ADVANCES IN OPERATING SYSTEM DESIGN

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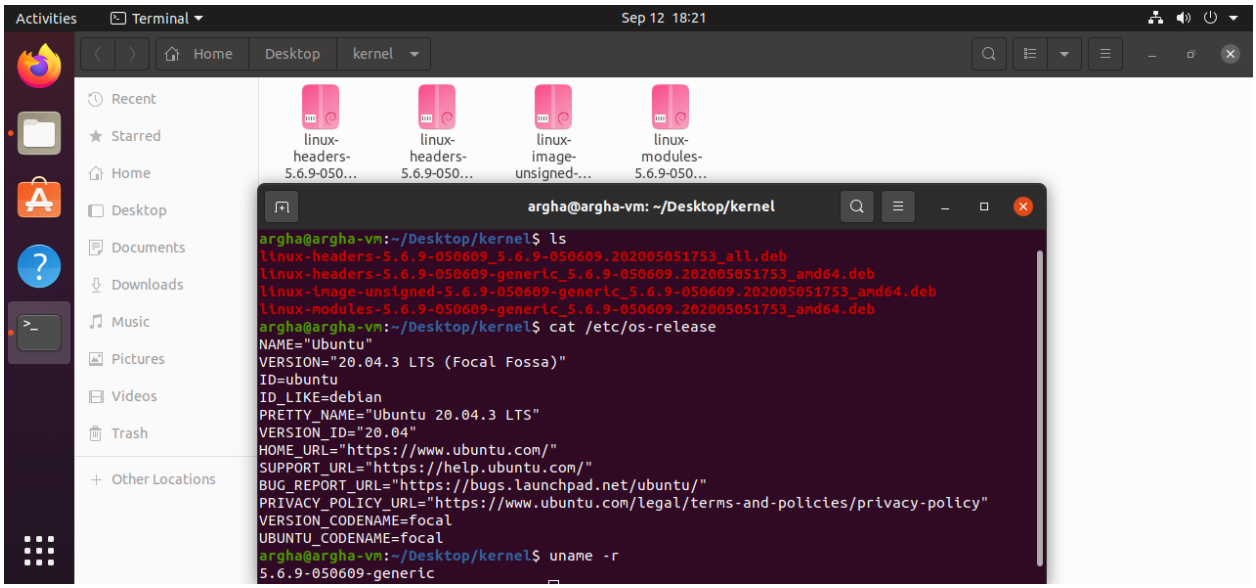
Part A: Configuring and building Linux kernel

For Installing the **Kernel 5.6.9 generic** in **Ubuntu 20.04 OS**, first I have collected the build packages from https://cdn.kernel.org/pub/linux/kernel/v5.x/linux-5.6.9.tar.gz
Then I install the packages using **sudo dpkg -i *.deb**

Also, I have updated the grub file so that after every boot, it shows the grub menu to select the kernel version 5.6.9-generic.
The screenshot below shows the header files of the selected/installed kernel version **5.6.9-generic** in **Ubuntu 20.04 LTS** OS.



1. Removing NUMA memory allocation, scheduler, and emulation

   Now to remove the NUMA memory allocation module, I first check if it is enabled or disabled. In the .config file of the kernel 5.6.9, I found it is enabled.
   `CONFIG_ARCH_SUPPORTS_NUMA_BALANCING=y`
   `CONFIG_NUMA_BALANCING=y`

`CONFIG_NUMA_BALANCING_DEFAULT_ENABLED=y`
`CONFIG_NUMA=y`
`CONFIG_AMD_NUMA=y`
`CONFIG_X86_64_ACPI_NUMA=y`

Using the command **sudo make menuconfig**, I disable it. It removes the NUMA memory allocation, scheduler, and emulation.

2. Removing Kyber I/O Scheduler

   First, I checked the .config file and found that Kyber I/O is already disabled. As it shows `CONFIG_MQ_IOSCHED_KYBER=m`. So I keep it as it is.

3. Including multipath TCP (MPTCP)

   First, I check the .config file of kernel 5.6.9. I found MPTCP is already enabled as it shows,
   `CONFIG_MPTCP=y`
   `CONFIG_MPTCP_IPV6=y`

   Here also, I keep it as it is.

Thus, after configuring the kernel, I started developing the Loadable Kernel Module for Assignment (Part B). I have attached the .config file.