Indian Institute of Technology, Kharagpur
Department of Computer Science and Engineering

Advances in Operating Systems

ASSIGNMENT 1: LOADABLE KERNEL MODULE

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1. Assignment 1

1.1 Remove NUMA memory allocation, scheduler, and emulation

NUMA support was removed by switching the menuconfig option for the Linux kernel version 5.10.191.

To remove it, we unselect it from *Processor type and features -> NUMA Memory Allocation and Scheduler Support.*
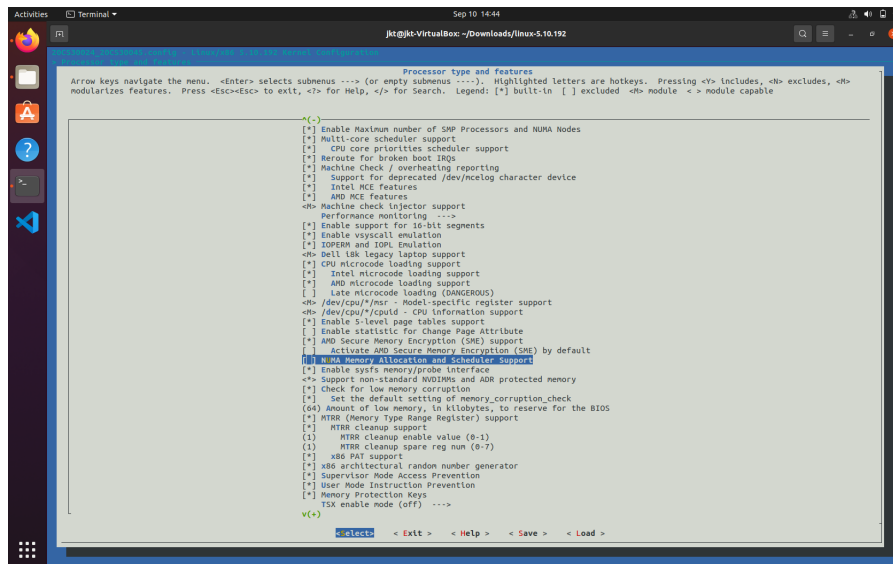

Figure 1: NUMA menuconfig option

On deselecting this option, it automatically removes the 3 sub-options which had been selected. As we can see in the following screenshot, `numactl --hardware` returns no NUMA available, which indicates that NUMA has been disabled.
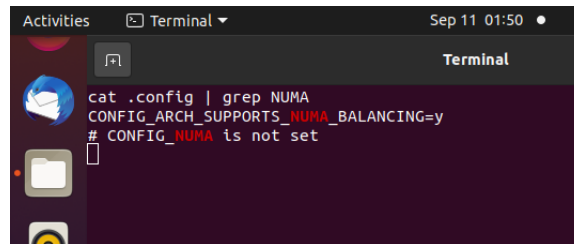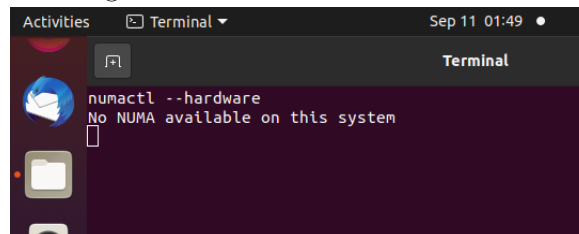

Figure 2: NUMA disabled verification

Figure 3: `numactl` output

1.2 Remove Kyber I/O Scheduler

Kyber I/O Scheduler support was removed by switching the menuconfig option.
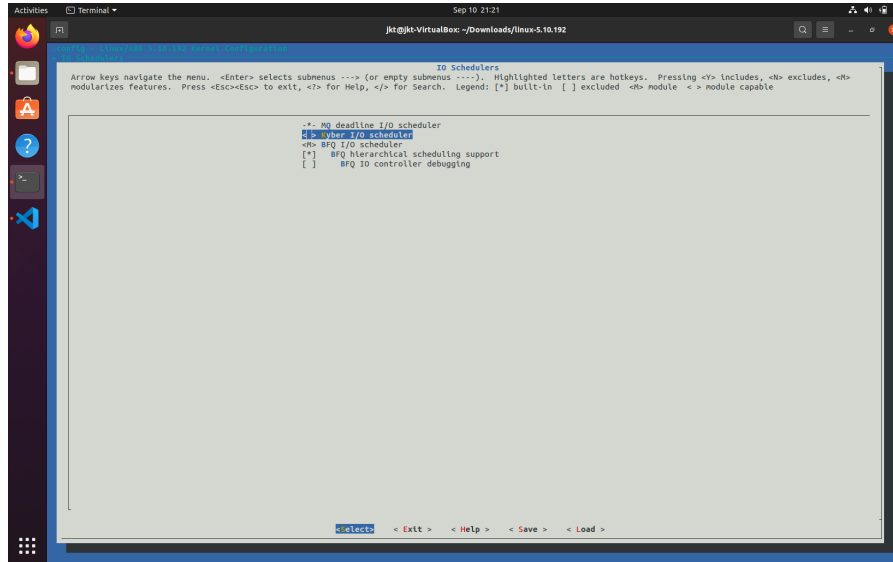To remove it, we unselect it from *IO Schedulers -> Kyber I/O scheduler.*

