

i.MX 8X LAUNCH WEBINAR

i.MX Product Marketing
MAY 2020



SECURE CONNECTIONS
FOR A SMARTER WORLD

EXTERNAL

NXP, THE NXP LOGO AND NXP SECURE CONNECTIONS FOR A SMARTER WORLD ARE TRADEMARKS OF NXP B.V.
ALL OTHER PRODUCT OR SERVICE NAMES ARE THE PROPERTY OF THEIR RESPECTIVE OWNERS. © 2020 NXP B.V.





IN THIS WEBINAR YOU WILL:

Learn about the i.MX 8X family of applications processors and how they are positioned to support your automotive or industrial needs

Learn about scalability possibilities and migration between i.MX product families

Device features, software and system design

Real world applications in which the i.MX 8X can be used.

Where to get documentation, design files and software

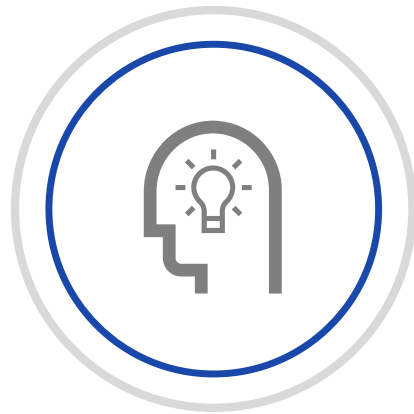


MAJOR TECHNOLOGY VECTORS FOR ANY SMART DEVICE

SENSE



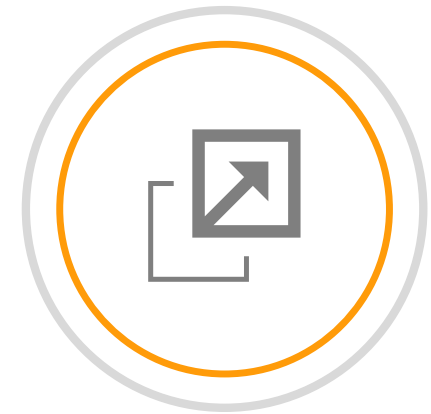
THINK



CONNECT



ACT



MAJOR TECHNOLOGY VECTORS FOR ANY SMART DEVICE

SENSE



**EVERYTHING
AWARE**

THINK



**EVERYTHING
SMART**

CONNECT



**EVERYTHING
CONNECTED**

ACT



**EVERYTHING
EFFICIENT**



Uniquely positioned across all required building blocks



EVERYTHING SAFE & SECURE

AUTOMOTIVE GLOBAL MEGATRENDS DRIVING THE NEED FOR NEXT GENERATION SILICON CAPABILITIES



AUTONOMY

Zero Road Accidents

90% of accidents
from human error



ELECTRIFICATION

Zero Emissions

Increasing global
regulations

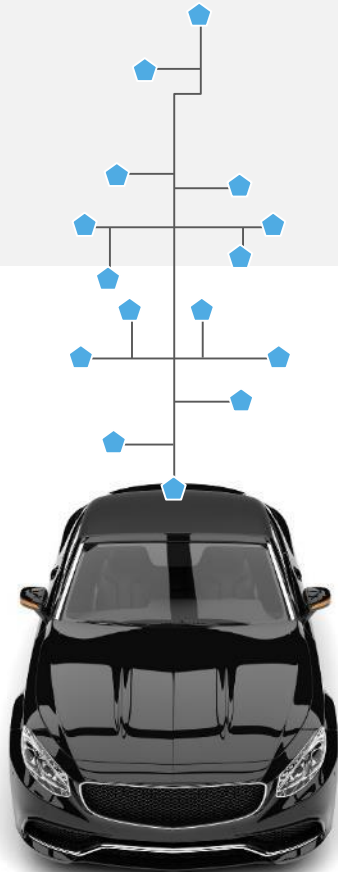


CONNECTIVITY

Zero Time Wasted

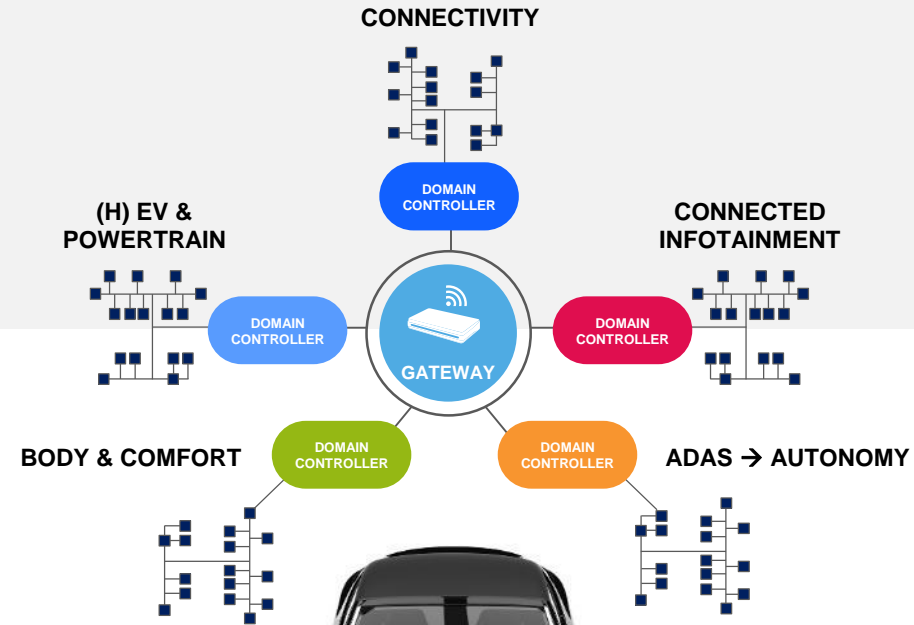
Intelligent transport systems,
new opportunities for infotainment

