Computer Systems Organisation (CS2.201)

Summer 2021, IIIT Hyderabad

28 July, Wednesday (Lecture 28) – Virtual Memory

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Virtual Memory (contd.)

Advantages

Virtual memory has two main advantages: memory management and memory protection:

- As a tool for memory management (or allocation), virtual memory aids in the use of RAM as a cache for the hard disk. It also simplifies sharing (communication between processes or IPC), linking (combining object files) and loading (moving code from hard disk to memory).
- As a tool for memory protection, virtual memory enables us to store "permissions" for memory blocks (in the form of bits in the page table).

Address Translation

The task of the MMU is to convert a virtual address to a physical address.

In the virtual address, if the page size is 2^n bytes, the LS n bits (the page offset) identify the byte we need to access in the page; it is unchanged from the virtual to the physical address. The remaining part of the address form a virtual page number, which is converted to the physical page number by looking it up in the translation lookaside buffer (TLB).