NXP EXPANDS FREE OF CHARGE SOFTWARE OFFER FOR POWER ARCHITECTURE AND S12Z

FEBRUARY 2019

Automotive-grade Software Solutions

- Free-of-charge AUTOSAR (Classic) MCAL and Operating System software for the MPC57xx MCUs

- Free-of-charge Core Self Test software for MPC57xx and S12Z MCU families

- New version RTM 2.0.0 of production-grade Software Development Kit (SDK) for Power Architecture

NXP

AUTOSAR Software

www.nxp.com/AUTOSAR
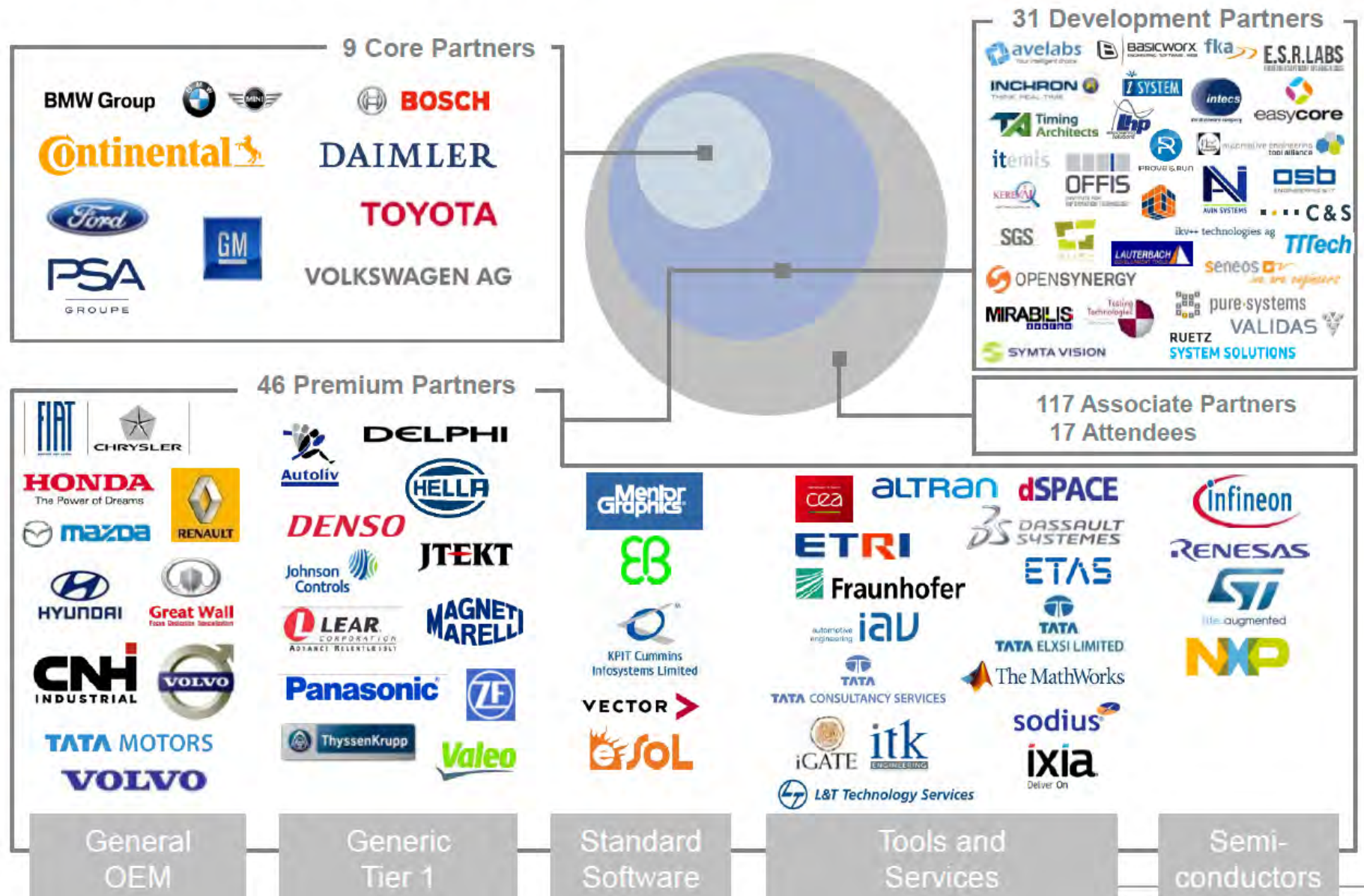
AUTOSAR[1] is ...

