

ARM KNOWLEDGE LAB: DESIGNING THE FUTURE

DAY 2

PSOC™ Edge – ML-Enabled Microcontrollers
Venkata Appanabhotla, Infineon

Arm Knowledge Lab: Three short and compact sessions



Day 1

Secure by Design – From
Threats to Trusted Devices



Day 2

AI at the Edge – Building
Smarter Embedded Systems



Day 3

Safety-Critical Systems –
Engineering Reliability

Find more presentations from our Arm Knowledge Lab:
<https://www2.hitex.com/arm-knowledge-lab-2026-download>



PSOC™ Edge ML-Enabled Microcontrollers

April 2026



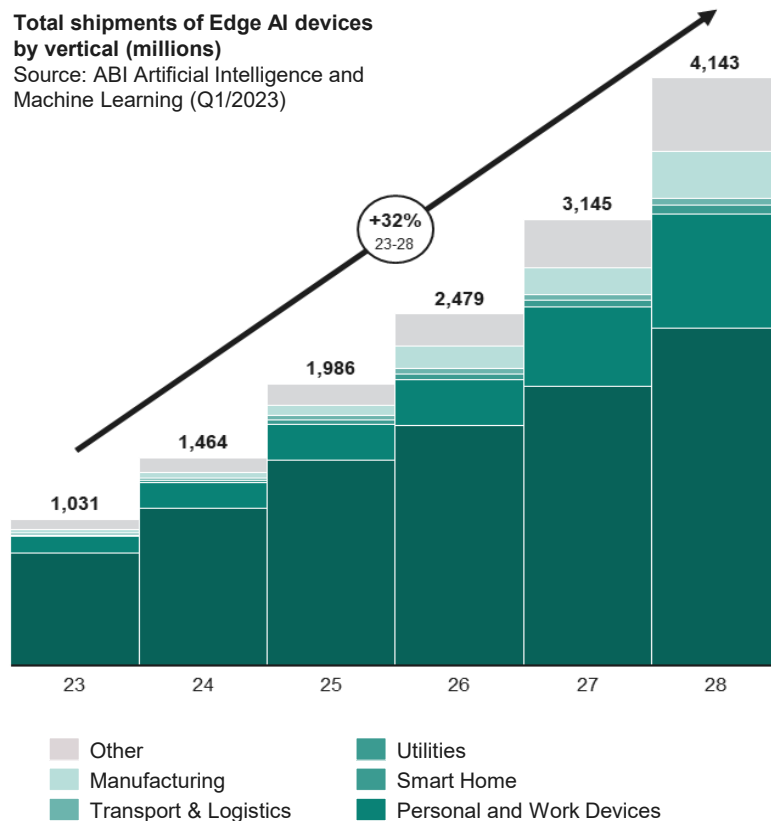
Edge AI is a key enabler of IoT and beyond, offering significant market opportunity for intelligent devices

Edge AI models run on devices at the edge of a network. Close to the source of data. Available on MCUs.

Edge AI is growing

Total shipments of Edge AI devices by vertical (millions)

Source: ABI Artificial Intelligence and Machine Learning (Q1/2023)



Benefits of Edge AI

Low latency and deterministic response: faster system response times and lower latency vs. cloud-based analytics

Improved Security & Data privacy: Data never has to leave your device, thus increasing data privacy and security

Increased system reliability: not reliant on a network that may suffer connection or bandwidth issues

Low power consumption: no streaming data leads to less power consumption

Small memory requirement: reduced memory size per processor enables smarter IoT Devices