VEHICLE ARCHITECTURE TRANSFORMATION



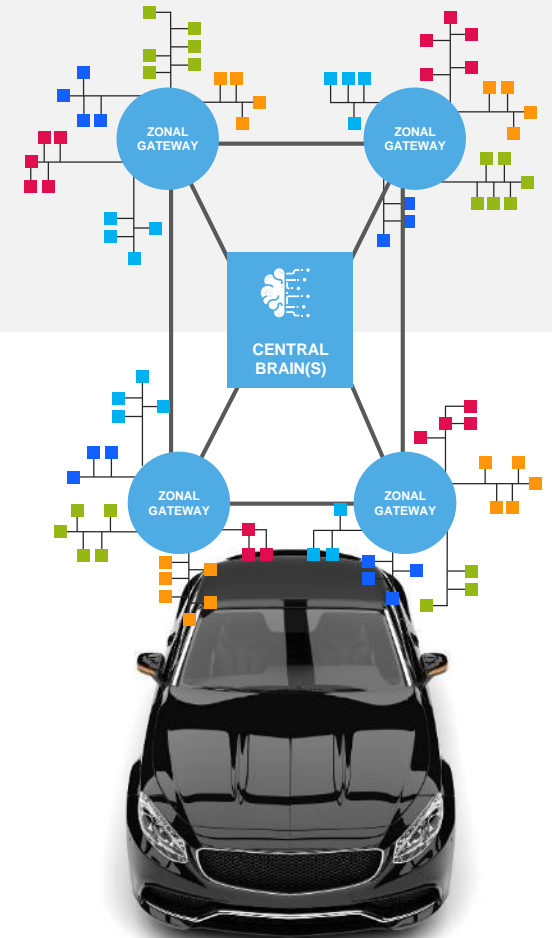
TODAY | FLAT

UNFIT TO FUTURE MOBILITY



LOGICAL RESTRUCTURE | DOMAINS

ENABLING AUTONOMOUS CAR

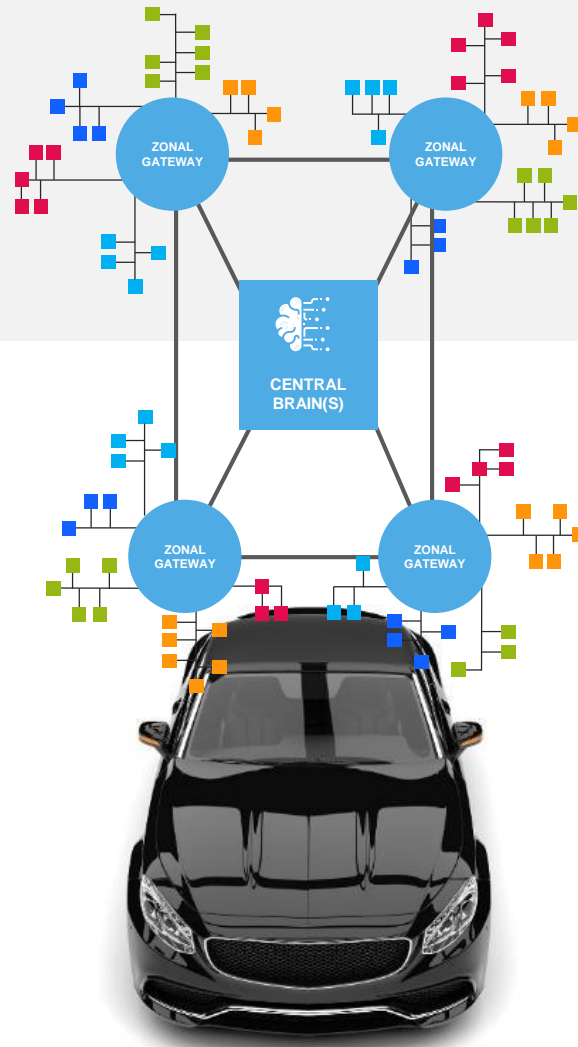


PHYSICAL RESTRUCTURE | ZONES

ENABLING USER-DEFINED CAR

VEHICLE ARCHITECTURE TRANSFORMATION

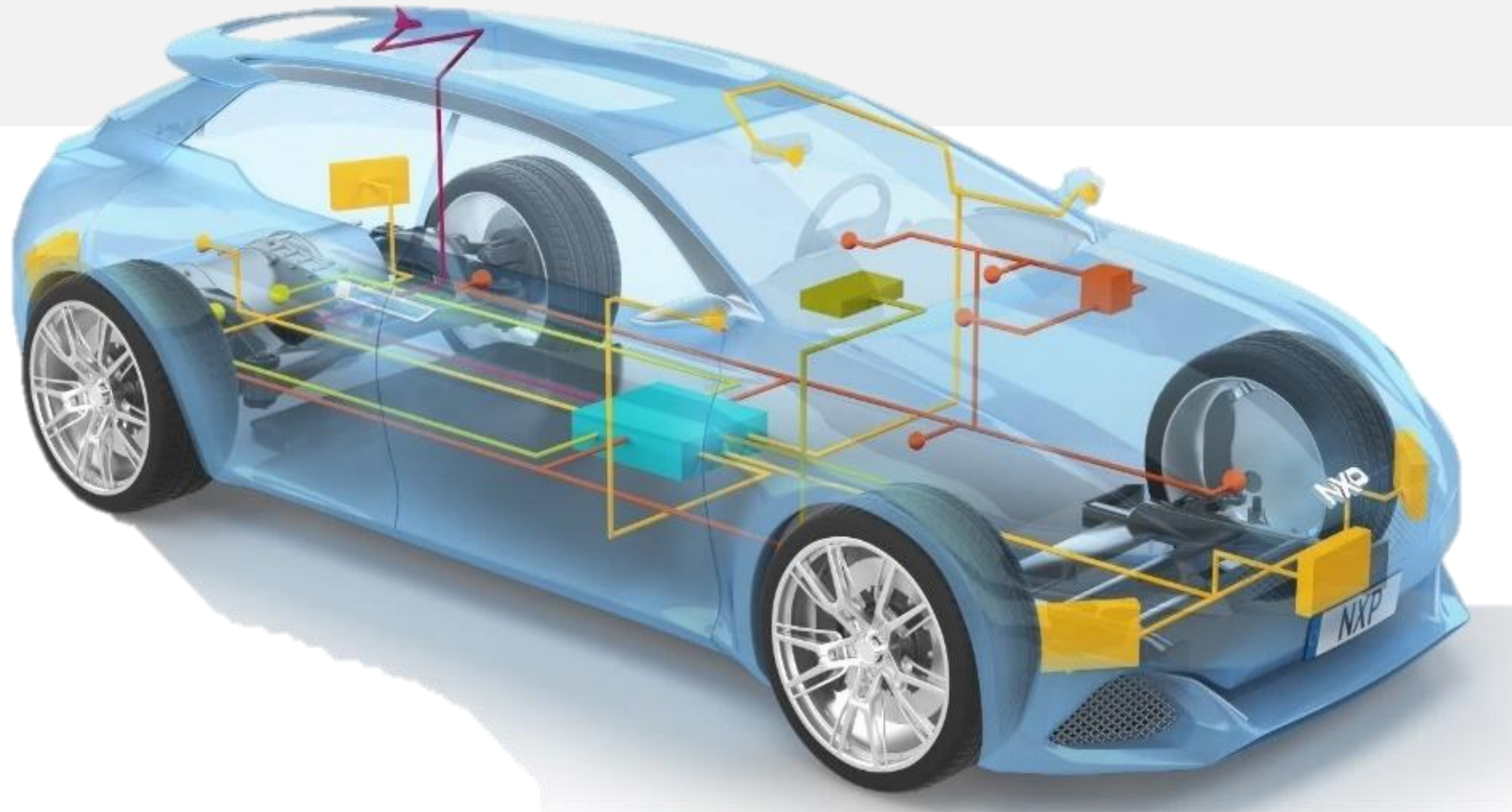
~~TOMORROW~~
TODAY
ZONES



PHYSICAL RESTRUCTURE | ZONES

ENABLING USER-DEFINED CAR

VEHICLE ARCHITECTURE TRANSFORMATION





INDUSTRIAL & IOT

INNOVATING EDGE TO CLOUD

VALUE PROPOSITION

Broad, scalable portfolio

Ultra-low-power and high-performance processors

High-performance crossover processors

Low-power secure and connected MCUs

Leader in Connectivity - UWB, Wi-Fi, NFC, RFID and Bluetooth

Common software

Large partner ecosystem

Deep applications insights

From working with and supporting 26,000+ customers across thousands of applications



