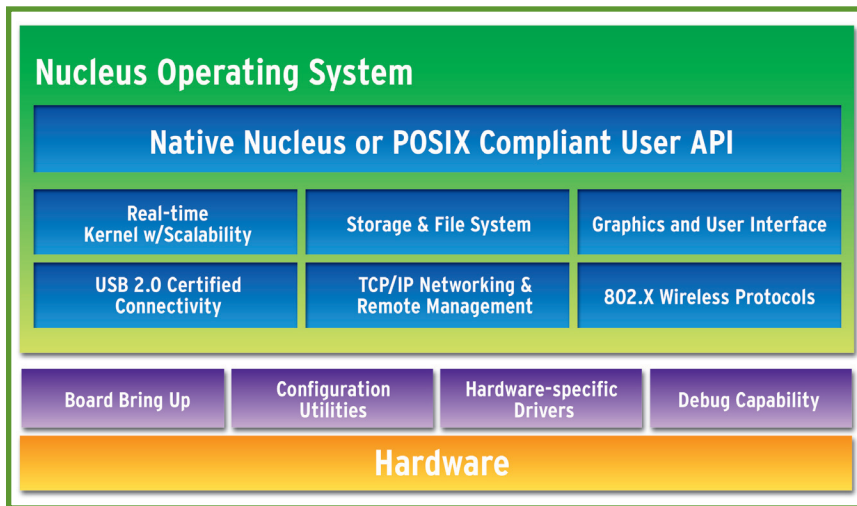


# MENTOR EMBEDDED NUCLEUS RTOS SOLUTIONS

D A T A S H E E T



*Nucleus is a proven, highly efficient OS with a comprehensive set of system services.*

## Embedded operating systems matter more today

Complex microprocessors lie at the heart of every electronic device. Embedded systems today – from mobile phones and industrial controllers, to software-defined radios and medical devices such as pacemakers and handheld monitors – all demand sophisticated software to get the job done.

The role of an embedded operating system (OS) is to provide a software foundation that interfaces to the microprocessor, delivering a set of core services upon which to build and deploy applications.

But not all operating systems are created equal. In fact, very few meet the full range of requirements demanded by today's more advanced products. These demands include real time responsiveness, high performance, low-resource usage, and breadth of services.

## Introducing the Nucleus Real Time OS

Nucleus® Real Time OS is central to the Mentor Embedded™ software solution. Nucleus empowers a full range of electronic products, and to date, has been deployed in billions of devices running on hundreds of different types of microprocessors.

## Why Nucleus is the smart choice

Not only is Nucleus a proven, highly efficient, and reliable OS, but it offers a comprehensive set of system services that scale to any target hardware. These characteristics combine to deliver best-in-class performance while reducing resource usage, enabling developers and device manufacturers alike to bring a more profitable product to market.

## Product Features:

### Hard real-time performance

The perfect choice for a wide range of embedded applications

### Broad hardware support

Out-of-box support for a vast array of microprocessors and architectures

### Resource efficient by design

Delivers excellent performance in constrained environments

### Supports a full range of OS services

Comprehensive support for networking, storage, USB, UI, and 802.1x wireless

### Scales to any target hardware

Only those OS services utilized are compiled into the final design

## Product Benefits:

### Reduce risk

Nucleus RTOS is market proven, having shipped in billions of products powered by hundreds of microprocessors

### Faster time to market

A broad range of OS services from a single vendor speeds integration and application development

### Reduce production costs

Obtain desired results with less processor and memory overhead

### Differentiate profitably

Deliver a high-end user experience with cost-effective bill of materials

### Achieve economies of scale

Consolidate development with a single OS platform across any project, processor, and architecture

## Mentor Embedded OS services include:

### Kernel

At the heart of Nucleus lies a collection of kernel services, extensions, and industry standard APIs:

- Hard real-time performance
- Dynamic task creation/deletion
- Inter-task communication and synchronization via mailboxes, queues, pipes, semaphores
- Application timers/Event flags
- Full MMU support
- Static/dynamic memory allocation; Zero-copy buffers
- Dynamic loading of code
- Familiar APIs including C++, ANSI C, POSIX

### Networking

Nucleus offers an extensive suite of network and connectivity protocols, drivers, and utilities – all built from the ground up to meet the needs of today's more complex embedded systems:

- 50+ standard IP protocols including; FTP, DHCP, SNMP, 802.11, IPSec
- Full IPv4 and IPv6 support
- BSD-like IP socket interface
- Optimized encryption libraries for secure connectivity
- Zero-copy buffers and other throughput optimizations
- Broad bus support including; PCI, PCI-X, PCI-e, I<sup>2</sup>C, etc...

### Storage & Database

Nucleus provides all that's required to store and manage data within sophisticated real-time applications:

- Unified, extensible API
- Multiple file formats; ISO9660, FAT16, FAT32, etc...
- Multiple media formats; IDE/ATA, SD, USB, etc...
- Fault tolerant file system
- Support for persistent FLASH storage

### User Interface (UI)

The UI plays an increasingly more important role in determining the success of a wide range of products today. Nucleus provides a range of services to help developers address this need:

- Efficient, low-level rendering of texts, bitmaps, shapes, and more
- Input devices include touch panel, key pad, mouse, etc...
- BSD-like IP socket interface
- Desktop-like control framework (menus, buttons, dialogs)
- Advanced, menu-driven 3D interface engine with drag-and-drop design tool
- Optional OpenGL/ES hardware acceleration support

### Wireless 802.11

Nucleus offers 802.11 a/b/g/n support (with WPA/WEP) including support for a Smart Data card IO stack on some hardware platforms. The WPA supplicant is hardware independent and includes a number of authentication protocols including:

- EAP-TLS
- EAP-TTLS
- EAP: MSCHAPv2/FAST/PAP/CHAP
- EAP MD5

### More about Mentor Embedded

The Mentor Graphics Embedded Software Division (ESD) comprises the Mentor Embedded family of products and services, including embedded software IP, tools, and professional consultant services to assist developers and silicon partners optimize their products for design and cost efficiency. Mentor Embedded continues to lead the industry with involvement in the open source community (Linux, Android, and MeeGo) and in innovations such as Android beyond mobile handsets, advanced 2D and 3D UI development, and multi-OS on multicore architectures.

## For additional information please visit us at [mentor.com/embedded](http://mentor.com/embedded)

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