

The NXP logo is centered in the image. It consists of the letters 'NXP' in a bold, black, sans-serif font. The background features a series of colorful rays emanating from the top center, creating a sunburst effect. The rays are divided into three color zones: green on the left, blue in the center, and orange/yellow on the right. The rays are of varying lengths and thicknesses, creating a dynamic and energetic feel.

NXP

Essential NXP Platforms for Linux®

Choosing the Right i.MX Applications Processor for
Your Embedded Linux Design

NXP expands Linux capabilities for thousands of edge applications

Secure computing platforms that scale from gateways to machine learning (ML) enabled processing platforms are driving an ever-expanding world of smart, connected, applications at the edge. The Linux operating system (OS) is the most widely used open-source OS to use for devices accessing the web. The global Linux operating system market size was valued at \$18.34 billion in 2023 and growing preference for Linux OS for servers and embedded systems likely to drive growth at 20% C.A.G.R. to over \$66 billion by 2030⁽¹⁾.

Embedded system designs prefer Linux as it is a versatile, customizable, community driven operating system with large, growing ecosystem, globally available commercial tools, open-source licensing and distribution, and massive pool of skilled professional developers. Linux can be customized and fine-tuned for high levels of security and low resource use, and easily updated to support new standards. NXP provides a broad range of hardware, software, services, and support resources for the development of efficient embedded systems.

NXP i.MX Platforms for Linux

NXP's scalable i.MX processor portfolio provides secure, energy-efficient, purpose-built SoC platforms optimized for Linux-based IoT and industrial applications, including industrial gateways, electric vehicle (EV) chargers, portable medical devices, Matter platforms, smart home appliances, fitness equipment, smartwatches and other wearables. i.MX processors equipped with neural processing units (NPU) also unlock AI and machine learning (ML) capabilities for Linux platforms, further expanding the intelligent edge.

The growing i.MX processor portfolio provides an optimal mix of high performance, power efficiency, advanced features and enhanced

security, backed by a comprehensive development ecosystem geared to streamline customer product design and faster time to market. NXP's Linux board support packages (BSPs) use Yocto, an extensive and robust toolchain that helps customers create customized Linux based systems for embedded devices. This common toolchain ensures reusable Linux development efforts Across the i.MX portfolio of application processors, reducing overall development costs and maintenance.



1 - <https://www.fortunebusinessinsights.com/linux-operating-system-market-103037>

Essential i.MX Apps Processors for Linux Product Portfolio						
	i.MX 6ULL	i.MX 6ULZ	i.MX 8ULP	i.MX 93	i.MX 91	i.MX 8M Nano UltraLite
Core	Arm Cortex-A7 @ 900 MHz	Arm Cortex-A7 @ 900 MHz	2x Arm Cortex-A35 @ 800 MHz	2x Arm Cortex-A55 @ 1.7 GHz	1x Arm Cortex-A55 @ 1.4 GHz	1x / 2x / 4x Cortex-A53 (1.4 GHz)
Co-Processor	-	-	Arm Cortex-M33 @ 216 MHz	Arm Cortex-M33 @ 250 MHz	-	-
DSP	-	-	HiFi4 + Fusion DSP	Arm Ethos-U65 NPU	-	-
On-chip Memory & External Memory Interfaces	Internal: 128 KB SRAM External: LPDDR2/ DDR3L/DDR3 QuadSPI	Internal: 128 KB SRAM External: LPDDR2/ DDR3L/DDR3 QuadSPI	Internal: 896KB SRAM External: LPDDR3/LPDDR4X Octal SPI	Internal: 640 KB SRAM External: LPDDR4X/LPDDR4 Octal SPI, 3x SD/SDIO/eMMC	Internal: 384 KB SRAM External: LPDDR4 Octal SPI, 3x SD/SDIO/eMMC	Internal: 215 KB OCRAM External: DDR3L/LPDDR4
Multimedia (GPU & Video)	-	-	3D+2D GPU; PXP	PXP	-	
Operating System	Linux, RTOS	Linux, RTOS	Android, Linux	Linux, FreeRTOS, Green Hills, QNX, VNXWorks	Linux, Green Hills, QNX	Linux, RTOS
EdgeLock® Secure Enclave (Advanced profile)	-	-	Yes	Yes	Yes	-
Package	9x9 mm, 0.5mm pitch MAPBGA 14x14 mm, 0.8mm pitch MAPBGA	14x14 mm, 0.8 mm pitch BGA	9.4x9.4 mm FCBGA 15x15 mm MAPBGA	9 mm x 9 mm, 0.5 mm pitch FCCSP 11 mm x 11 mm, 0.5 mm pitch FCCSP 14 mm x 14 mm, 0.65 mm pitch FCCSP	9 mm x 9 mm, 0.5 mm pitch FCCSP 11 mm x 11 mm, 0.5 mm pitch FCCSP	11 mm x 11mm
Target Application (click link for list)	i.MX 6ULL Applications Processor Single Arm® Cortex®-A7 @ 900 MHz NXP Semiconductors	i.MX 6ULZ Applications Processor NXP Semiconductors	i.MX 8ULP Applications Processor Family NXP Semiconductors	i.MX 93 Applications Processors Family NXP Semiconductors	i.MX 91 Applications Processors Family NXP Semiconductors	i.MX 8M Nano Family - Arm® Cortex®-A53, Cortex-M7
Evaluation Kit	No Longer Available From NXP	No Longer Available From NXP	Yes	Yes	Yes, not available yet	Yes

Whatever your Linux development projects may be, NXP can meet your needs with scalable i.MX platform solutions and comprehensive support.

i.MX 91 Family

The i.MX 91 family delivers an optimized blend of the security, features and energy-efficient performance required for long-life, cost-optimized and flexible Linux controller platforms for next-generation IoT and Industrial applications.