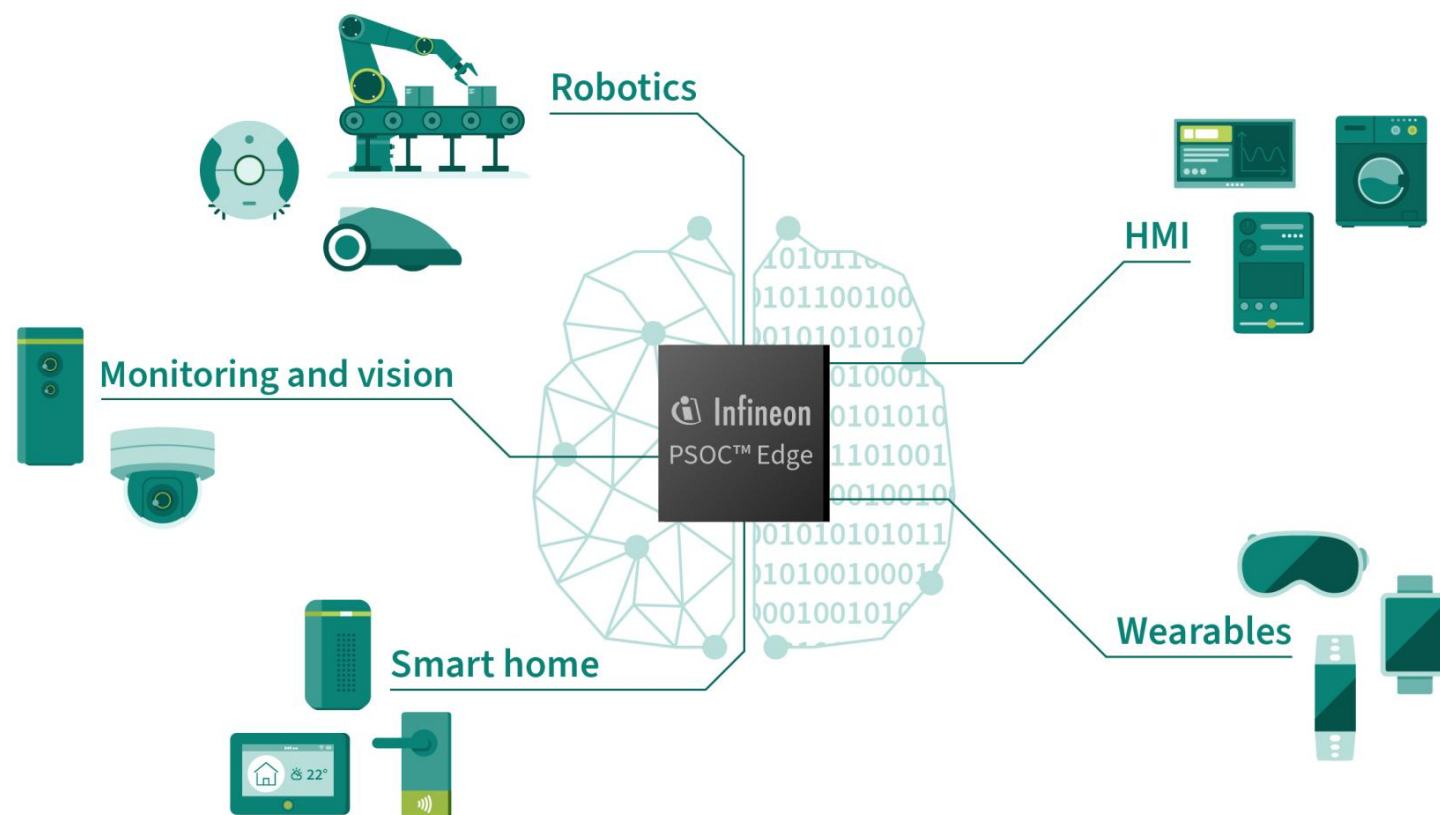
Reduced system cost: saving cloud cost



PSOC™ Edge – Infineon's Next-Generation of ML-enabled MCUs

PSOC™ Edge

- **Arm® Cortex®-M55** based micro-controllers with up to 400 MHz
- **Arm® Cortex®-M33** with up to 200 MHz
- **Ethos-U55** and **NNLite NPUs** for next-generation Edge AI applications
- **Scalable and compatible portfolio** in features, packages, pinouts, memory and performance
- **Comprehensive peripheral set**, to optimized BOM cost design
- **Highest level of security** for microcontrollers with **Infineon Edge Protect Category 4 (EPC4)** with **PSA Certified L3/L4 iSE**



