



Supported Linux for Demanding Embedded Systems

Enea has a long and proven experience in delivering generic and customized operating system solutions and software for mission-critical embedded systems on ARM and other architectures. We proudly present Enea Linux, a Yocto-compatible Linux distribution for a number of architectures. Enea Linux offloads you from challenges that you would face if building and maintaining a Linux distribution yourself. Enea Linux enables high throughput, low latency, networking, virtualization, and provides open-source development tools exclusively. You can try out Open Enea Linux for rapid prototyping, download a complete generic supported Linux distribution with source code, images and tools, or request a customer-tailored Linux kernel and distribution for your hardware.



Supported

A known weakness of the open source model is the lack of defined support and customer-specific adaptations. Enea provides customer-tailored Linux kernel configurations and BSPs, and has service capabilities for unique customer requirements on embedded Linux. Enea also provides prompt help with world-class support, and best-in-class trainings approved by the Linux Foundation.



Community Based

Enea Linux is based on the Yocto Project which is the de-facto standard for embedded Linux. Enea is a significant contributor to many software communities, which is the key to provide the best software quality and productivity. Enea is the only independent software vendor (ISV) involved in both Yocto and Linaro. Enea is kernel maintainer and one of the OpenDataPlane (ODP) drivers in the Linaro Networking Group (LNG).



Hardware Agnostic

Enea Linux runs on ARM, Intel and Power architectures, and is readily available for a wide variety of reference boards from known manufacturers. Enea's position as ISV, its expertise in BSP development, and four decades of partnership with major semiconductor companies, mainly developing ARM architectures, makes Enea Linux a reliable and flexible choice for any hardware.



Protects IPR

Usage of Free and Open Source software forces companies to deal with complicated license obligations that could jeopardize their Intellectual Property Rights. Enea secures IPR by a licensing analysis and compliance program for customers' software, ensuring compliance between all involved licenses and that proprietary context resides outside kernel space.



Communication Centric Features

Combining high throughput with low latency is crucial for Network Functions Virtualization (NFV) and Software-defined Networking (SDN) in high-performing communication platforms. Enea Linux supports key functionalities in these areas, and Enea is active in LNG to improve Linux for real-time, networking, and virtualization.



Development Tools

The Enea Linux tools suite consists solely of open source development tools covering all phases of the development process - from building Linux images to application development, including tracing, profiling, and debugging. Enea supports and verifies all tools in their host and target environment, which ensures functionality with your Linux build host system and target hardware.



Secured

Over 45 years of RTOS legacy provides Enea with a unique exposure and resulting experience in handling security risks. Security in open source software poses a number of special challenges compared to proprietary products. Enea's engagement in the OSS Security Group enables a strategic position to gain early awareness of the security risks which makes it possible to rapidly provide security patches.



Verified

Enea Linux is a thoroughly verified Linux distribution. The testing covers standards, package functionality, development tools, device drivers, benchmarks, and IP performance. Enea's test framework can host customers' hardware, which is the key to provide best-in-class verification support.