INDUSTRIAL TARGETED SECTORS



FACTORY AUTOMATION



HEALTHCARE



ROBOTICS



BUILDING CONTROL

INDUSTRIAL TECHNOLOGY FOCUS

INDUSTRIAL CONNECTIVITY

Configurable IP for industrial protocols

Wireless connectivity roadmaps



SAFETY & SECURITY

IEC 61508 Safety enablement

EdgeLock Secure devices and technology

Secure connectivity



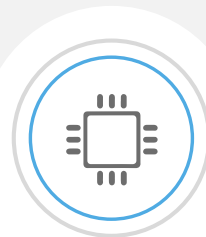
HMI

Scalability from MCU to MPU, PXP to GPU

Integrated video decode/encode

Speech recognition and voice control

Gesture and touch control



MACHINE LEARNING & VISION

Sensor & vision enablement

Image processing

Machine learning hardware and tools

- Object Rec
- Identification



CLOUD SERVICES

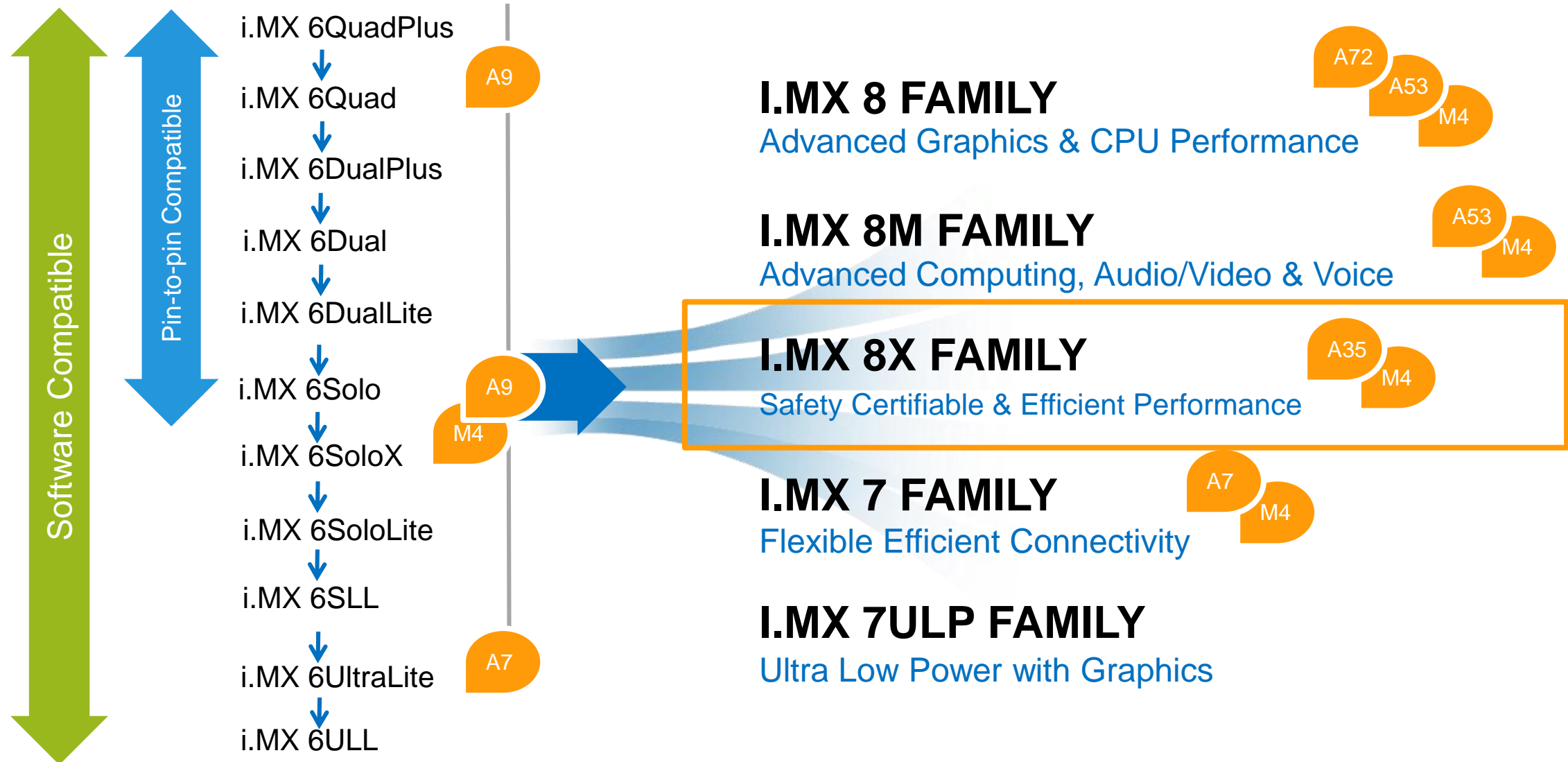
Machine learning

- Anomaly detection
- OTA model updates

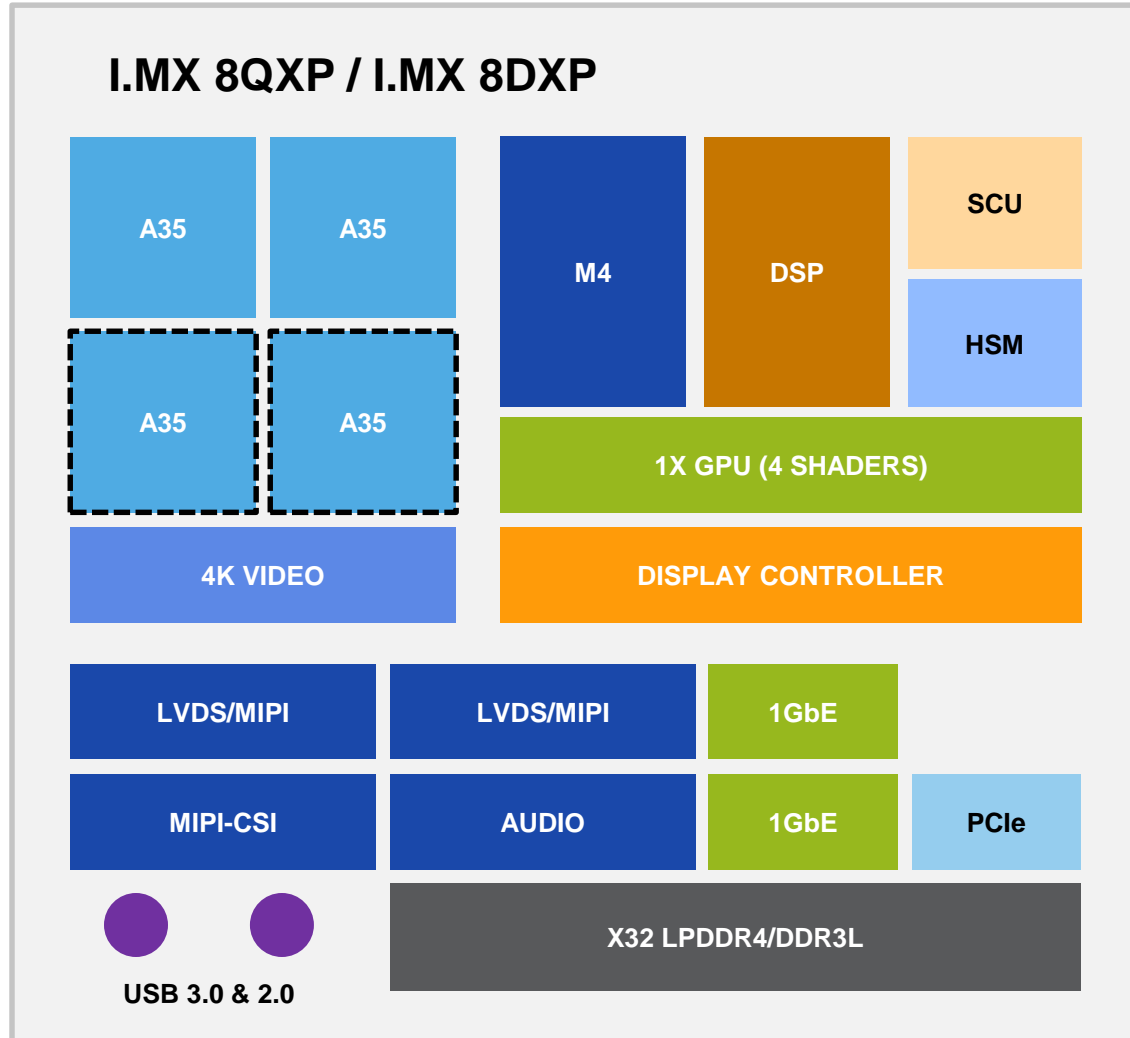
Partnerships with Microsoft, Amazon, Google, etc.