Industrial/Consumer Focus: Markets and Applications

HMI



Smart Home



Wearables



Robotics



Monitoring and Vision



Markets



- Appliances
- Industrial Devices Usability
- Factory Automation



- Thermostat
- Speakers
- Door Locks



- Fitness Watch
- AR/MR/VR Glasses & Accessories
- Audio Accessories



- Vacuum Cleaner
- Vacuum Robots
- Service Robot
- Industrial Robotics



- IP Camera
- Smart Doorbell
- Security Camera & Accessories

Advanced ML

Performance/Low Power

Integration

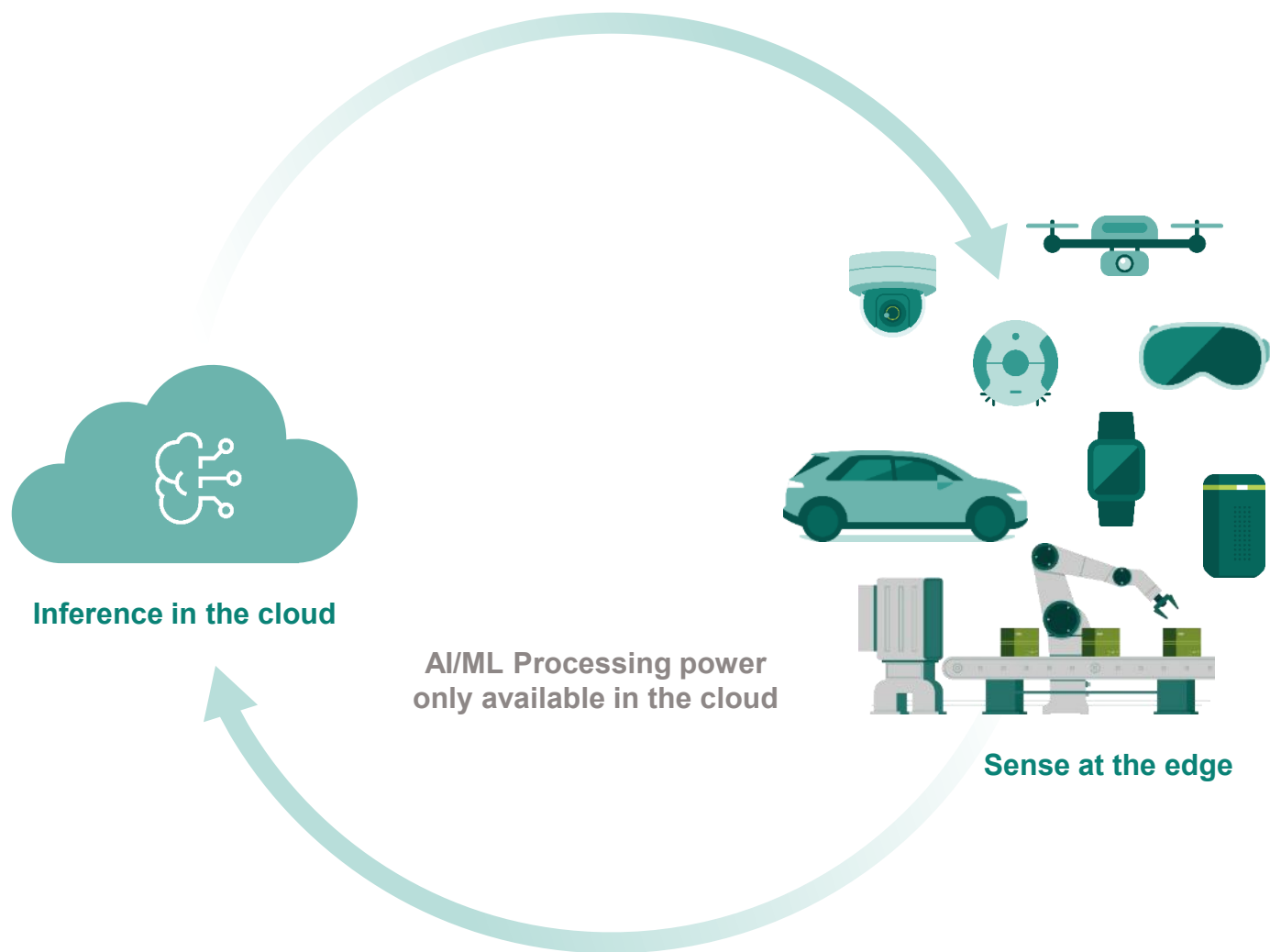
DEEPCRAFT™ AI Suite and ModusToolbox™

Infineon's Next Generation of ML Enabled MCUs

PSOC™ Edge E8

PSOC™ Edge – Portfolio and Device Overview

Status Quo – AI/ML in the cloud



Limitations of cloud AI/ML

Internet connection required

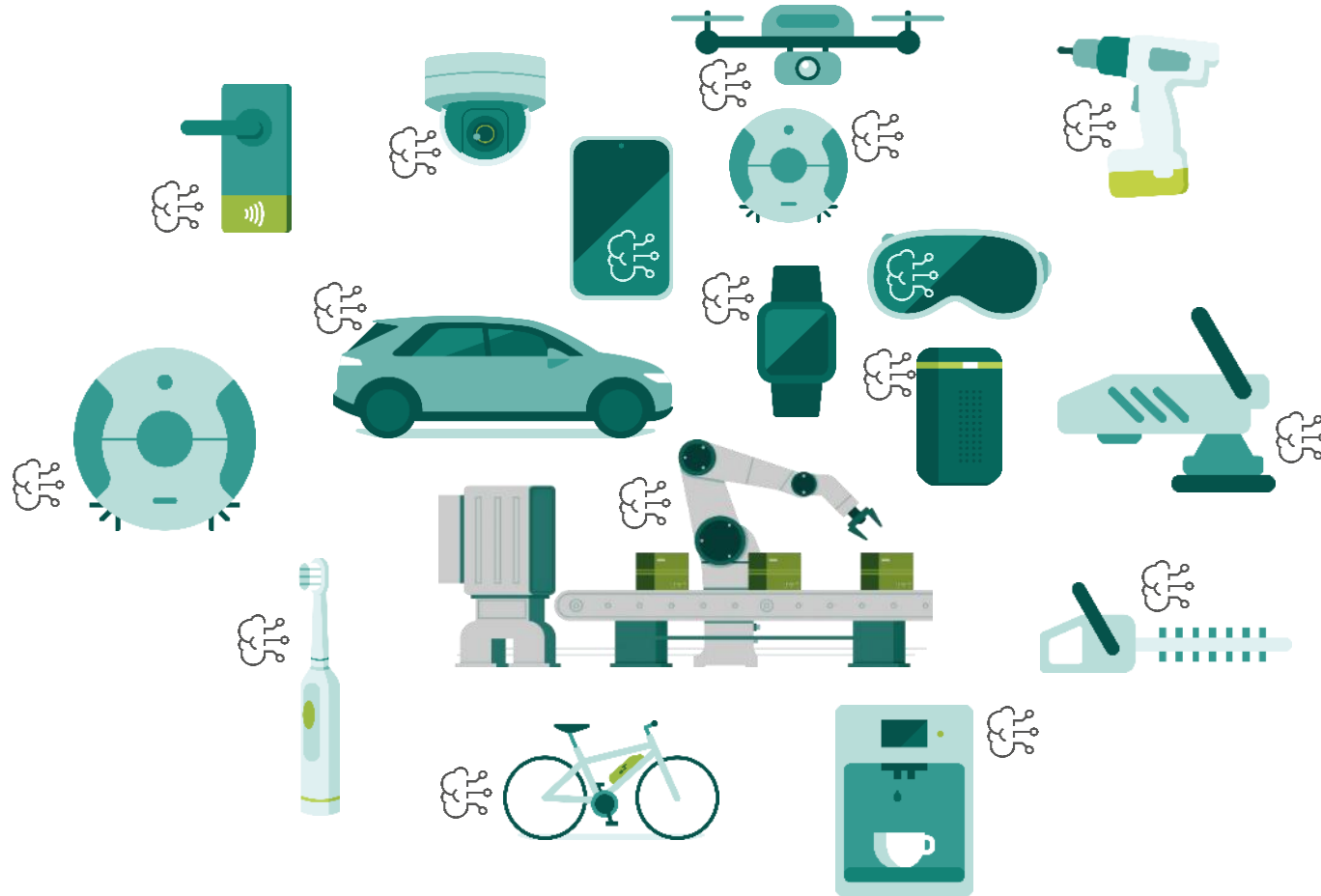
Latency and non-real-time response

Inefficient power – requires radio wakeup

Security and data privacy risks

Relatively high cost

PSOC™ Edge – AI/ML at the Edge!