- an embedded software architecture
- developed for but not restricted to electronic control units (ECU's) in vehicles
- taking automotive legacy standards into account (CAN, LIN, OSEK, diagnostics)
- following the „cooperate on standards, compete on implementation" approach
- including a top-down configuration methodology from car to network to ECU to s/w module
- using XML for configuration description at all levels

AUTOSAR[1] does ...

- enable use of AUTOSAR compliant s/w from different vendors
- allow users to focus on their application rather than the basic software architecture
- offer a width of tool support from config to model based design auto-code generation
- offer high reuse of s/w components across projects and between MCU generations
- save time to market after an initial learning curve
- provide consistent documentation for all s/w modules, to highest quality standards

Footnote: (1) Classic Platform, www.autosar.org

AUTOSAR Partnership Structure

9 Core Partners

BMW Group · BOSCH · Continental · DAIMLER · Ford · TOYOTA · GM · PSA GROUPE · VOLKSWAGEN AG

31 Development Partners

avelabs · basicworx · fka · E.S.R.LABS · INCHRON · i SYSTEM · intecs · easycore · Timing Architects · itemis · OFFIS · KERESAR · PROVE & RUN · AVIN SYSTEMS · osb · C&S · SGS · ikv++ technologies ag · TTTech · LAUTERBACH · seneos · OPENSYNERGY · MIRABILIS · pure·systems · VALIDAS · RUETZ SYSTEM SOLUTIONS · SYMTA VISION

46 Premium Partners

117 Associate Partners
17 Attendees

FIAT · CHRYSLER · DELPHI · HONDA · RENAULT · Autoliv · HELLA · MAZDA · DENSO · JTEKT · HYUNDAI · Great Wall · Johnson Controls · LEAR CORPORATION · MAGNETI MARELLI · CNH INDUSTRIAL · VOLVO · Panasonic · ZF · TATA MOTORS · ThyssenKrupp · Valeo · VOLVO

Mentor Graphics · EB · KPIT Cummins Infosystems Limited · VECTOR · eSOL

cea · ALTRAN · dSPACE · ETRI · DASSAULT SYSTEMES · Fraunhofer · ETAS · iav · TATA ELXSI LIMITED · TATA CONSULTANCY SERVICES · The MathWorks · iGATE · itk ENGINEERING · sodius · ixia · L&T Technology Services