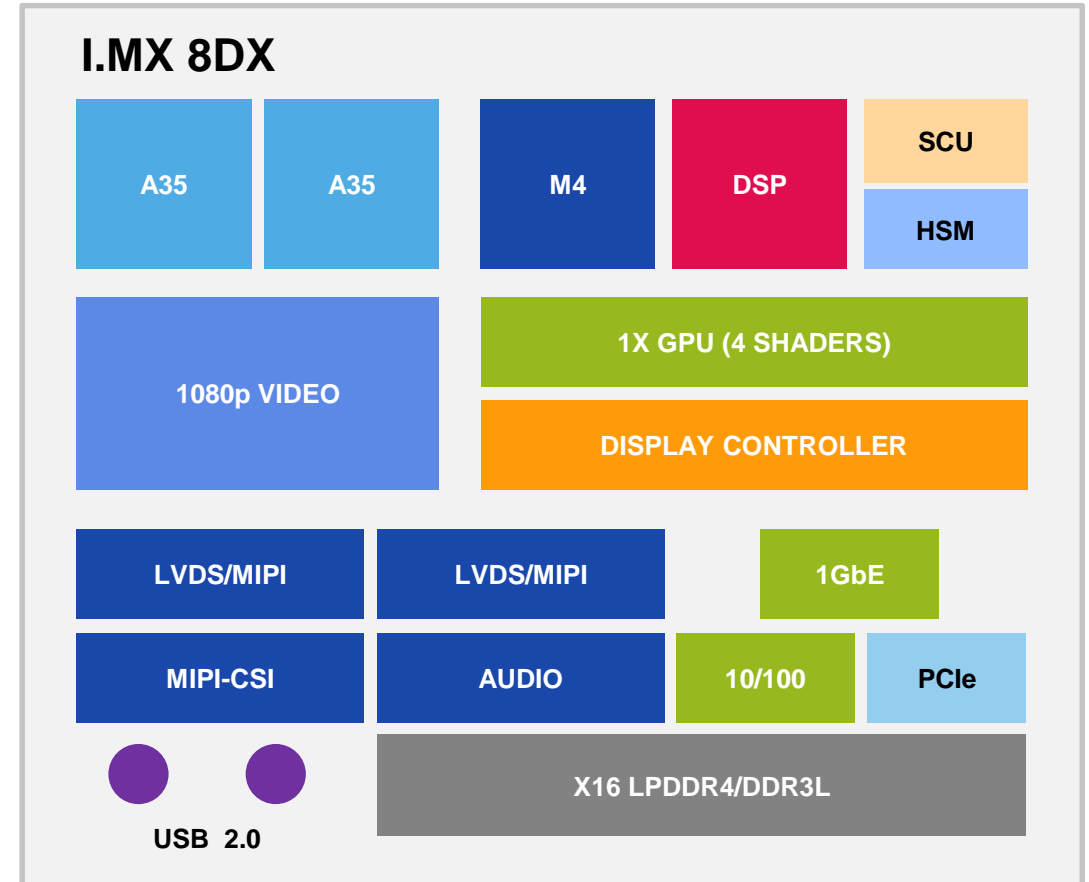
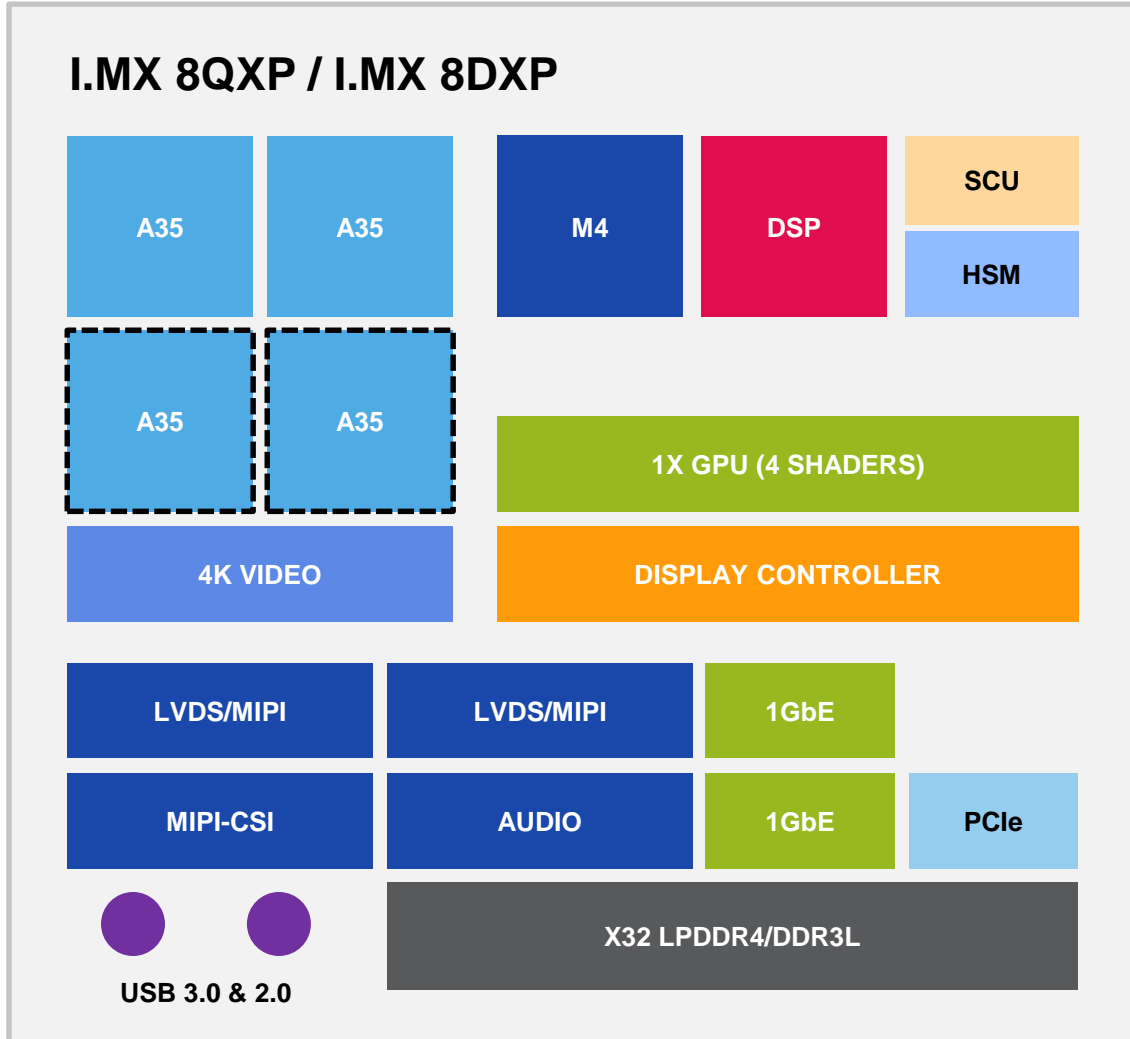
I.MX APPLICATIONS PROCESSOR SCALABILITY



