

# **Sloth: Efficient Hardware-based Task Scheduling and Dispatching for the Automotive Domain**

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Traditional operating systems differentiate between threads, which are managed by a scheduler in software, and interrupt service routines, which are scheduled by the hardware. This inherently bears issues for real-time systems, as low-priority interrupt routines can preempt high-priority threads. The Sloth concept proposes to overcome this by implementing both interrupt handlers and threads as interrupts, which are scheduled and dispatched by the hardware. This eliminates the distinction between the two types of control flows and introduces a unified abstraction for both. With this simplification, scheduling and dispatching of threads can be managed completely by the interrupt subsystem in hardware. This approach is applicable to systems with static task priorities, such as the automotive OSEK/AUTOSAR OS standards. Our evaluation shows that the Sloth design not only prevents issues of priority inversion, but also significantly reduces event latencies and kernel footprint in general.