Interoperability between NXP's i.MX 91 and i.MX 93 families' common platform accelerates development of scalable Linux platforms that easily pivot into new markets and applications, leveraging existing platform investments and streamlining product line updates.

- Secure, cost-effective and energy-efficient Linux controller platform for IoT and industrial markets
- Target applications: EV charging, Matter devices, connected appliances, printers, audio systems, gateways, essential HMI, I/O and motor control, portable medical devices, and system-on-module (SoM) computing
- Arm® Cortex™-A55 processor for efficient performance, with full-featured I/O, 2x GbE, 2x USB 2.0, and parallel display/camera for IoT and industrial applications paired with support for LPDDR4/4X memory

i.MX 6ULL/6ULZ Family

The i.MX 6ULL is a power-efficient, cost-optimized applications processor family featuring an advanced implementation of a single Arm Cortex-A7 core operating at speeds up to 900 MHz. The i.MX 6ULZ is an ultra-low-



cost extension of the i.MX 6ULL family with a high degree of functional integration targeting the consumer Linux market.

- Power-efficient, cost-optimized applications processors for the automotive edge, IoT and industrial markets
- Target applications: small engine and motor control, modems and gateways, metering, essential HMI, and wearables and hearables
- Arm Cortex-A7 core with LPDDR2/DDR3/DDR3L, 2x 100M Ethernet, 2x USB 2.0 and secure boot



i.MX 93 Family

The i.MX 93 family combines a dedicated machine learning acceleration core with state-of-the-art security and exceptional integration to deliver efficient, fast, secure ML capabilities at the edge. These family attributes enable developers to address diverse applications, from voice-assisted smart home devices to low-power industrial gateways to advanced driver assistance systems (ADAS).

- Secure, cost- and energy-efficient ML edge platform for automotive edge, IoT and industrial markets
- Target applications: driver monitoring, speech recognition, essential HMI, energy metering, EV charging, smart city infrastructure, gateways and Matter smart home devices
- 2x Arm Cortex-A55 and 1x Cortex-M33 cores, LPDDR4/4X, Arm® Ethos™-U65 microNPU, MIPI-CSI/DSI, 2x GbE, 2x USB 2.0 and EdgeLock® Secure Enclave

i.MX 8ULP Family

The i.MX 8ULP family brings ultra-low power processing and advanced integrated security with EdgeLock® Secure Enclave to the intelligent edge. i.MX 8ULP processors also feature NXP's innovative Energy Flex architecture, which combines heterogeneous domain computing, design techniques and process technology to deliver exceptional efficiency across a range of applications.

- Applications processor family for ultra-low power applications for IoT and industrial markets
- Target applications: smart home, energy-efficient audio solutions, wearables, building automation, access controllers, systems control, EV charging, vivid HMI and matter capable devices
- 2x Arm® Cortex™-A35 and Arm Cortex-M33 cores, LPDDR3/4/4X, on-chip DSP, 2D + 3D GPU, 100M Ethernet, MIPI-CSI/DSI and EdgeLock Secure Enclave
- HiFi4/Fusion DSP (instead of on-chip DSP)

i.MX 8M Nano UltraLite Family

The i.MX 8M Nano UltraLite family of products, UltraLite family provides an exceptional base for a Linux platform targeting IoT and Industrial applications that need more general-purpose compute.

- Scalable set of applications processors for IoT and industrial markets
- Target applications: smart home, energy-efficient audio solutions, wearables, building automation, access controllers, systems control, EV charging, vivid HMI and matter capable devices
- 4x Arm® Cortex™-A53 and Arm Cortex-M7 cores, DDR3L/LPDDR4, software scalable with i.MX 8M Nano and i.MX 8M Mini families

Linux software and development tools for i.MX processors

NXP's Yocto-based Linux board support packages (BSPs) help customers quickly jumpstart Linux-based designs on i.MX family of applications processors, reducing time to market for embedded products. NXP provides pre-built, ready-to-install binary images for all i.MX applications processors reference EVKs, enabling customers to quickly evaluate platform capabilities. The source code, including binaries for advanced IPs, libraries and other support files, allows our customers to build a customized bootloader, Linux kernel image, and a root file system as per their use case needs.

Available at no cost to customers, these BSPs are tested and certified to support i.MX applications processors and ensure that a fully operational toolchain, kernel and board-specific peripherals are ready to use together within a fixed configuration for i.MX hardware development tools and reference platforms.





Learn more about NXP's essential Linux solutions and support

NXP offers a variety of i.MX processor platforms and support options to best suit your Linux development needs. Our comprehensive hardware and software solutions, connectivity stacks, evaluation kits, reference designs, documentation, engineering services, Linux partner program, third-party ecosystems and open NXP communities can help you streamline Linux development and accelerate time to market. Valued Linux partners provide end-to-end device security solution and additional embedded Linux platform expertise. For more information, visit www.nxp.com/linux.