Sense and Inference at the edge

Key benefits of Edge AI/ML

No internet connection required

Low latency and real-time response

Optimized power efficiency

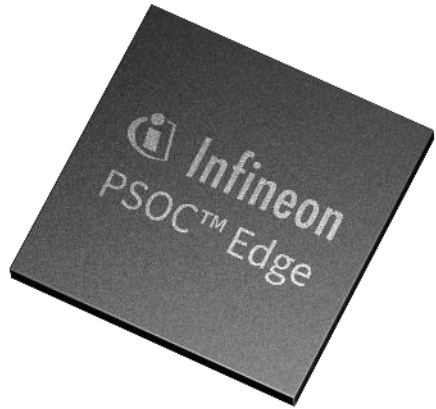
Improved security and data privacy

Reduced cost

PSOC™ Edge enables a new generation of responsive ML Edge devices



PSOC™ Edge Microcontrollers Differentiating Features & Performance



Fully Integrated MCU SoC Family with comprehensive Tools, Software & Enablement

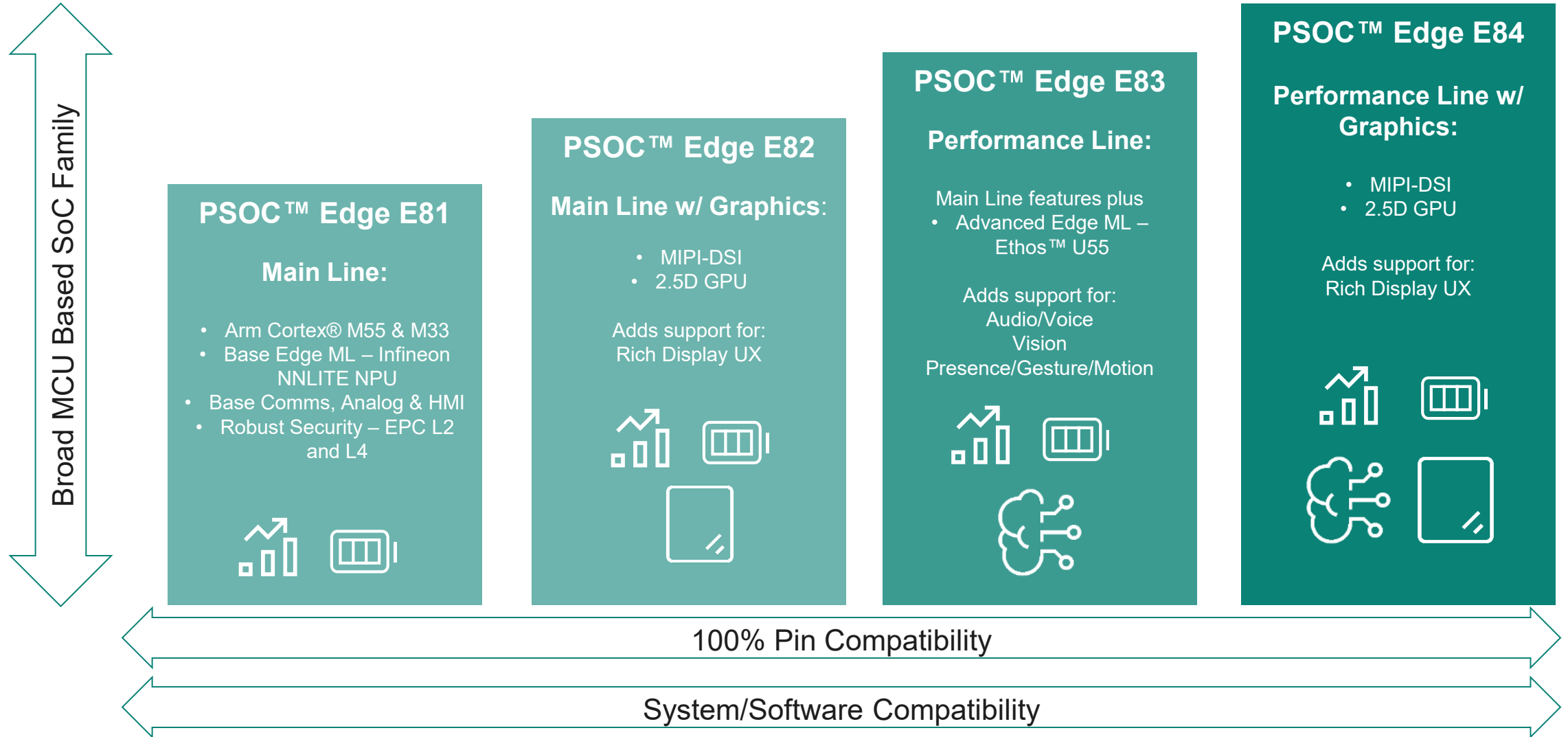
System/Software Compatibility
100% Pin Compatibility

	High Performance & Low Power Architecture – Cortex®-M55 MCU core with Helium™ DSP up to 400MHz – Always-on, low-power domain Cortex®-M33 MCU core up to 200MHz
	Energy Efficient Edge AI – Ethos-U55 at 400MHz for high-performance AI/ML HW NPU – NNLite for always-on operation NPU acceleration – Enabled by DEEPCRAFT™ AI Suite
	State-of-the-art Security – Infineon EPC4 with PSA Certified L3/L4 iSE – Secured Enclave architecture – Edge Protect Bootloader and TF-M Stack available in MTB
	Multi-modal, Advanced HMI – Voice, Natural Language & Generative AI – Accelerated multi-microphone audio performance – Vision for contextual awareness & frictionless interaction – Low-Power Graphics
	Easy-to-Use Software & Tools – ModusToolbox™: Software, tools, middleware & more – DEEPCRAFT™ AI Suite: Studio, AI Hub, Solutions & more – Hardware evaluation kits for rapid evaluation & prototyping