I.MX 8X SUBSYSTEM REUSE SCALABILITY OF EMBEDDED PROCESSING



I.MX 8X SUBSYSTEM REUSE SCALABILITY OF EMBEDDED PROCESSING



Core Complex 1

- 2-4 x Arm® Cortex®-A35
- 32 KB I-cache 32 KB D-cache
- 512 KB L2 cache with ECC

Multimedia

GPU

1 x 4-Shader, OpenGL® ES 3.0 or 3.1, Vulkan®

VPU

Video: h.265 dec 4K, h.264 enc/dec 1080p

Audio

DSP Core

- Tensilica® HiFi 4 32 KB I 48 KB D
- 512 KB SRAM (448 KB OCRAM, 64 KB of TCM)

Display and Camera I/O

- Display Processor with SafeAssure®
- 2 x MIPI-DSI/LVDS Combo PHY*
- 1 x Parallel Display 1 x Parallel CSI
- 1 x MIPI CSI

Core Complex 2

Cortex-M4F	1 x I ² C
16 KB I-cache	1 x UART
16 KB D-cache	6 x GPIO
256 KB SRAM	1 x TPM Timer

Memory

- DDR3L @ 933 MHz (ECC option)/ LPDDR4 @ 1200 MHz (no ECC)
- 2 x SDIO3.0/eMMC5.1
- RAW NAND-BCH62
- 2 x Quad/1 x Octal SPI

Security


- HAB, SRTC, SJTAG, TrustZone®
- AES256, RSA4096, SHA-256
- 3DES, ARC4, MD-5
- Flashless SHE, ECC
- Tamper, Inline Enc Engine

System Control

- Power Control, Clocks, Reset
- BootROMs
- PMIC interface (dedicated I²C)
- Domain Resource Partitioning

Connectivity

- 4 x UART
- 8 x I²C
- 4 x SPI
- 1 or 2 x 1 Gbit Ethernet AVB
- 1 x 10/100 Ethernet
- 3.3 V/1.8 V GPIO
- PCIe 3.0 with L1 Substate-1-lane
- 1 x USB3 OTG w/PHY
- 1 or 2 x USB2 OTG w/PHY
- 3 x CAN/CAN FD
- MOST 25/50
- 4 x 4 Keypad
- 4 x PWM
- 1 x ADC (6-ch.)
- 2 x ASRC, SPDIF
- 4 x SAI, ESAI, MQS

 Available on certain product families Note: Accessing muxable controller's full capabilities is dependent upon board component choices.





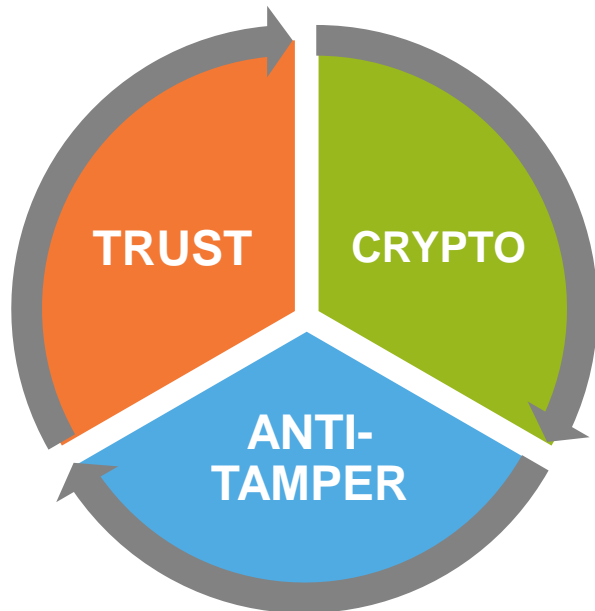
QUALITY

SUPPORT

SECURITY

SAFETY

PRODUCT LONGEVITY



I.MX APPLICATIONS PROCESSOR VALUES

- **Trusted Supply**

- Product longevity: Minimum 10 to 15 years
- Security and safety: Hardware acceleration, software
- Reliability: Zero-defect methodology, ULA, low SER FIT
- Quality: Automotive AEC-Q100, Industrial, JEDEC

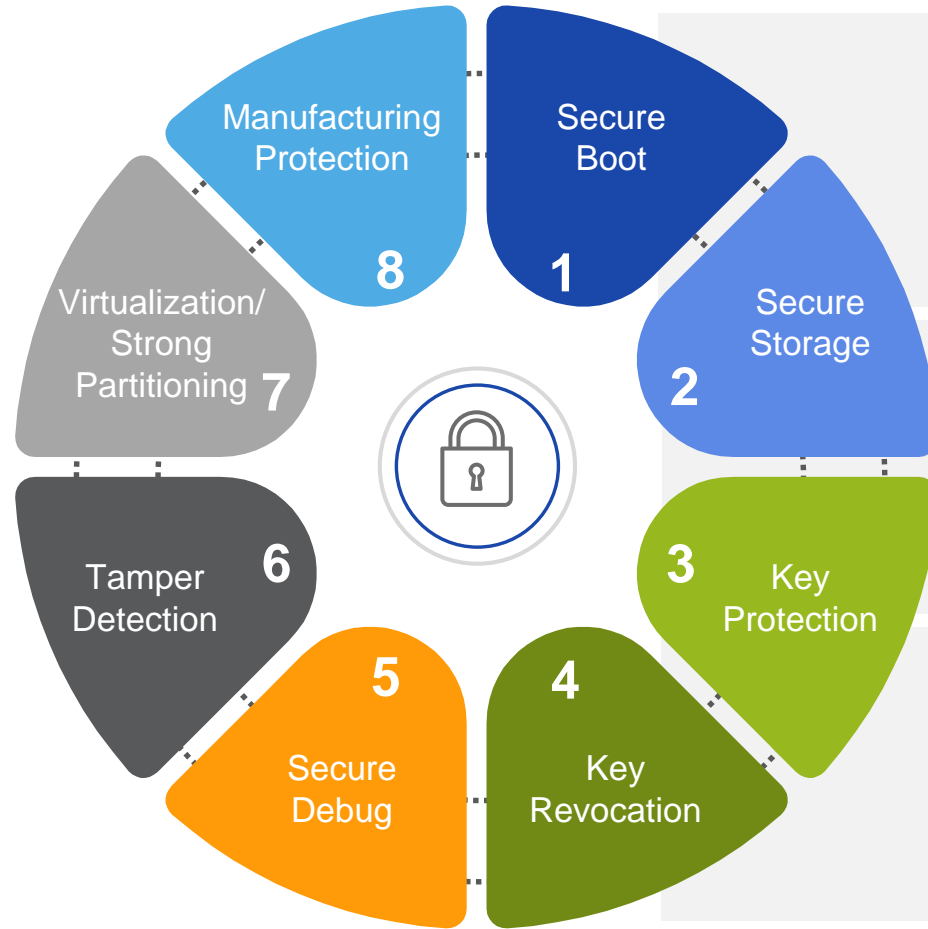
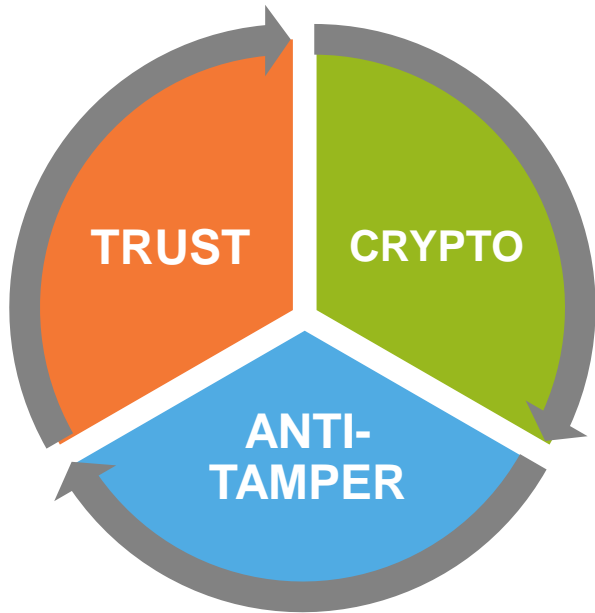
- **Scalability for Maximum Platform Reuse**

