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COP 6726: Database Systems Implementation
Spring 2018
Weekly Assignment 3

02-06-2018

- Virtual Memory System
- Up to Intel 386 processor there was no memory protection and each program would fight for the same memory
- That meant every application had to have a robust system to yield memory… including OS otherwise those memory locations would be locked away.
- OS figured out a new mode called protected mode … where interrupts would be disabled while the protected mode was on.
- 386 supported 4 privilege levels, Linus used Rings 0 and 2 in Linux operating system.
- Linux came around launch of 386 chip so leveraged a lot of the new feature from the first version.
- Introduction of Virtual Memory System provided isolation of memory between applications
- It provided an index that maps virtual memory locations to physical address locations
- Now kernel is the only one which had access to shared memory locations.
- In case one of the processes accessing the shared location tries to change it, kernel allocates a duplicate copy of the memory to make sure that nothing gets changed for another process accessing that shared memory.
- All modern processors support 48 bit VMem. That's a 256GB limit instead of the 4 GB limit in 32bit Vmem
- Right now there are 4TB RAM solutions out there is industry
- mmap memory map
- They allow direct manipulation of Vmem system
- They were used to map files to memory in a lazy loading method.
- Alignment is memory is very big deal

02/08/2018

- Perf abstract system data in linux
- Professor basically showed a demo of this tool in class.
- It's in linux-common-tools package
- sudo apt install linux-common-tools
- There are many commands you can run on Perf, this helps you deal with the system at a level where you can see all the OS level details
- sudo perf top - returns current processes or threads.
- sudo perf record - starts recording all events

- sudo perf report - shows the usage statistics report
- Its like the Process manager in windows, but in commandline. So you can use this tool to figure out the details of V mem that a process uses and learn how the V Mem actually works.