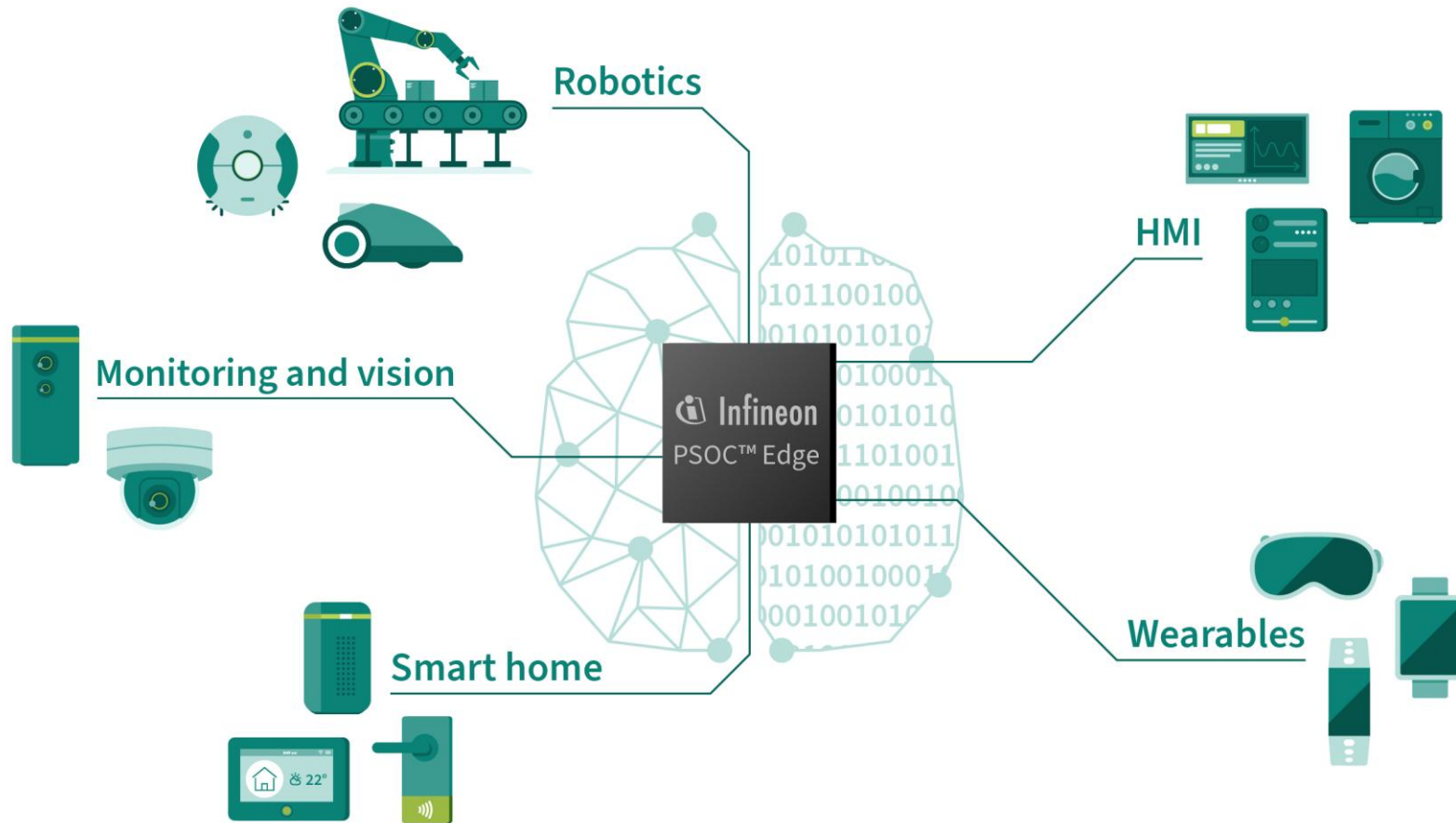
Driving tomorrow's products with:

- Advanced Features
- Lower Power
- Highest Security
- Machine Learning
 - Presence/Gesture/Motion
 - Predictive Maintenance
 - Anomaly Detection
 - Autonomous Operation
- Advanced ML
 - Voice & Natural Language
 - Vision
 - Access & Safety
- Graphics
- Motor Control

PSOC™ Edge portfolio – Next gen MCU based Edge device platform



PSOC™ Edge enabling a new generation of responsive ML Edge devices



Human Machine Interface (HMI)

- Appliances
- Industrial Device Usability
- Factory Automation

Smart Home

- Thermostat
- Speaker
- Door lock

Robotics

- Vacuum Cleaner
- Vacuum Robots
- Service Robot
- Lawn & Garden Robotics
- Industrial Robotics

Wearables

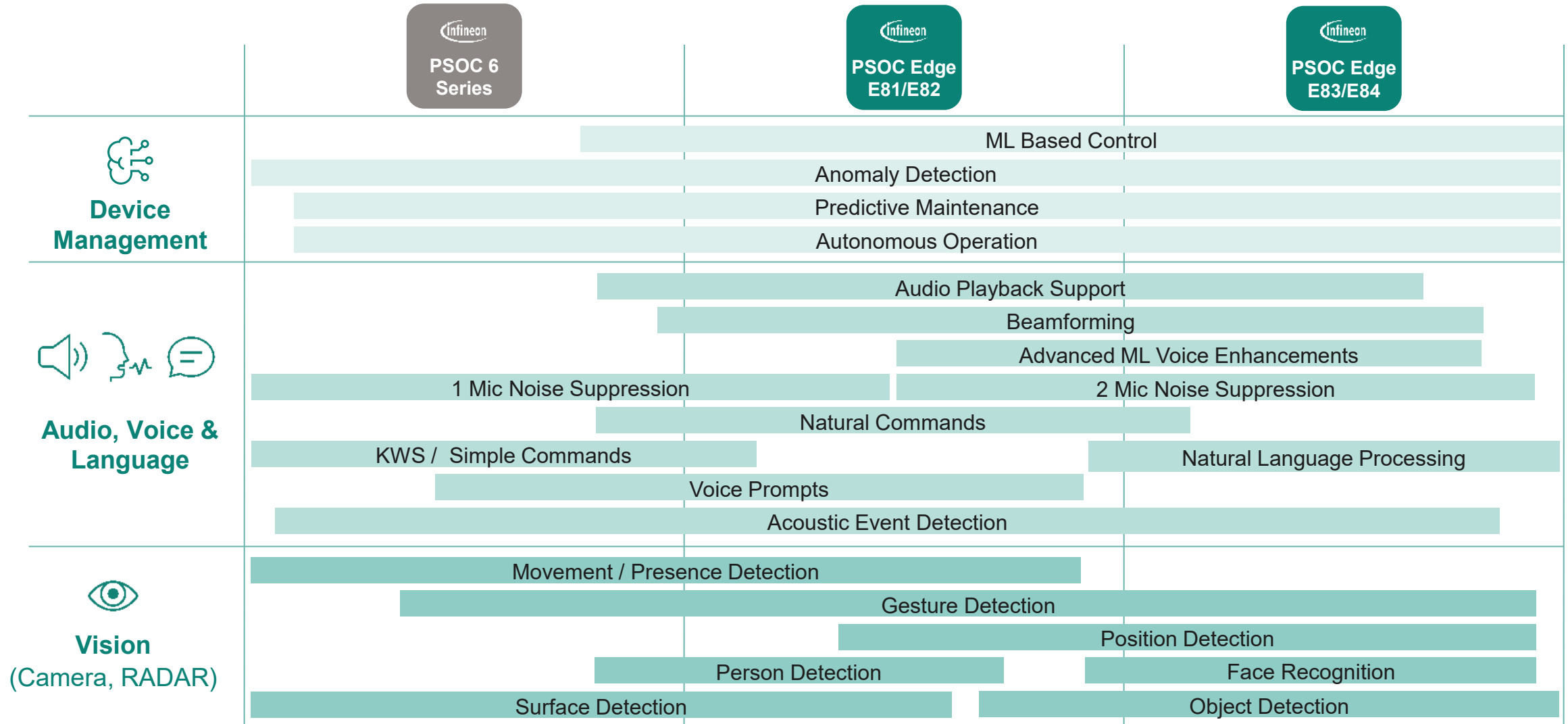
- Fitness Watch
- AR/MR/VR Glasses & Accessories
- Audio Accessories