- Pin compatibility and software portability
- Integration: CPU (single/dual/quad, asymmetric), GPU, IO
- Software: Linux, Android, FreeRTOS, Green Hills, QNX

- **Support and Enablement**

- Industry-leading partners and support community
- Manufacturability: 0.8mm option, fewer PCB layers
- System solutions: SoC, sensors, memory, PMIC, connectivity, standard products, software

PRODUCT LONGEVITY



BASELINE SECURITY
 Secure Boot
 Secure Debug
 Secure Storage

TAMPER DETECTION
 Detect Tamper Events
 Tamper Response

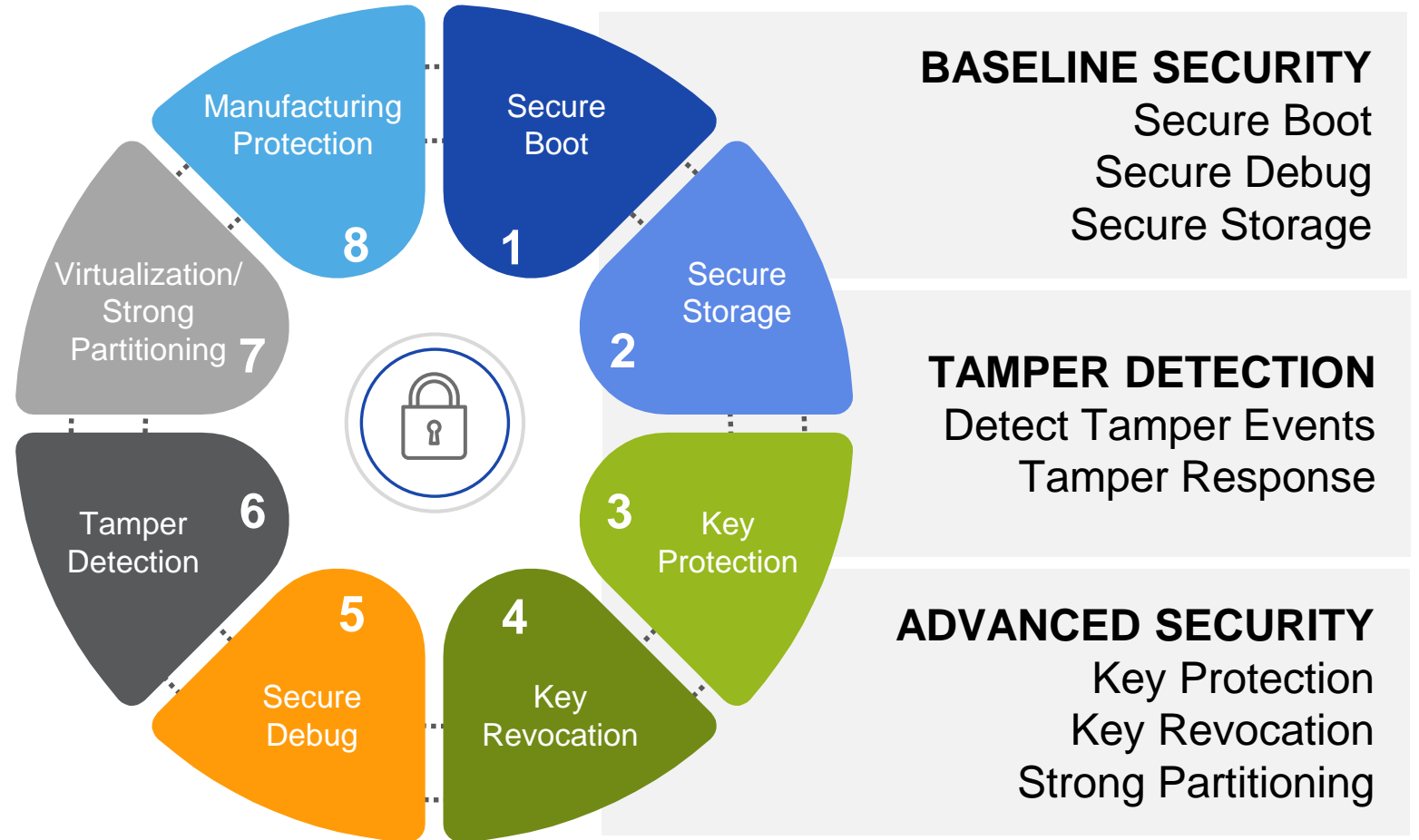
ADVANCED SECURITY
 Key Protection
 Key Revocation
 Strong Partitioning

Mobile and stationary machines want full access to cloud-based knowledge

This requires **faster, more reliable** and secure connectivity

NXP is at the **forefront of secure communications** and tamper resistance

Leadership experience in security markets: over 10 billion smart cards sold



HIT BY A VEHICLE
TRAVELING AT:

HIT BY A VEHICLE
TRAVELING AT:

HIT BY A VEHICLE
TRAVELING AT:



9 OUT OF 10
PEDESTRIANS SURVIVE*



5 OUT OF 10
PEDESTRIANS SURVIVE



ONLY 1 OUT OF 10
PEDESTRIANS SURVIVES



OUT OF ALL ACCIDENTS GLOBALLY,
90% are caused by
HUMAN ERROR

Source: Seattle's Vision Zero Plan/Documents/Departments/beSuperSafe/VisionZeroPlan, ASIRT.ORG

