Assignment 6

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Title:

Study of different CPU Frequency Governors. Writing an application to change CPU frequency of Raspberry-Pi board

Aim/Objectives:

- To understand the concept of CPU Frequency Governance

CPU Frequency Governor

- The governor defines the power characteristics of the system CPU, which in turn affects CPU performance.
- Each governor has its own unique behavior, purpose, and suitability in terms of workload.

Types of CPU Frequency Governors:

Performance:

The Performance governor forces the CPU to use the highest possible clock frequency.

- Clock frequency will be statically set, and will not change.
- No power saving benefit.
- Only suitable for hours of heavy workload

Power Save:

- The Power-save governor forces the CPU to use the lowest possible clock frequency.
- Clock frequency will be statically set, and will not change.
- This governor offers maximum power savings, but at the lowest CPU performance.

On-Demand:

- The On-Demand governor is a dynamic governor that allows the CPU
  a. To achieve maximum clock frequency when system load is high, and
  b. To achieve minimum clock frequency when the system is idle

User Space:

- The Userspace governor allows the user to set the CPU frequency for User programs.

CPU Frequency of Raspberry Pi 3:

- Minimum CPU frequency: 700 MHz
- Maximum CPU frequency: 1200 MHz (1.2 GHz)
- Raspberry pi 3 having On-Demand CPU Frequency Governor

Steps to change the CPU Frequency of Raspberry Pi 3:

- For changing cpu frequency of Raspberry Pi 3 we know the current frequency of Raspberry Pi-3
- Open the LX-Terminal of Raspberry Pi-3
- Type the following command
- cat /sys/devices/system/cpu/cpu0/cpufreq/scaling_cur_freq
- Press Enter key
- You will get the current speed in kHz.
- Divide this speed by 1000 to get in MHz.
- For changing current cpu frequency open config.txt file using following command sudo nano /boot/config.txt
- Press Enter key
- It will open the configuration file
- Uncomment the arm_freq and change its value (Not more than 1200) because CPU frequency of Raspberry pi 3 is minimum 700 MHz and Maximum 1.2 GHz.
- Then press Ctrl+O and then enter for writing the changes in file.
- Open the LX-Terminal in Raspberry pi-3
- Reboot Raspberry pi using following command sudo reboot
- After Restarting Raspberry Pi 3 open LX-Terminal and check the current frequency of Raspberry Pi 3 using step 3.