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SPECIFICATIONS	HIGHLIGHTS
<p>SUPPORT AND CUSTOMER FOCUS</p> <ul style="list-style-type: none"> ■ Enea works close to the customer ■ Enea provides what customers need <ul style="list-style-type: none"> ■ Customer-tailored, optimized Linux kernel configurations and distributions ■ BSP layers for customers' hardware ■ Cyclic tests and benchmarks on hosted customers' hardware ■ Source code upstreamed on request when beneficial for the customer ■ Trainings approved by the Linux Foundation ■ Enea Linux is supported throughout the entire product life cycle <p>LICENSE COMPLIANCE & IPR</p> <ul style="list-style-type: none"> ■ License analysis ensures that customers' proprietary context resides in user space only, thus avoiding license propagation that could jeopardize IPR ■ Compliance program ensures that all different licenses involved in customers' software are compatible with each other ■ License compliance training <p>VERIFICATION</p> <ul style="list-style-type: none"> ■ Thorough testing with daily automated tests and continuous benchmark tests ■ Packages, toolchains, tools, drivers, standards, and performance verified on various hosts and reference boards ■ ptest framework invented by Enea <p>HARDWARE ARCHITECTURES</p> <ul style="list-style-type: none"> ■ ARM[®], ARM[®] Cortex[®] ■ Power Architecture[™] ■ Intel[®] ■ Other architectures on demand <p>DEVELOPMENT TOOLS</p> <ul style="list-style-type: none"> ■ Eclipse tools and command-line tools from open source tools only (Yocto ADT) are provided with Enea Linux ■ Tools for the entire development chain <ul style="list-style-type: none"> ■ Customized image creation ■ Application testing (QEMU), debugging, tracing and profiling ■ Kernel debugging (KGDB) <p>COMMUNITY BASED</p> <ul style="list-style-type: none"> ■ Enea Linux is open source ■ Enea is active in multiple projects <ul style="list-style-type: none"> ■ The Yocto Project ■ Linaro Networking Group ■ Linux Foundation ■ Eclipse umbrella projects ■ OSS Security Group ■ Open Enea Linux, Enea's own project <p>SECURED</p> <ul style="list-style-type: none"> ■ Early awareness via OSS Security Group ■ Security patches provided <p>COMMUNICATION CENTRIC FEATURES</p> <p>Enea Linux facilitates high throughput with low latency for embedded systems, cloud, data centers, NFV, and SDN:</p> <p><i>Networking</i></p> <ul style="list-style-type: none"> ■ Packages for high-performance network communication and IP processing <ul style="list-style-type: none"> ■ Open vSwitch - virtual network switch distributed across multiple physical servers ■ NUMA - fast access to local memory in multiprocessor environment ■ Intel[®] DPDK - libs and drivers for fast packet processing on x86 platforms ■ Intel[®] DPDK vSwitch - fork of Open vSwitch ■ ODP with DPDK will make Enea Linux a perfect choice for IP processing <p><i>Real-time</i></p> <ul style="list-style-type: none"> ■ Flexible kernel preemption <ul style="list-style-type: none"> ■ Native preemption models ■ PREEMPT_RT patch models ■ NO_HZ tickless execution in isolated cores ■ Know-how - extensive Real-Time Guide with basics and optimizing techniques ■ Core isolation - the partirt tool dedicates CPUs for real-time critical tasks <p><i>Virtualization</i></p> <ul style="list-style-type: none"> ■ Various kernel configurations <ul style="list-style-type: none"> ■ KVM - fully virtualized environment to run multiple guests of a variety of operating systems, each with virtualized hardware ■ LXC - lightweight method to run multiple Linux systems (containers) on a single host ■ libvirt - API for virtual network creation and connection to guests or containers 	<p>☞ Enea delivers expertise for real-time systems since four decades</p> <p>☞ Enea delivers virtualization solutions for Linux since 2009</p> <p>☞ Enea co-drives the ODP initiative in Linaro to increase driver portability</p> <p>☞ Enea provides flexible SoC solutions for Linux and RTOS on separate cores</p> <p>☞ Enea Linux extensions secure that Enea OSE and OSEck applications can run in Linux user-space context</p> <p>GLOSSARY</p> <p>ADT = Application Development Toolkit DPK = Data Plane Development Kit IPR = Intellectual Property Rights ISV = Independent Software Vendor KGDB = Kernel GDB KVM = Kernel-Based Virtual Machine LNG = Linux Networking Group LXC = Linux Containers NFV = Network Function Virtualization NUMA = Non-Uniform Memory Access ODP = OpenDataPlane[™] OEL = Open Enea Linux OSS = Open Source Software RTOS = Real-Time Operating System SDN = Software-Defined Networking SoC = System on Chip</p> <p>LINKS</p> <ul style="list-style-type: none"> ■ Enea Linux in the Yocto Project yoctoproject.org/product/enea-linux ■ www.enea.com/linux ■ www.enea.com/solutions/Enea-Linux/Open-Enea-Linux ■ wiki.yoctoproject.org/wiki/Ptest ■ www.enea.com/Embedded-hub/whitepapers



Enea is a global software and services company focused on solutions for communication-driven products. With 40 years of experience Enea is a world leader in the development of software platforms with extreme demands on high-availability and performance. Enea's expertise in realtime operating systems and high availability middleware shortens development cycles, brings down product costs and increases system reliability. Enea's vertical solutions cover telecom handsets and infrastructure, medtech, industrial automation, automotive and mil/aero. Enea has 750 employees and is listed on Nasdaq OMX Nordic Exchange Stockholm AB. For more information please visit enea.com or contact us at info@enea.com.