Infineon · RENESAS · ST life.augmented · NXP

General OEM · Generic Tier 1 · Standard Software · Tools and Services · Semi-conductors
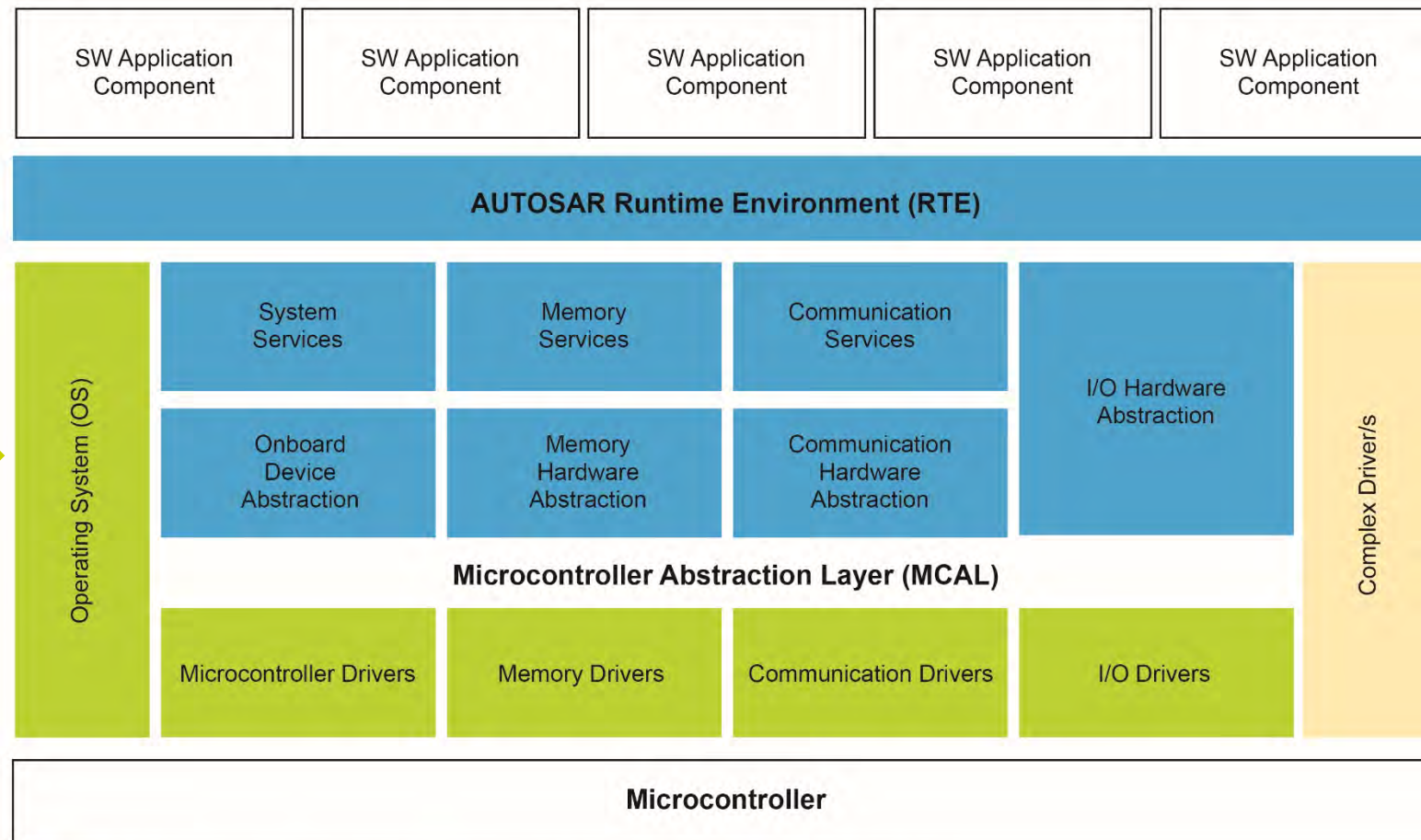
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Autosar Basic Software (Classic Platform)