Monitoring and Vision

- IP Camera
- Doorbell
- Security Camera & Accessories

PSOC™ Edge expands AI/ML use cases of our PSOC™ 6 portfolio

AI/ML use case compute requirements for next gen devices



PSOC™ Edge E8 MCU Family Overview



	PSOC Edge E81 Base	PSOC Edge E82 Base + GFX	PSOC Edge E83 Base + NPU + Vision	PSOC Edge E84 Base + NPU + Vision + GFX
Processor	Cortex-M55 + DSP Cortex-M33	Cortex-M55 + DSP Cortex-M33	Cortex-M55 + DSP Cortex-M33	Cortex-M55 + DSP Cortex-M33
Machine Learning	DSP NN accelerator, NNLite	DSP NN accelerator, NNLite	DSP NN accelerator, NNLite, U55-128	DSP NN accelerator, NNLite, U55-128
SRAM	Up to 4 MB (System RAM) Up to 1 MB (Low-Power Domain)	Up to 4 MB (System RAM) Up to 1 MB (Low-Power Domain)	Up to 4 MB (System RAM) Up to 1 MB (Low-Power Domain)	Up to 5 MB (System RAM) Up to 1 MB (Low-Power Domain)
RRAM / NVM	512 kB	512 kB	512 kB	512 kB
External Memory	2x SMIF, 2x SD Host Controller	2x SMIF, 2x SD Host Controller	2x SMIF, 2x SD Host Controller	2x SMIF, 2x SD Host Controller
Audio/Voice	ULP Always ON prog. analog for voice, audio, sensing 4x Analog Mic, 6x Digital Mic Acoustic Activity Detection & NNLite Wake Word	ULP Always ON prog. analog for voice, audio, sensing 4x Analog Mic, 6x Digital Mic Acoustic Activity Detection & NNLite Wake Word	ULP Always ON prog. analog for voice, audio, sensing 4x Analog Mic, 6x Digital Mic Acoustic Activity Detection & U55 ML- based Wake Word & Full Voice Inferencing	ULP Always ON prog. analog for voice, audio, sensing 4x Analog Mic, 6x Digital Mic Acoustic Activity Detection & U55 ML-based Wake Word & Full Voice Inferencing
Graphics	No	LP 2.5D GPU Up to 1024 x 768, MIPI-DSI/DBI formats	No	LP 2.5D GPU Up to 1024 x 768, MIPI-DSI/DBI formats
Vision	No	No	Position Detection/Face Recognition/Object Detection (VGA) via USB	Position Detection/Face Recognition/Object Detection (VGA) via USB
Peripherals & IO	USB, 10/100 Ethernet, CAN, SPI, UART, I2C, I3C, I2S	USB, 10/100 Ethernet, CAN, SPI, UART, I2C, I3C, I2S	USB, 10/100 Ethernet, CAN, SPI, UART, I2C, I3C, I2S	USB, 10/100 Ethernet, CAN, SPI, UART, I2C, I3C, I2S
Security	Infineon EPC4 with PSA Certified L3/L4 iSE Edge-Protect Bootloader and TF-M stack	Infineon EPC4 with PSA Certified L3/L4 iSE Edge-Protect Bootloader and TF-M stack	Infineon EPC4 with PSA Certified L3/L4 iSE Edge-Protect Bootloader and TF-M stack	Infineon EPC4 with PSA Certified L3/L4 iSE Edge-Protect Bootloader and TF-M stack
Packages	BGA-220, 10x10, 0.65p WLB-154, 4.3x5.3, 0.35p	BGA-220, 10x10, 0.65p WLB-154, 4.3x5.3, 0.35p	BGA-220, 10x10, 0.65p WLB-154, 4.3x5.3, 0.35p	BGA-220, 10x10, 0.65p eWLB-235, 7x7, 0.4p WLB-154, 4.3x5.3, 0.35p
Availability	Now	Now	Now	Now

PSOC™ Edge – Portfolio of Edge AI enabled Microcontrollers delivering energy efficient consumer and industrial applications



High-Performance, Low-Power Architecture

Cortex-M55 with Helium DSP on-demand domain - up to 400MHz
Cortex-M33 always-on low-power domain - up to 200MHz



Energy Efficient Edge AI

Ethos-U55 NPU – up to 400 MHz
Infineon's NNLite NPU – up to 200 MHz
Enabled by DEEPCRAFT™ AI Suite



