GNU GDB with Eclipse GUI
- Open OCD



## **Adesto SmartEdge™ Platform**

Adesto's SmartEdge™ platform incorporates all the Sensor AFE (Analog Front End), Calibration, Control, Communication and Security elements of a smart edge device, all integrated onto a single cost-effective ASIC chip. Adesto's ASIC & IP division has a strong legacy of embedded software development through its internal teams and partner eco-system. With more than 20 years' experience designing advanced embedded mixed-signal chips for hundreds of customers in every major region, Adesto delivers a new breed of design-centric semiconductor supplier capable of optimising its designs for every customer, yet achieving cost economies not thought possible with custom chips designs until now.