Figure 4: Kyber I/O menuconfig option

As we can see in the following screenshot, the IO scheduler option has been disabled in the config file, and the directory shows that the kernel module file is present.
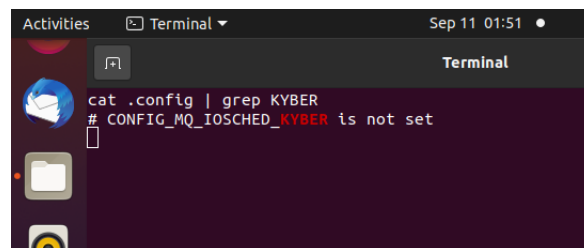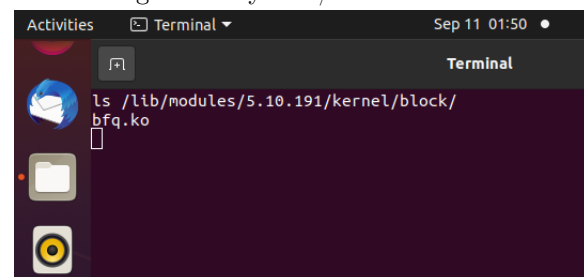

Figure 5: Kyber I/O Verification

Figure 6: Kyber I/O Verification

1.3 Include multipath TCP (MPTCP)

MPTCP support was ensured by checking the menuconfig option for MPTCP.
To remove it, we select it from *Networking support -> Networking options -> MPTCP: Multipath TCP*.
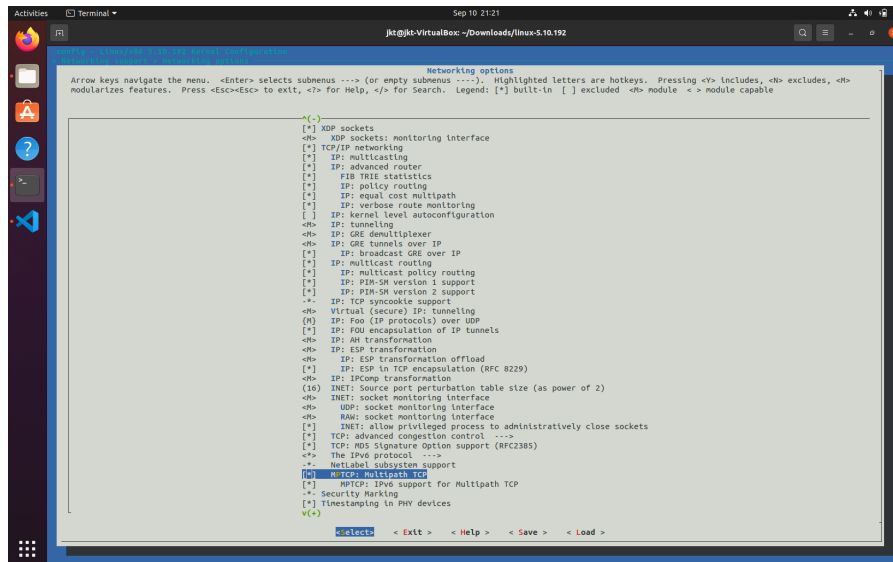

Figure 7: MPTCP menuconfig option

As we can see in the following screenshot, the MPTCP been loaded in the kernel as is visible from the output of the kernel ring buffer (`dmesg`).
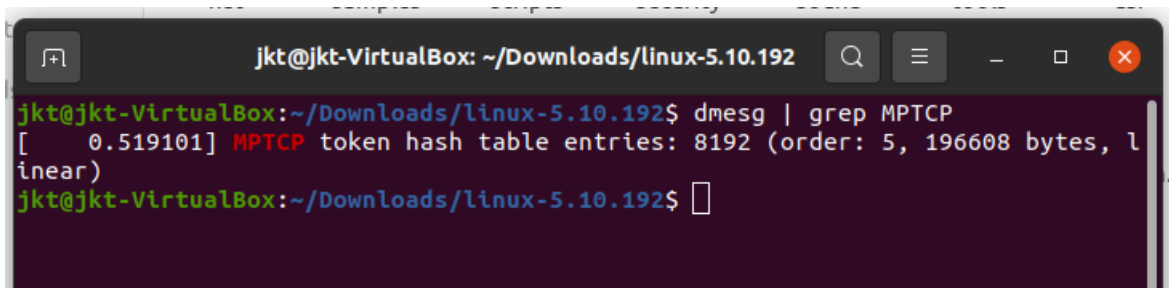

Figure 8: MPTCP Verification

1.4 Additional Configs

We have also disabled all the compression modules except ZSTD.