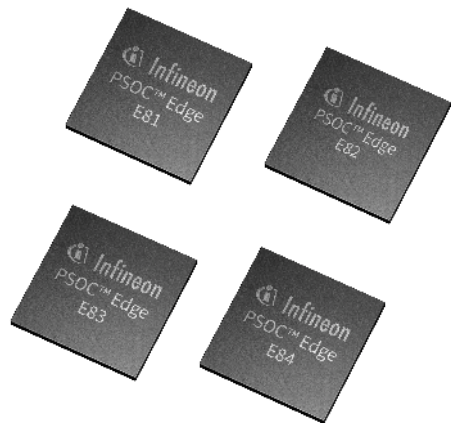
State-of-the-Art Security

Secured Enclave
Infineon EPC4 with PSA Certified L3/L4 iSE
Edge-Protect Bootloader and TF-M stack



Multi-Modal, Advanced HMI

Voice, Natural Language & Generative AI
Accelerated multi-microphone audio
Vision-based awareness & interaction
Low-Power Graphics with 2.5D GPU – up to 400MHz



Scalable and Compatible Portfolio

Easy to Use Software & Tools



ModusToolbox™

(code examples, middleware, device drivers, project creation, library management, & configuration)

DEEPCRAFT™ AI Suite Studio, AI Hub, Solutions & More

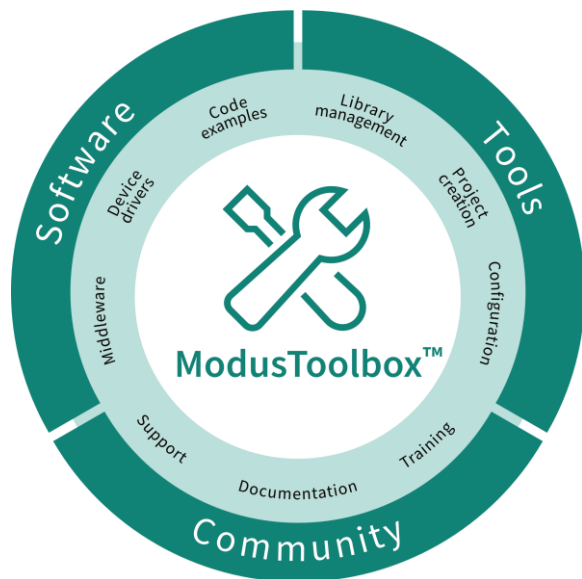


Development Kits for easy prototyping

PSOC™ Edge E8 – Ecosystem, Software and Firmware

PSOC™ Edge – Ecosystem for AI/ML Applications

ModusToolbox™

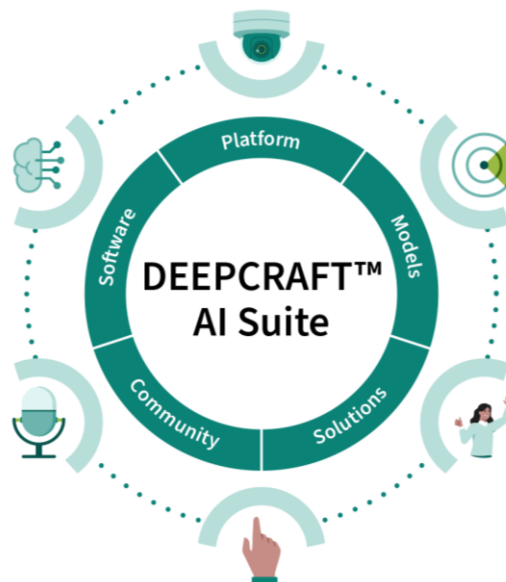


ModusToolbox™ – Comprehensive collection of resources

- Flexible development tools and resources
- Robust software, middleware, and security ecosystem

Comprehensive Zephyr RTOS enablement for seamless integration and rapid development

DEEPCRAFT™ AI Suite



DEEPCRAFT™ AI Suite - fast-track to intelligent, power-optimized Edge AI products

- Integrated platform and tools for end-to-end AI workflow
- Comprehensive AI solutions
- Centralized DEEPCRAFT™ AI Hub

PSOC™ Edge Embedded Development

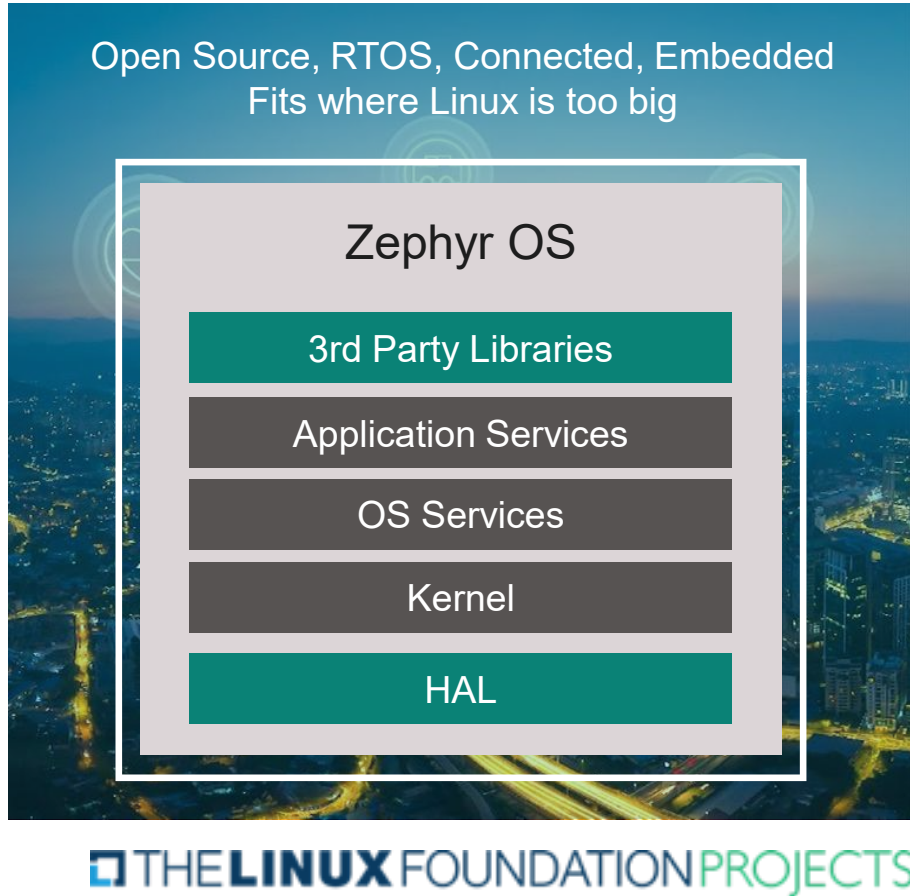


Development Boards

- **PSOC™ Edge E84 Evaluation Kit:** PSOC™ Edge Device functional evaluation
 - **PSOC™ Edge E84 SOM:** PSOC™ Edge Minimal System Module
- **PSOC™ Edge E84 AI Kit:** Low-cost kit with multiple sensors for evaluation of AI capabilities and fast prototyping

