MENTOR EMBEDDED
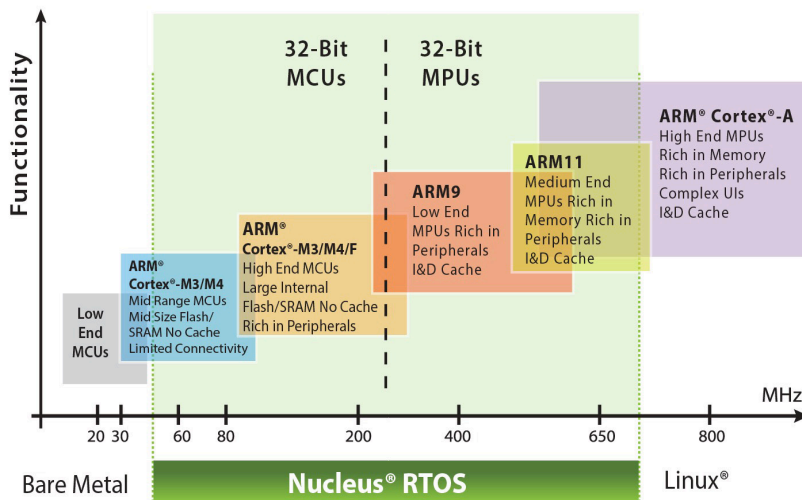# Nucleus RTOS

Nucleus easily accommodates both low-end MCUs to high-end MPUs.

The Real-time Operating System for Today's Advanced Designs

Mentor® Embedded Nucleus® RTOS enables system developers to address the complex requirements demanded by today's advanced embedded designs. Nucleus brings together integrated software IP, tools, and partner technologies into a single, ready-to-use solution – ideal for applications where a scalable footprint, connectivity, security, power management, and deterministic performance are essential.

Deployed on over three billion embedded devices, Nucleus RTOS is a proven, reliable, and fully optimized RTOS. Nucleus has been used successfully in high volume and highly demanding market areas including industrial automation, medical devices, IoT/wearables, software defined radios, smart energy systems, and more. With Nucleus, developers can deploy a hard real-time, deterministic kernel as small as 2kb on a wide selection of hardware including MCUs, DSPs, FPGAs, and MPUs. Product highlights include:

Nucleus Platform

Nucleus platform is a component of Mentor Embedded's multicore solution which enables developers to harness the power of today's advanced homogeneous or heterogeneous multicore system-on-chip (SoC) processor architectures. The solution provides the industry's broadest portfolio of runtime operating systems, integrated tools, and multicore technologies to manage the system-wide resources on these complex SoC architectures.

Scalability

Nucleus® ReadyStart consists of a single unified source tree that includes all of the Nucleus components, giving the system developer the flexibility to easily add or remove components, scaling down to 2kb if required.

PRODUCT FEATURES:

- Hard, real-time performance
- Fast boot time and submicro-second latency for interrupt service and context switching
- Reliable, scalable kernel with a small memory footprint (as low as 2kb)
- Process model for application/kernel separation and reliability
- Power management APIs for low-power designs
- A full range of integrated modules/services including: networking, file system, connectivity, and security
- Rich UI development with optimized Qt® graphics support
- Fully integrated development environment ensuring project creation, build, debug, and analysis are managed within Eclipse
- Extensive architecture support including ARM®, MIPS, and PowerPC

BENEFITS:

Reduce risk
Nucleus is market proven, having shipped in billions of products powered by hundreds of different types of MPUs/MCUs

Faster time to market
Broad range of OS modules from single vendor speeds integration and application development
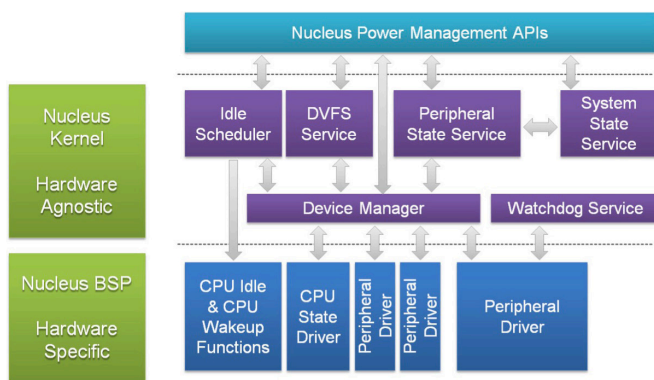
Lower production costs
Achieve desired results with less processor and memory overhead

mentor®
embedded

Process Model

The Nucleus process model adds task and library isolation to the real-time embedded platform with either an MMU or Memory Protection Unit (MPU). Developers can dynamically update application software during system operation, allowing the target to be kept up to date, even in mission critical environments.

Low Power Design

Embedded developers can now take advantage of the latest power saving features in today's processors with the Nucleus® Power Management Framework. Developers specify application requirements with high-level hardware agnostic APIs, and Nucleus automatically discovers power-aware components to help simplify the design process, increase code reuse, and speed time to market.

The Nucleus Power Management Framework.

Connectivity and Middleware

Nucleus supports optimized USB 2.0/3.0, Wi-Fi, Bluetooth, BLE, full IPv4/IPv6 "IPv6 Ready" dual-stack support, network security protocols, and a wide range of bus communication services. Nucleus also provides storage and data management options for a wide variety of file formats and physical storage devices.

Graphics and UI

Create compelling, interactive user interfaces for a spectrum of embedded applications. Graphics solutions include enhanced Qt® for embedded memory and performance optimizations, and a range of partner solutions scaling down to extremely resource-constrained MCU target platforms.

Security

Nucleus security services incorporate a range of security technologies to provide authentication, integrity, and confidentiality. For cryptographic functionality, Nucleus provides an OpenSSL-based solution, containing a rich set of algorithms and is extensively tested for reliability.

Integrated Sourcery CodeBench IDE

The Nucleus platform includes Mentor Embedded's Sourcery™ CodeBench GNU-based Eclipse development environment, which covers every aspect of embedded development, integrating a GNU-based complier and debugger with optional JTAG support.

Sourcery CodeBench includes Mentor's award-winning Sourcery™ Analyzer visual analysis tool, which is a powerful embedded design analysis solution that combines a unique profiling and analysis engine with data visualization capabilities. With Sourcery Analyzer, developers can unlock new insights and efficiently design today's complex embedded systems that integrate data from multiple operating systems on advanced SoC architectures.

More about Mentor Embedded

Mentor Graphics® Embedded Systems Division comprises the Mentor Embedded™ family of products and services, including embedded software IP, tools, and professional services to assist developers and silicon partners to optimize their products for design and cost efficiency.

For the latest product information, call us or visit: www.mentor.com/embedded