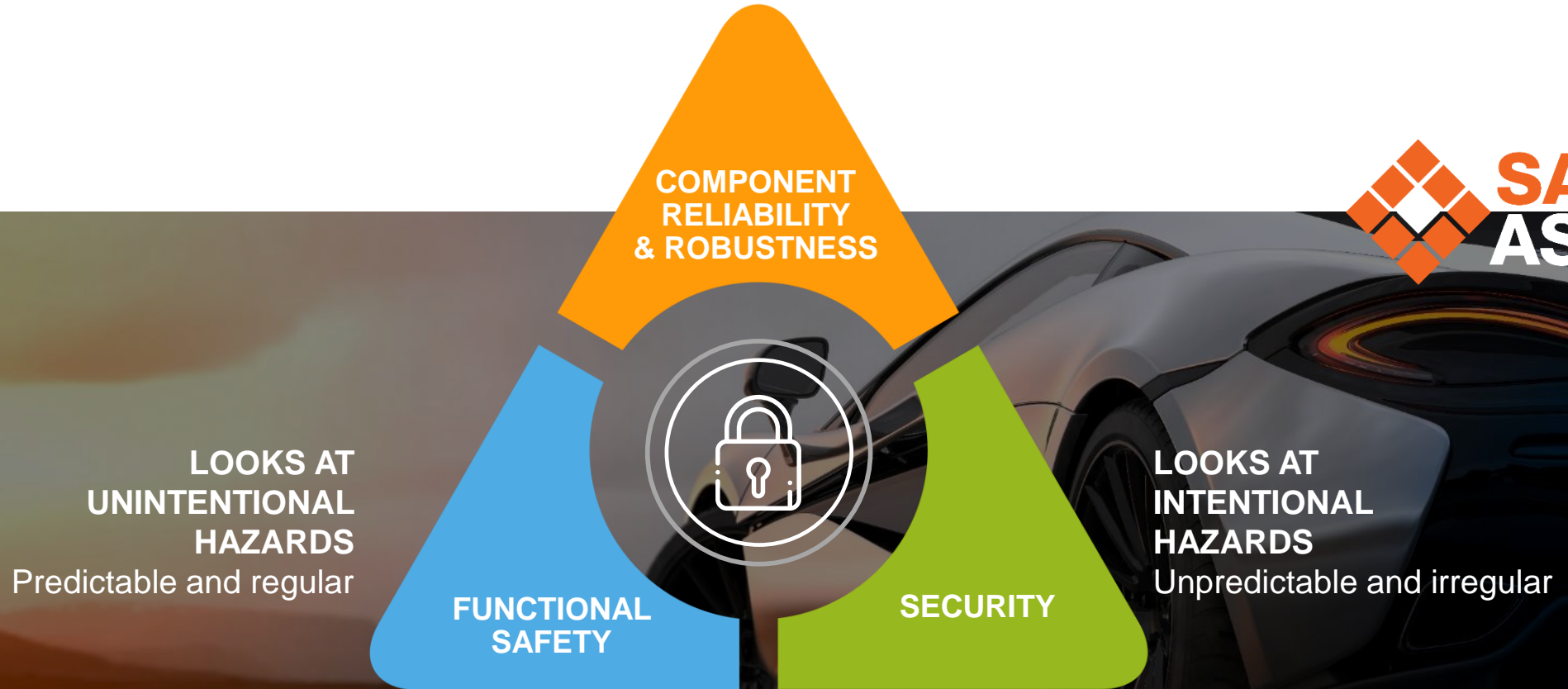
1.3 MILLION

Road traffic deaths
occur every year



SYSTEM DEVELOPMENT UNLOCKS NXP'S VALUE PROPOSITIONS FUNCTIONAL SAFETY AND SECURITY

MAXIMUM QUALITY OF COMPONENTS IS
MANDATORY FOR HIGH-VALUE SYSTEM



I.MX 8QUADXPLUS MEK SYSTEM – AVAILABLE

Part Number

MCIMX8QXP-CPU – works standalone w/o baseboard
Includes LVDS to HDMI adapter (IMX-LVDS-HDMI)

OVERVIEW

- NXP i.MX 8QuadXP
- NXP PF8100 PMIC
- 3 GB LPDDR4 memor
- 32 GB eMMC 5.0
- 64 MB Octal SPI Flash
- 5.24" x 5.24" 8-layer P

DISPLAY CONNECTO

- 2x mini-SAS MIPI / LV connectors (Combo PI
- Camera MIPI-CSI thro mini-SAS connector

AUDIO

- Audio Codec
- Microphone and head

CONNECTIVITY

- 1x full-size SD/MMC c
- 10/100/1000 Ethernet
- 1x USB 3.0 Type C



DEBUG

- JTAG connector
- Serial to USB connector

EXPANSION CONNECTOR

- M.2 Connector (PCIe, USB, UART, I2C and I2S)

ADDITIONAL FEATURES

- NXP 3-axis accelerometer & eCompass [not populated]
- NXP Gyroscope
- NXP Light Sensor
- NXP Pressure Sensor
- RGB LED
- Power supply
- No battery charger

OS SUPPORT

- Linux, Android and FreeRTOS BSPs from NXP
- Others: 3rd parties

TOOLS SUPPORT

- Lauterbach
- ARM (DS-5)

WI-FI: (NOT INCLUDED WITH KIT)

- Murata WiFi module

Part Numbers

MCIMX8-8X-BB

Includes Audio Board (IMX-AUD-IO)

CONNECTIVITY

- 1x I2C Auxiliary Connector
- 1x Tamper Head
- 1x Parallel CSI Connector
- 1x UART, 2x CAN
- 1x uUSB OTG connector
- 1x Audio In Connector,
- 1x Audio Out Connector
- 1x 10/100/1000 Ethernet connector Muxed w/ Audio port)

EXPANSION CONNECTOR

- Arduino Connector / MikroBus Interface

I.MX 8QUADPLUS MEK BOARDS AND ACCESSORIES

i.MX 8QuadXPlus MEK CPU Board
Standalone Powered
MCIMX8QXP-CPU



MEK Common Baseboard
Works with i.MX 8QuadMax and i.MX 8QuadXPlus
MCIMX8-8X-BB



4-Camera Board miniSAS
MX8XMIPI4CAM2



OV10635 MIPI Camera
MCIMXCAMERA1MP



MIPI to HDMI miniSAS Convertor
IMX-MIPI-HDMI



LVDS to HDMI miniSAS
IMX-LVDS-HDMI



OV5640 MIPI CSI board miniSAS
MINISASTOCSI



BroadReach 100 Mbps PHY
IMX-RMII-BRPHY



Std 1Gbps PHY
IMXA12ETH-ATH



POWER MANAGEMENT IC – PF8100/8200

Proven robustness,
lower risk, & shorter
time to market

- Co-developed with MCU team
- Enhanced thermal management

Reduced complexity for
functional safety
implementation

- Scalable Functional safety from QM to ASIL-B
- System level functional safety

Reduced system cost

- Scalable Architectures matched to MCU and application
- OTP configurability allows flexibility during development
- Optimize BOM size (<200mm² component area)

Faster certification
through radiation
reduction

- Multiple frequency tuning optimization



POWER MANAGEMENT IC – PF8100/8200

- **Proven robustness, lower risk, & shorter time to market**
 - Co-developed with MCU team
 - Enhanced thermal management
- **Reduced complexity for functional safety implementation**
 - Scalable Functional safety from QM to ASIL-B
 - System level functional safety
- **Reduced system cost**
 - Scalable Architectures matched to MCU and application
 - OTP configurability allows flexibility during development
 - Optimize BOM size (<200mm² component area)



PARTNERS

Digi International will deliver the Digi ConnectCore® 8X family of pre-certified, low-power SOMs and SBCs with fully integrated wireless connectivity and built-in Digi TrustFence™ security for connected industrial and medical applications.

PHYTEC launched the [phyCORE-i.MX 8X SoM and Development Kit](#). Designed for safety, security, and industrial control, the high-performance and energy efficient module features the NXP SE050 integrated cloud security chip, CAN-FD, display support and comes with PHYTEC engineering support, Linux BSP, and long-term availability.

Toradex extended its successful SoM families with the [Colibri iMX8X](#) and [Apalis iMX8X](#). These are ideal solutions for demanding applications and offer wireless connectivity, advanced HW security and safety features. The extensive ecosystem and the ready-to-use [Torizon](#) Linux OS simplifies product development and maintenance.

TQ Systems GmbH is launching two Embedded Modules / Platforms based on i.MX 8X for your reliable project development. The [TQMa8Xx/MBa8Xx](#) supports DDR3L w. ECC and also LPDDR4. The SMARC 2.1 based platform [TQMa8XxS /MB-SMARC-2](#) supports LPDDR4. Both designs are available, with personal technical support program.

