Notes on "Porting the Linux Kernel to the Ajit processor"
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Kernel's memory layout:
- Current kernel image size is about 2MB (the size depends on way the kernel is configured, the number of drivers enabled, etc.)

- The kernel is always present in the physical memory at a fixed address. It is never swapped out. Further, a range of virtual addresses in every process' virtual address space is reserved for the kernel. Thus the kernel is always accessible to user programs.

- The range of virtual addresses reserved for the kernel is 0xC0000000 to 0xFFFFFFFF (Total 1GB). The rest of the address space (3GB) is available for the user process.

- However, the execution of kernel routines or writes to the kernel segment must be allowed in supervisor model only. System calls provide a mechanism by which user code can access kernel routines. A system call is essentially a software interrupt. The software interrupt causes the processor to enter supervisor mode and jump to a specific kernel routine.

Sparc specific: Kernel symbols start at virtual address 0xF0004000. This is mapped to physical address 0x00004000

Bootloader: (os/Ajit_linux/Ajit_bootloader)
- The Ajit bootloader is located at VA=0x0 and also placed in physical memory at address 0. Since the kernel symbols start at physical address 0x00004000, the bootloader can occupy memory up to address 0x00003FFF (up to 16 KB).
- Bootloader has nearly 100 instructions,
    - does the MMU initialization,
    - sets up the virtual to physical address translation and
    - jumps to the kernel coden(F0004000)
- os/Ajit_linux has the linux kernel → modified to Ajit_linux kernel

Ajit linux kernel:
- Derived from Linux 3.16.1
- Buildroot is used for generating a cross-compiler and obtaining a root-file system
- Ajit_linux/Documentation/Readme
- Modifications done: are in arch/sparc

- Serial driver is in tty/serial/Ajitserial.c
- Blob part is in the kernel
- Kernel requires the device tree routines to be supplied
- Romvec pointer is passed to the kernel in setup_32.c
- Serial and timer addresses are hardwired
- A patch has to be applied to the assembly file generated by the device tree compiler to make the syntax acceptable to the gnu sparc-assembler

Kernel memory map:
- Readme: /os/Ajit_linux/Documentation/Readme
- Ajit_linux/Documentation/Readme: (6) and (7) can be modified
- 2 configs:
    - Defconfig : buildroot's top-level configuration file
    - Linuxkernel config : kernel configuration file