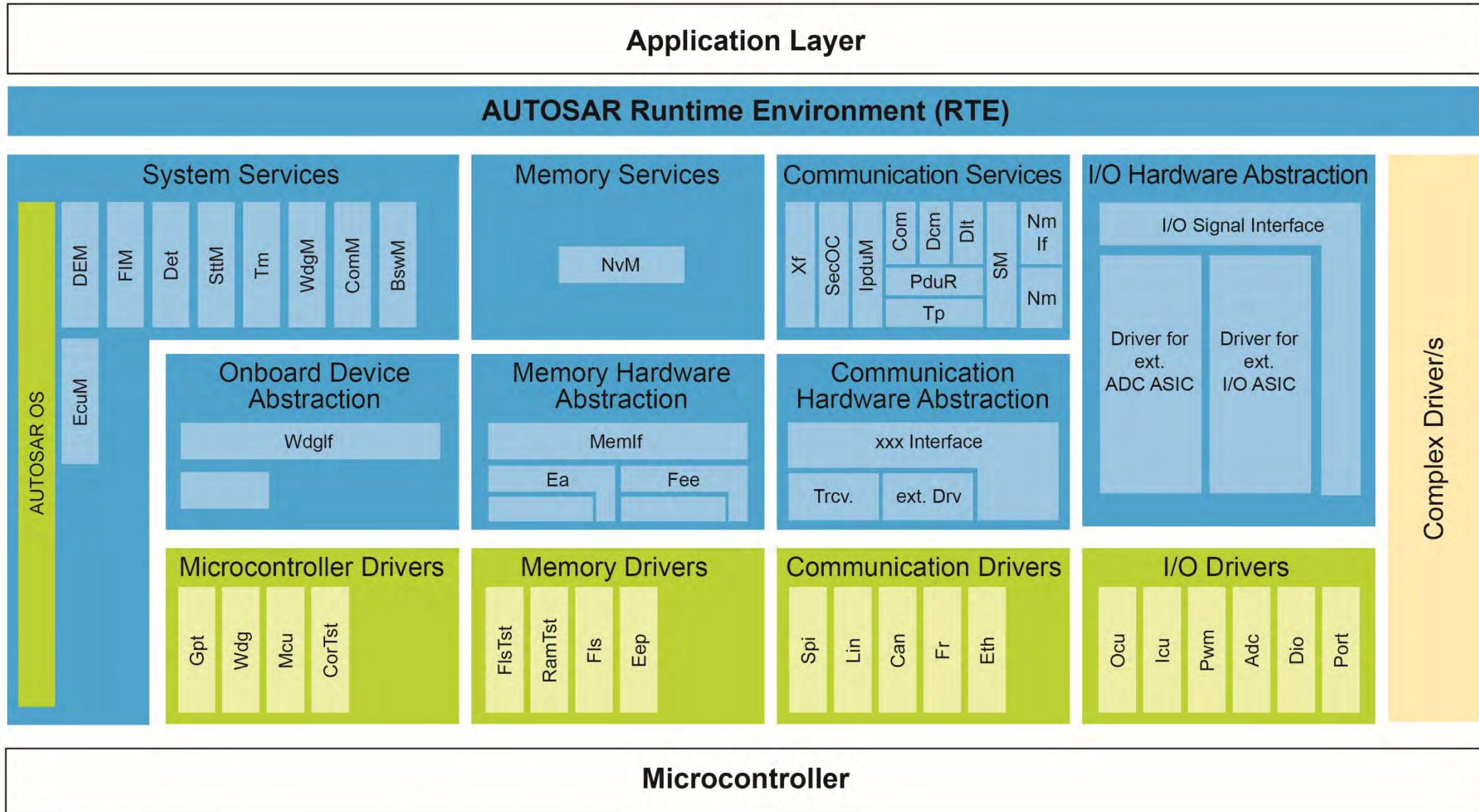**From NXP :** MCAL (source code), OS (source code) and Config Tool (executable) for MCAL and OS

From 3rd party AUTOSAR s/w companies* : The rest of AUTOSAR basic software as needed & integration services

SW Application Component

SW Application Component

SW Application Component

SW Application Component

SW Application Component

AUTOSAR Runtime Environment (RTE)

Operating System (OS)

System Services

Memory Services

Communication Services

I/O Hardware Abstraction

Onboard Device Abstraction

Memory Hardware Abstraction

Communication Hardware Abstraction

Microcontroller Abstraction Layer (MCAL)

Microcontroller Drivers

Memory Drivers

Communication Drivers

I/O Drivers

Complex Driver/s

Microcontroller

* 3rd party s/w companies for AUTOSAR are e.g.:
- **Elektrobit**
- **ETAS**
- **KPIT**
- **Vector**

and others.

