Linux Nios2 Documentation

The kernel development community

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CHAPTER

ONE

LINUX ON THE NIOS II ARCHITECTURE

This is a port of Linux to Nios II (nios2) processor.

In order to compile for Nios II, you need a version of GCC with support for the generic system call ABI. Please see this link for more information on how compiling and booting software for the Nios II platform: http://www.rocketboards.org/foswiki/Documentation/NiosIILinuxUserManual

For reference, please see the following link: http://www.altera.com/literature/lit-nio2.jsp

1.1 What is Nios II?

Nios II is a 32-bit embedded-processor architecture designed specifically for the Altera family of FPGAs. In order to support Linux, Nios II needs to be configured with MMU and hardware multiplier enabled.

1.2 Nios II ABI

Please refer to chapter "Application Binary Interface" in Nios II Processor Reference Handbook.

FEATURE STATUS ON NIOS2 ARCHITECTURE

Feature	Kconfig	Status	Des
cBPF-JIT	HAVE_CBPF_JIT	TODO	arch
eBPF-JIT	HAVE_EBPF_JIT	TODO	arch
generic-idle-thread	GENERIC_SMP_IDLE_THREAD	TODO	arch
jump-labels	HAVE_ARCH_JUMP_LABEL	TODO	arch
thread-info-in-task	THREAD_INFO_IN_TASK	TODO	arch
tracehook		ok	arch
debug-vm-pgtable		TODO	arch
		TODO	arch
KASAN		1	arch
kcov		TODO	arch
kgdb		ok	arch
kmemleak		TODO	arch
kprobes		TODO	arch
kprobes-on-ftrace	HAVE_KPROBES_ON_FTRACE	TODO	arch
kretprobes	HAVE_KRETPROBES	TODO	arch
optprobes	HAVE_OPTPROBES	TODO	arch
stackprotector	HAVE_STACKPROTECTOR	TODO	arch
uprobes	ARCH_SUPPORTS_UPROBES	TODO	arch
user-ret-profiler	HAVE_USER_RETURN_NOTIFIER	TODO	arch
dma-contiguous	HAVE_DMA_CONTIGUOUS	TODO	arch
cmpxchg-local	HAVE_CMPXCHG_LOCAL	TODO	arch
lockdep	LOCKDEP_SUPPORT	TODO	arch
queued-rwlocks	ARCH_USE_QUEUED_RWLOCKS	TODO	arch
queued-spinlocks		TODO	arch
kprobes-event	HAVE_REGS_AND_STACK_ACCESS_API	TODO	arch
perf-regs	HAVE_PERF_REGS	TODO	arch
perf-stackdump	HAVE_PERF_USER_STACK_DUMP	TODO	arch
membarrier-sync-core	ARCH_HAS_MEMBARRIER_SYNC_CORE	TODO	arch
numa-balancing	ARCH_SUPPORTS_NUMA_BALANCING	_	arch
seccomp-filter	HAVE_ARCH_SECCOMP_FILTER	TODO	arch
	ARCH_HAS_TICK_BROADCAST	TODO	arch
clockevents	!LEGACY_TIMER_TICK	ok	arch
context-tracking	HAVE_CONTEXT_TRACKING	TODO	arch
irq-time-acct	HAVE_IRQ_TIME_ACCOUNTING	TODO	arch
virt-cpuacct	HAVE_VIRT_CPU_ACCOUNTING	TODO	arch
