

Enea® SMP Solution for Xilinx Zynq-7000

A comprehensive cross-development tool chain and runtime environment for the Xilinx Zynq™-7000 All Programmable SoC

Enea and Xilinx have a long history together, where Enea not only has provided BSPs and drivers for Xilinx boards and SDKs, as well as FPGA re-writes and updates, but also ported the Enea real-time operating system family and Enea Linux to Xilinx SoCs.

Combining a Yocto compatible Linux distribution with a compact kernel RTOS and an inter-process communications service, Enea creates a compelling SMP platform offering for designing next-generation heterogeneous systems on the Zynq™-7000, maximizing customer value and benefit.

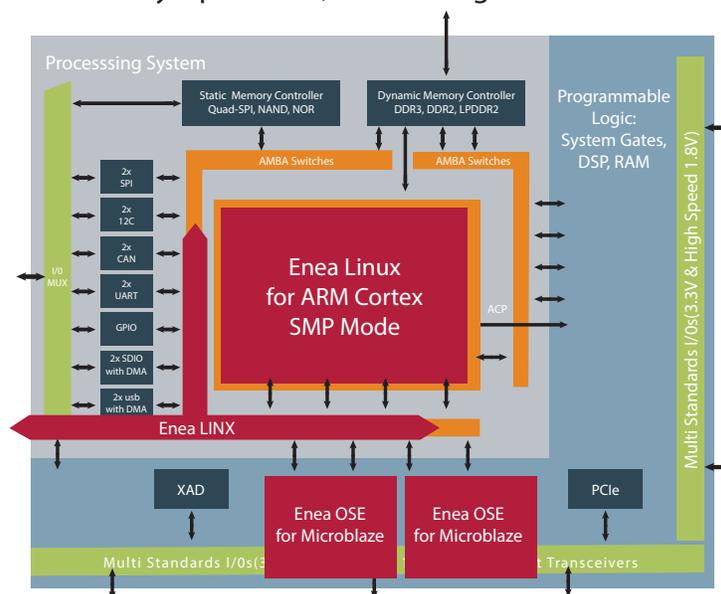


Figure 1 – The Enea SMP solution for the Xilinx Zynq™-7000.

Enea offers a complete software platform with a Linux distribution running in SMP mode on the ARM Cortex™ A9 cores, and an RTOS running on the programmable Microblazes, communicating through an inter-process communications service, shown in Figure 1:

- Enea® Linux
Yocto compatible Linux distribution
- Enea® OSE
Compact kernel real-time operating system
- Enea® LINX
Inter-process communications services

Yocto compatible Linux distribution

Enea® Linux, available for the Zynq™-7000 All Programmable SoC family, provides a comprehensive cross-development tool chain and runtime environment that may be combined with Enea and other technologies, depending on the specific use cases and requirements. The Zynq™-7000 family of devices combines the software programmability of a Processor with the hardware programmability of an FPGA, resulting in unrivaled levels of system performance, flexibility, scalability while providing system benefits in terms of power reduction, lower cost with fast time to market. Enea Linux, with optional real-time capabilities, provides the best performance optimized solution for the Zynq™-7000 SoC family.

ENEAA

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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.

www.enea.com

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Yocto Project Compatible

Enea® Linux is based on the best embedded Linux software the open source community can offer; that from The Yocto Project™. Our goal is to minimize the effort required to adopt a commercial grade Linux distribution by providing the most open flexible and well tested Yocto Compatible Linux distribution in the market.

Enea Linux Tenets

- A complete hardened embedded Linux with networking and communication focus.
- Yocto Project™ compatible.
- Linux standards compliant.
- Built and supported using Enea's unique knowledge of embedded systems and communications market.
- Stable release cycle for predictability and long term commitment.
- Adaptable to customer specific use cases and requirements.
- Dedicated global Enea Linux support teams distributed worldwide to ensure local and timely support in all regions.
- Legal insurance and responsibility.
- Real-time solutions using various approaches, e.g. RT patch, core isolation.
- Upstream service for open source community contribution.
- Integration with Enea proprietary software.

Key Components

- Linux Kernel.
- Application packages.
- Board support packages.

- Development tools.

- Build and configuration system.

Real-time operating system

The Enea® OSE family of real-time operating systems has the benefits of a compact and robust kernel with small memory footprint, combining rich functionality with high performance and true real-time behavior. It is ideal for running on the Microblazes of the programmable logic in the Zynq™-7000.

Enea® OSE has a fully pre-emptive kernel, optimized to provide low interrupt latency and high rates of data throughput, yet compact enough to meet limited memory availability.

Enea® OSE has been designed specifically for use in distributed and multiprocessor systems. Inter-process communication is completely transparent, regardless of whether the communicating processes are located on the same or a remote processor.

Enea® OSE also includes comprehensive error handling, as well as powerful application-level debugging features.

Product Features

- Designed for fault tolerant, distributed systems
- Modular, layered microkernel architecture
- Event-driven, deterministic real-time response
- Simple, intuitive, asynchronous direct message-passing model
- Scalable hybrid multicore solution - exploiting the advantages from both SMP and AMP models
- Memory protected
- Advanced error handling and remediation
- Built-in task (process) monitoring and failure detection
- Dynamic, run-time program loading
- Power management with low-power sleep mode

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- Demand paging support for optimizing RAM usage
- Comprehensive networking/security support
Distributed system-level simulation

Inter-process communications service

Enea® LINX is a high-performance, open source inter-process communication (IPC) technology for distributed real-time systems.

Utilizing a transparent, message-based protocol, Enea® LINX is platform and interconnect independent, scales well to large systems with any topology, and delivers the performance needed for high traffic bearing applications.

Enea® LINX provides a high-level message passing programming model that makes it easy to break complex applications into simpler concurrent processes, communicating via high-speed direct messages. This makes complex applications easier to conceptualize, model, partition, and debug.

It also provides transparency that separates applications from the details of the underlying hardware and physical topology, making the resulting code more scalable and easier to migrate. Applications use the same APIs for communicating with other applications, regardless of whether they run on the same CPU or on different CPUs or DSPs in the network.

Enea® LINX provides a single common IPC service that can be used throughout a distributed system, even with a heterogeneous mix of CPUs or DSPs. Suitable even for small footprint devices, Enea® LINX scales well to large networks with a large number of network nodes. The flexible addressing model maps to any network topology, and enables dynamic discovery of that topology at run time.

Designed for high-availability applications, Enea® LINX provides a powerful connection and link supervision framework for maintaining and managing the system, allowing automated fault management (with support for redundant links) and discovery and inclusion of new nodes and connected networks.

Enea® LINX is OS, CPU / DSP, and interconnect independent, meaning that it is portable to most operating systems on most CPUs / DSPs, and can be used with most device interconnects or media. Other protocols like SCTP, UDP, etc, can also be used with Enea® LINX as bearer protocols for communications.

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