5

AUTOSAR BLOCK DIAGRAM

Application Layer

AUTOSAR Runtime Environment (RTE)

System Services
- DEM
- FIM
- Det
- SttM
- Tm
- WdgM
- ComM
- BswM
- EcuM
- AUTOSAR OS

Memory Services
- NvM

Communication Services
- Xf
- SecOC
- IpduM
- Com
- Dcm
- Dlt
- SM
- Nm If
- PduR
- Nm
- Tp

I/O Hardware Abstraction
- I/O Signal Interface
- Driver for ext. ADC ASIC
- Driver for ext. I/O ASIC

Onboard Device Abstraction
- WdgIf

Memory Hardware Abstraction
- MemIf
- Ea
- Fee

Communication Hardware Abstraction
- xxx Interface
- Trcv.
- ext. Drv

Complex Driver/s

Microcontroller Drivers
- Gpt
- Wdg
- Mcu
- CorTst

Memory Drivers
- FlsTst
- RamTst
- Fls
- Eep

Communication Drivers
- Spi
- Lin
- Can
- Fr
- Eth

I/O Drivers
- Ocu
- Icu
- Pwm
- Adc
- Dio
- Port

Microcontroller

Legend:
- NXP Standard Products
- Partner Products
- Complex Drivers

Microcontroller Abstraction Layer (MCAL)

- Suite of software drivers for the most common peripherals of an MCU

- Each driver is highly configurable to cope with different use scenarios

- Production grade, well documented, developed to highest quality standards (Auto SPICE & MISRA)

- Deployed in hundreds of automotive production ECUs

Memory Hardware Abstraction

FLASH EEPROM Emulation

Microcontroller Drivers	Memory Drivers	Communication Drivers	I/O Drivers
GPT Driver	internal Flash Driver	SPI Handler Driver	OCU Driver
Watchdog Driver		LIN Driver	ICU Driver
MCU Driver		CAN Driver	PWM Driver
		FlexRay Driver	ADC Driver
		Ethernet Driver	DIO Driver
			PORT Driver

Microcontroller

GPT | WDT | MCU Power & Clock Unit | FLASH | SPI | LIN or SCI | CAN | OCU | CCU | PWM | ADC | DIO

Autosar Operating System

- Light-weight real-time operating system, low memory footprint
- Designed for use within an AUTOSAR architecture, but may also be used standalone
- Based on OSEK/VDX™ OS with several AUTOSAR feature additions

OSEK features

- event triggered predictable real time OS for embedded applications
- statically configured (OIL), scalable
- fixed priority-based scheduling
- interrupt handling: based on priority compared to running task
- protection against incorrect use of OS services

Additional AUTOSAR features

- software and hardware counters
- schedule tables with time synchronisation
- stack monitoring
- timing protection, memory protection and service protection (stronger than OSEK)
- OS applications, trusted and non-trusted code
- protection hook and application specific hook routines
- statically configured: ARXML

