

ECHIDNA™: A RECONFIGURABLE REAL-TIME OPERATING SYSTEM FOR EMBEDDED PROCESSORS

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OBJECTIVE

To further develop Echidna™, a reconfigurable Real-Time Operating System (RTOS) for embedded processors.

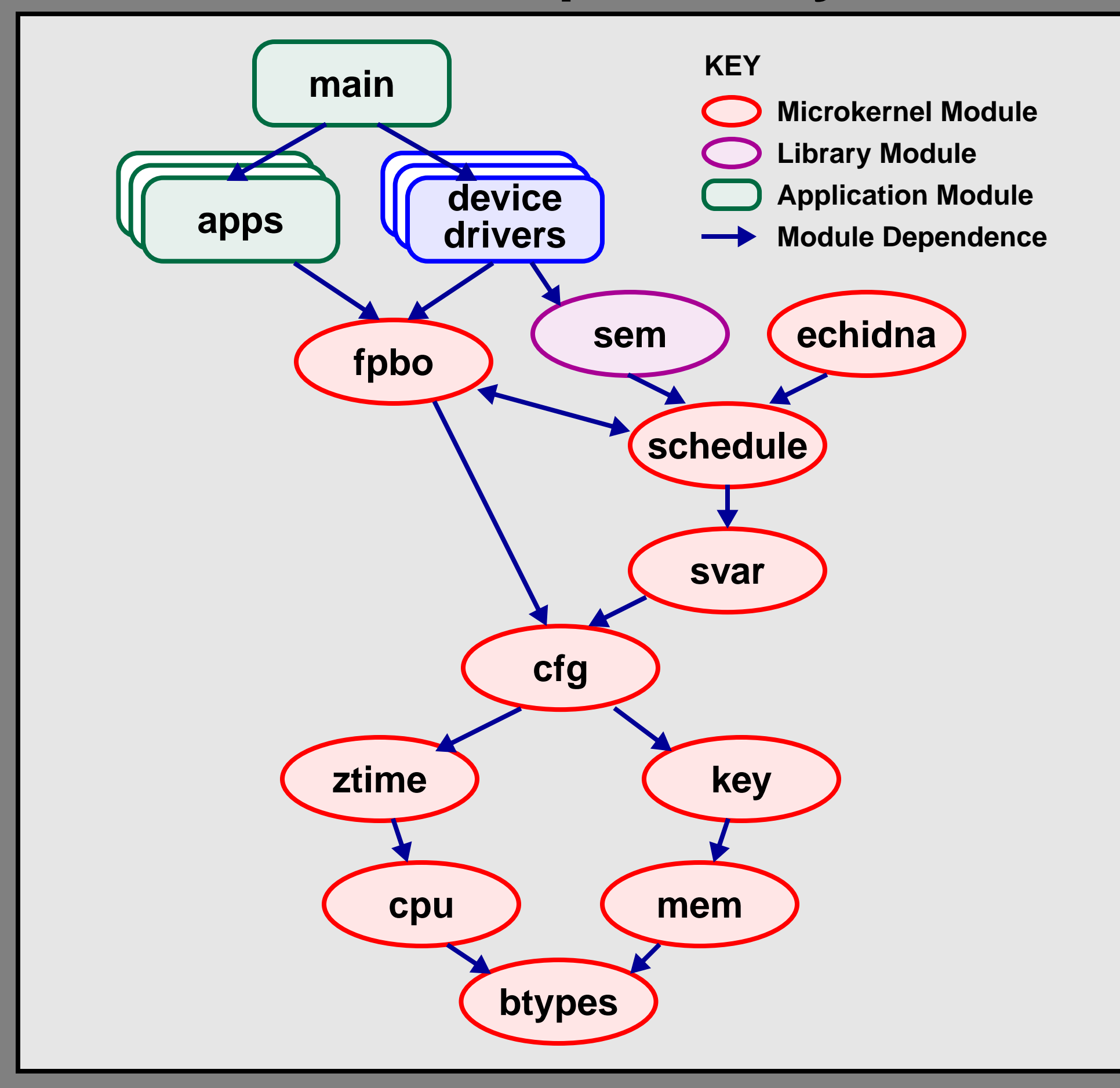
MOTIVATION

Reconfigurable software is cheaper to develop and easier to maintain. Thus, Echidna™ reduces the complexity of programming embedded systems on DSPs & microcontrollers, making telecommunications software development faster, easier, and cheaper.