	cBPF-JIT eBPF-JIT generic-idle-thread jump-labels thread-info-in-task tracehook debug-vm-pgtable gcov-profile-all KASAN kcov kgdb kmemleak kprobes kprobes-on-ftrace kretprobes optprobes stackprotector uprobes user-ret-profiler dma-contiguous cmpxchg-local lockdep queued-rwlocks queued-spinlocks kprobes-event perf-regs perf-stackdump membarrier-sync-core numa-balancing seccomp-filter arch-tick-broadcast clockevents context-tracking irq-time-acct	CBPF-JIT HAVE_CBPF_JIT generic-idle-thread GENERIC_SMP_IDLE_THREAD jump-labels HAVE_ARCH_JUMP_LABEL thread-info-in-task THREAD_INFO_IN_TASK tracehook HAVE_ARCH_TRACEHOOK debug-vm-pgtable ARCH_HAS_DEBUG_VM_PGTABLE gcov-profile-all ARCH_HAS_GCOV_PROFILE_ALL KASAN HAVE_ARCH_KASAN kcov ARCH_HAS_KCOV kgdb HAVE_ARCH_KGDB kmemleak HAVE_DEBUG_KMEMLEAK kprobes HAVE_KPROBES kprobes-on-ftrace HAVE_KPROBES optprobes HAVE_OPTPROBES stackprotector HAVE_STACKPROTECTOR uprobes ARCH_SUPPORTS_UPROBES user-ret-profiler HAVE_USER_RETURN_NOTIFIER dma-contiguous HAVE_OMPXCHG_LOCAL lockdep LOCKDEP_SUPPORT queued-rwlocks ARCH_USE_QUEUED_RWLOCKS queued-spinlocks ARCH_USE_QUEUED_RWLOCKS queued-spinlocks ARCH_USE_QUEUED_RWLOCKS queued-spinlocks ARCH_USE_QUEUED_RSTACK_DUMP membarrier-sync-core ARCH_HAS_MEMBARRIER_SYNC_CORE numa-balancing ARCH_SUPPORTS_IUMA_BALANCING seccomp-filter HAVE_ARCH_SICK_MICK_TICK_BROADCAST clockevents !LEGACY_TIME_ACCOUNTING irq-time-acct HAVE_IRQ_TIME_ACCOUNTING	cBPF-JITHAVE_CBPF_JITTODOeBPF-JITHAVE_EBPF_JITTODOgeneric-idle-threadGENERIC_SMP_IDLE_THREADTODOjump-labelsHAVE_ARCH_JUMP_LABELTODOthread-info-in-taskTHREAD INFO IN TASKTODOtracehookHAVE_ARCH_TRACEHOOKokdebug-vm-pgtableARCH_HAS_DEBUG_VM_PGTABLETODOgcov-profile-allARCH_HAS_GCOV_PROFILE_ALLTODOkASANHAVE_ARCH_KASANTODOkcovARCH_HAS_KCOVTODOkgdbHAVE_ARCH_KGDBokkmemleakHAVE_DEBUG_KMEMLEAKTODOkprobesHAVE_EXPROBESTODOkprobes-on-ftraceHAVE_KPROBESTODOkretprobesHAVE_KRETPROBESTODOstackprotectorHAVE_STACKPROTECTORTODOuprobesARCH_SUPPORTS_UPROBESTODOstackprotectorHAVE_STACKPROTECTORTODOuprobesARCH_SUPPORTS_UPROBESTODOdma-contiguousHAVE_DMA_CONTIGUOUSTODOdma-contiguousHAVE_DMA_CONTIGUOUSTODOcmpxchg-localHAVE_CMPXCHG_LOCALTODOlockdepLOCKDEP_SUPPORTTODOqueued-rwlocksARCH_USE_QUEUED_RWLOCKSTODOkprobes-eventHAVE_REGS_AND_STACK_ACCESS_APITODOperf-regsHAVE_PERF_REGSTODOperf-regsHAVE_PERF_USER_STACK_DUMPTODOmembarrier-sync-coreARCH_HAS_MEMBARRIER_SYNC_CORETODOnuma-balancingARCH_HAS_MEMBARRIER_SYNC_CORETODO

Table 1 - continued from p

Subsystem	Feature	Kconfig	Status	Desc
vm	batch-unmap-tlb-flush	ARCH_WANT_BATCHED_UNMAP_TLB_FLUSH	_	arch
vm	ELF-ASLR	ARCH_HAS_ELF_RANDOMIZE	TODO	arch
vm	huge-vmap	HAVE_ARCH_HUGE_VMAP	TODO	arch
vm	ioremap_prot	HAVE_IOREMAP_PROT	TODO	arch
vm	PG_uncached	ARCH_USES_PG_UNCACHED	TODO	arch
vm	pte_special	ARCH_HAS_PTE_SPECIAL	TODO	arch
vm	THP	HAVE_ARCH_TRANSPARENT_HUGEPAGE	_	arch