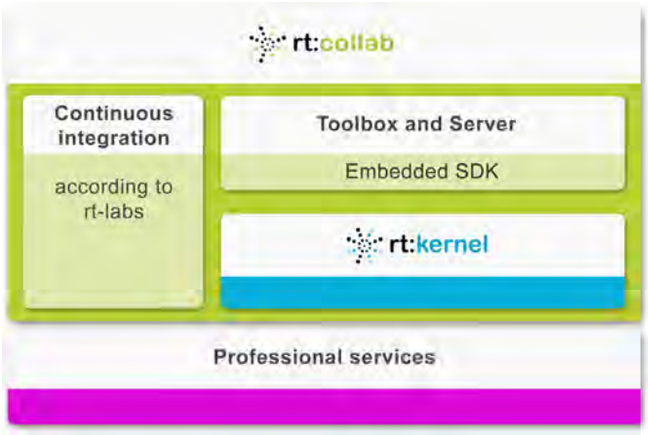
rt:kernel

a very small and very reliable
operating system for intelligent machines

rt:labs

rt-kernel® is a small, reliable and cost efficient real-time operating system for small embedded systems. Both time-triggered and event-triggered tasks can be combined in the same system through an innovative scheduling algorithm.



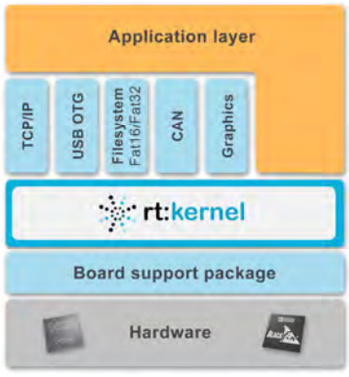
Modular architecture

rt-kernel® has been designed to be modular from the beginning and consists in its simplest configuration of a small OS-kernel and a few necessary basic primitives.

To support the different application needs, it is necessary to add additional functionality and add-on modules.

Real-time and scheduling

rt-kernel® is a multi-tasking operating system, which means that an application can execute several parallel program flows. They are scheduled according to a pre-emptive and priority based algorithm. The highest priority task ready to run, will be executed. This results in deterministic system behavior and also provides a simple and flexible framework for software development and maintenance.



For extremely time critical applications time-triggered scheduling is provided, which guarantees that each task will be executed at a certain point in time. This gives a system behavior that fulfils even the hardest real-time scenarios, for example in an engine control systems.

The two scheduling methods can be combined in the same system where the different application tasks are classified as more or less time critical. To ensure that the deadlines are always kept, the time critical tasks are assigned higher priority than all other tasks, even higher than some interrupts.

Hardware abstraction layer

rt-kernel® has a very flexible hardware abstraction layer. We are continuously developing support for new architectures and hardware platforms together with our customers.

Interrupts

When an interrupt occurs, rt-kernel® will call the interrupt routine assigned by the user. rt-kernel® has support for prioritized interrupts, where interrupts are nested and higher prioritized interrupts always interrupt the ones with lower priority.

Event control and synchronization

rt-kernel® provides several standard mechanisms for synchronization and communication between different tasks such as semaphores, mutexes, mailboxes and signals.

Error handling

At any error rt-kernel® will call an error routine assigned by the user. This solution gives a more robust and predictable system behavior compared to the traditional solution with functions returning different kinds of error codes.

Resource efficiency

Only the parts of the kernel code that are actually used are linked with the application code. This together with the fact that rt-kernel® has been developed with a minimalistic approach results in a very resource efficient end-product, with respect to both memory and processing capacity. rt-kernel® itself can be as small as 6 kB in its smallest configuration and a complete simple application can be as small as 10 kB.

These modest memory and performance requirements make rt-kernel® very well suited for smaller embedded systems or System-on-Chip solutions where both memory and I/O are integrated on one IC. It also helps our customers design energy efficient and environmental friendly products.

Reliability

rt-kernel® is small, simple and modular. Simplicity has always been a key design philosophy for us. It is therefore easier to test, secure quality and avoid unexpected surprises. rt-kernel® has been proven to be extremely reliable through thousands of hours in our lab and out in the real world, as a part of our customers' products.

Flexibility

Customer specific solutions are easy to develop thanks to the modular architecture and the intelligent linking that only links the parts required by the application. Both time and event-triggered tasks can be mixed in the same system thanks to innovative scheduling.

Cost efficiency

Developing an application based on rt-kernel® and its complete framework is easy and straight forward. Normally we are more used to flexible business models than the larger players on the market, which has been very appreciated by our customers, especially small and medium sized development companies.

rt-kernel® is currently available for ARM- PowerPC, Blackfin- and Cortex-processors. Each processor type is normally available in different families from several different manufacturers.

Please refer to the complete list on our website, www.rt-kernel.com.

rt-labs is specialized in software development for embedded systems and real-time systems for the Swedish manufacturing industry.

We offer a combination of software components, development tools, processes and consultancy services to help make your current embedded product development even more successful. By establishing good practices at an early stage, we can also help starting up a professional embedded software development organization from scratch.

Our customers are often successful and very competent within their industry and they chose to work with us due to our long experience from embedded software product development in a broad range of industries.

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