Software made free-of-charge as of Feb. 6, 2019

- AUTOSAR 4.x (Classic) MCAL and OS for MPC57xx MCUs
- Core Self Test software for MPC5xxx, S12X, S12Z MCUs
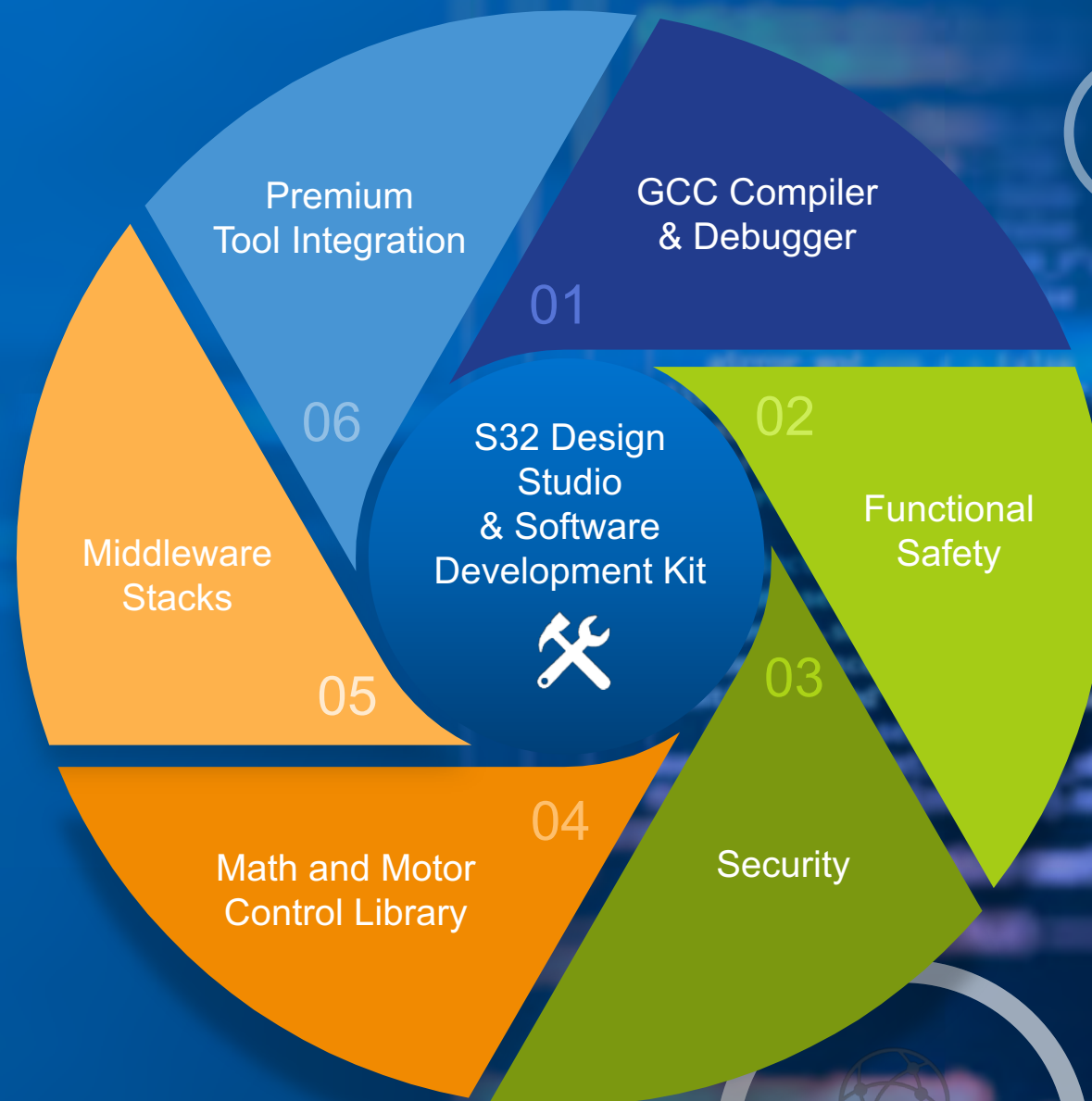
Software Development Kit (SDK)

www.nxp.com/MPC5748G

www.nxp.com/S32DS

Total System Enhancements

www.nxp.com/AutomotiveSoftware

Additional Software Stacks and Middleware

TCP/IP, Ethernet AVB, and USB stacks for high speed communication

SDHC to connect non-volatile memory cards

Safety and security software to meet requirements for functional safety and the increasing demand for data security

An extensive Math and Motor Control library, and a Motor Control Development Toolbox for model based design of motor control applications

SECURE CONNECTIONS
FOR A SMARTER WORLD