Variscite is offering a complete production-ready product suite based on the i.MX 8X processor. The product suite designed to deliver the best cost/performance and power-optimized solutions with a generous longevity commitment and includes the VAR-SOM-MX8X System-On-Module, a complementary Symphony-board SBC, the VAR-SOM-MX8X evaluation kits, and full Linux/Android software support.

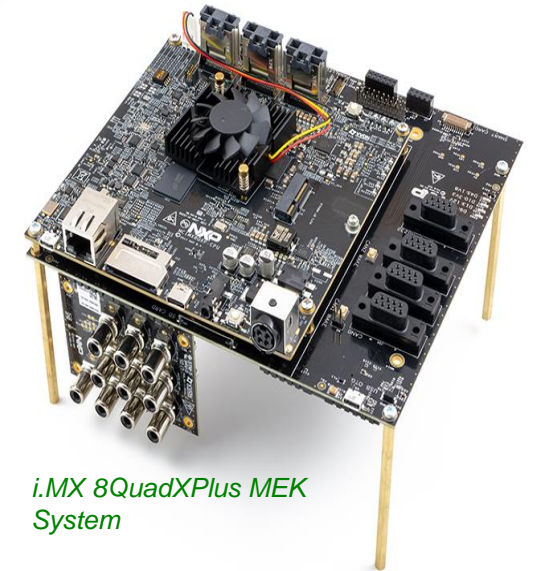
INTEGRITY FOR I.MX 8 AND 8X

- INTEGRITY® for i.MX 8/8X reference boards from NXP
 - i.MX 8QuadMax and 8QuadXPlus MEK boards from NXP.
 - Advanced multicore processing for Cortex®-A72, A53, A35
 - GPU (Vivante GC7000VX) - OpenGL ES 3.2, EGL 1.5, OpenCL
 - Camera, video, audio, communications and more
- Multivisor™ secure hypervisor
 - Safely include Linux and Android in ASIL systems
- ASIL D MULTI® IDE, C/C++ Compilers & Tool Chain
 - All Cores Supported: Cortex®-A72, A53, M4F. NEON SIMD intrinsics + auto-vectorization
 - Compiler and run-time libs qualified for ISO 26262 ASIL D, IEC 61508 SIL 3
 - Multicore debugger for Linux & INTEGRITY
 - MISRA C, Run-Time Error Checking, DoubleCheck™ code analyzer
- Green Hills Probes for JTAG and Trace
 - Multi-user, high-speed, JTAG bring-up and trace debugging
 - Cortex®-A72, Cortex®-A53, Cortex®-M4. Utilizes Arm® Coresight™
- Cryptographic Security and Secure Credential Management

INTEGRITY
OpenGL ES.

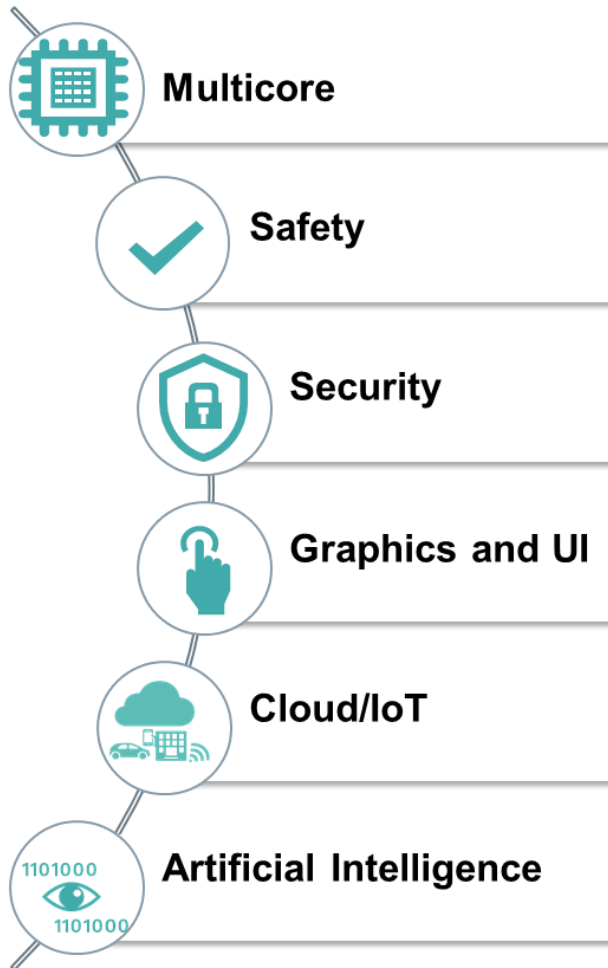


*i.MX 8QuadMax
MEK System*



*i.MX 8QuadXPlus MEK
System*

MENTOR EMBEDDED SOLUTIONS



- Mentor Embedded Linux[®] Operating Systems are commercially supported, extensible, and customizable platform that enables teams to quickly and efficiently scale to productivity.
- Nucleus[®] RTOS provides a high-performance, highly reliable, highly secure, connected embedded devices.
- Nucleus[®] SafetyCert™ is a safety certified real-time operating system and middleware package targeting high-performance, next-generation applications. It is designed to meet the stringent safety and regulatory requirements for aviation, industrial, medical, and automotive devices.
- The Mentor Embedded Multicore Framework Cert[®] allows developers to create systems of mixed safety-criticality on homogeneous or heterogeneous multicore processors. It simplifies implementation and lowers certification costs by separating safe and non safe applications.
- Mentor Embedded IoT Framework[®] supports multiple cloud platforms and enables easy, secure IoT data aggregation and transfer.
- We offer services to address the challenges of deploying Machine Learning to all embedded devices including downloading, monitoring and updating applications.

Mentor Embedded Offerings	I.MX8	
	Arm Cortex Core	
	A35, A53, A72	M4
Mentor Embedded Linux	✓	
Nucleus RTOS	✓	✓
Nucleus SafetyCert		✓
Mentor Embedded Multicore Framework Cert	✓	✓
Mentor Embedded IoT Framework	✓	✓
Machine Learning Services	✓	✓

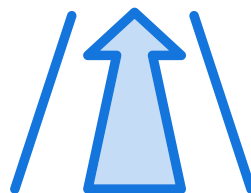
BLACKBERRY QNX SUPPORT FOR NXP I.MX8X

Available now

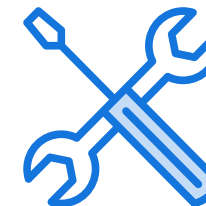
- i.MX 8QuadXPlus
- i.MX 8DualXPlus
- i.MX 8DualX

Comprehensive Support

- Advanced graphics
- Full connectivity
- Audio
- Customer hardened in production programs



**SAFETY CERTIFIED
EMBEDDED SOFTWARE
FOR MISSION CRITICAL
SYSTEMS**



**INTEGRATED
SOLUTIONS**



Robotics &
Industrial Processing



Energy



Automotive



Transportation



Medical

QNX Frameworks and Middleware

QNX Operating System

QNX Hypervisor

QNX Software Development Tools

Safety Certs

IEC 62304
IEC 61508
EN 50128*
ISO 26262



Heavy Machinery



Defense



Rail



RESOURCES

[i.MX 8X Family Product Page](#)

[i.MX 8QuadXPlus Multisensory Enablement Kit \(MEK\) Page](#)

[i.MX Software and Development Tools Page](#)

[i.MX Product Longevity Page](#)



SECURE CONNECTIONS
FOR A SMARTER WORLD