Zephyr Project Overview

A proven RTOS ecosystem, by developers, for developers



- **Open-source real time operating system**
- **Portable, secure, power-efficient**
- **Highly connected**
 - Bluetooth® LE, Wi-Fi, Ethernet, USB / USB-C, CANbus
- **Complete developer environment**
 - Toolchain and HAL management
 - Logging, tracing, debugging
 - Testing framework
- **Infineon support for:**
 - PSOC™ Edge E84
 - PSOC™ Control C3
 - AIROC™ CYW20829

and more



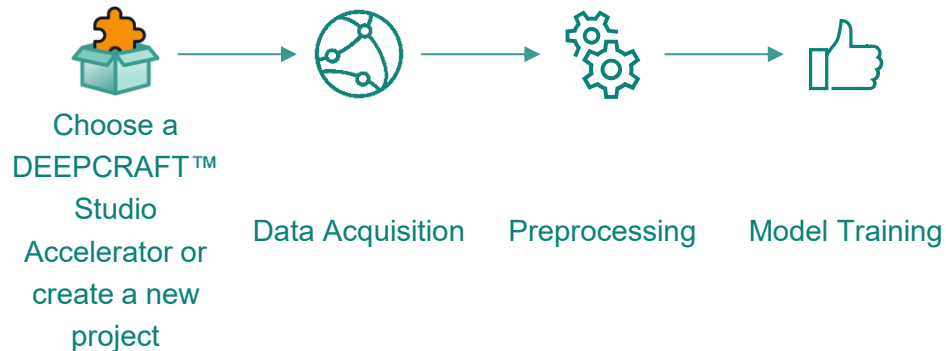
DEEPCRAFT™ Studio provides the full journey from AI/ML model development to embedded software



Build a new custom model, starting from scratch or using a DEEPCRAFT™ Studio Accelerator

Model development and customization

DEEPCRAFT™ Studio



Model optimization

DEEPCRAFT™ Studio

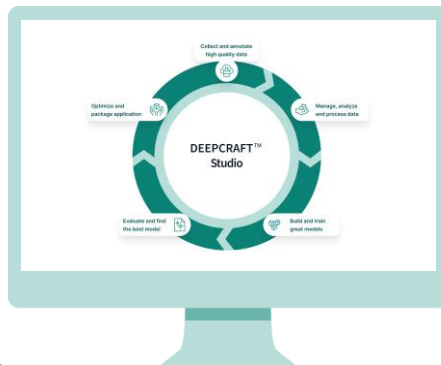


Model deployment on MCU

ModusToolbox™ - for PSOC™ and TRAVEO™



AURIX™ Development Studio



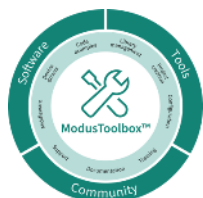
PSOC™ Edge E8 – Product Collaterals

PSOC™ Edge – More information to get started

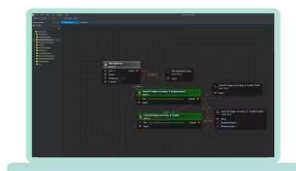
1. Get a [PSOC™ Edge Evaluation](#) or [PSOC™ Edge AI Kit](#)



2. Download [ModusToolbox™ Software](#) and Watch the [ModusToolbox™ training](#) series



3. Download [DEEPCRAFT™ Studio](#) to start developing AI models



Web Pages

- www.infineon.com/psocedge
- [PSOC™ Edge MCUs \(E81, E82, E83, E84\)](#)
 - Product Briefs, Whitepapers, Videos and Trainings, Documentation, Evaluation Kits

Development Kits

- [PSOC™ Developer Journey](#)
- [PSOC™ Edge E84 Evaluation Kit](#)
- [PSOC™ Edge E84 AI Kit](#)

ModusToolbox™

- [ModusToolbox™ Software](#)
- [ModusToolbox™ for Machine Learning](#)

DEEPCRAFT™ Edge AI Solutions

- [DEEPCRAFT™ Studio](#)
- [DEEPCRAFT™ Model Converter](#)
- [DEEPCRAFT™ AI Hub](#)
- [DEEPCRAFT™ Ready Models](#)
- [DEEPCRAFT™ Audio Enhancement](#)
- [DEEPCRAFT™ Voice Assistant](#)

Other Resources

- Applications: [Human Machine Interfaces](#), [Smart Home and Building](#)
- Products: [PSOC™ Edge](#), [CYW55513](#), [60GHz Radar](#), [Microphones](#), [PSOC™ 4000T](#), [CO2](#), [Pressure Sensor](#), [NBT 2000](#)



Hitex offerings ...



Ask alexander.hess@hitex.de – he looks forward to receiving your inquiries regarding Hitex offerings, including:

- Arm encryption libraries
- Development support and services
- Training courses for Arm, functional safety and security
- SO-DIMM compute modules for PSOC™, TRAVEO™ and more for an easy entry into the Infineon MCs.

THANK YOU.
SEE YOU NEXT TIME!

Stay informed: webinars, training sessions, knowledge labs
Find all the information at www.hitex.de