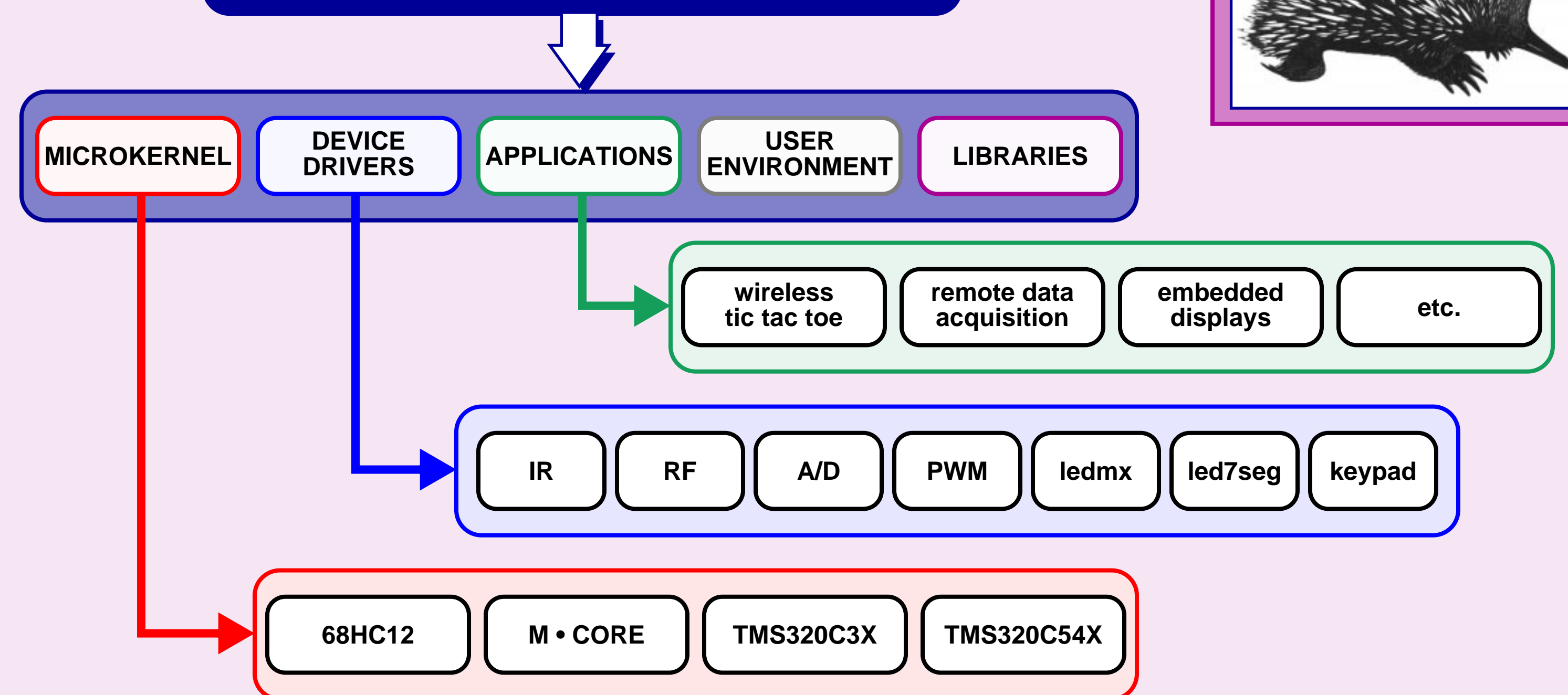
WHY RTOS?

- Hardware Abstraction
- Multiple Processes / Threads
- Simpler Virtual Machine
- Task Scheduling
- Code Re-use
- Real-Time Guarantees

Echidna™ Dependency Tree



Real-Time Operating System



“I STILL KNOW WHAT YOU DID LAST SUMMER”

- Hardware/Software co-design of I/O devices and device drivers
- Enhanced configurability for improved software reuse
- Implemented semaphores for aperiodic execution
- Provide new data types for manipulation of streaming data (e.g., audio & video)
- Integrated control and communication
- Created an experimental testbed for a wireless network of sensors & actuators

Digital Signal Processors vs. Microcontrollers

- DSPs are excellent for computationally-intensive tasks, such as filtering and FFT.
- DSPs are much faster than microcontrollers, especially for mathematical operations.
- DSPs are good for moving large amounts of data, since they have separate program and data buses.
- Microcontrollers are excellent for control applications, such as interfacing with sensors and actuators.
- Microcontrollers have many general-purpose and specialized I/O ports, including serial, PWM, CAN, A/D, and timer functions.
- Better compilers for microcontrollers than DSPs.

Echidna™ allows you to easily switch between DSPs and microcontrollers, depending on your needs.