Install Ubuntu 18.04

http://releases.ubuntu.com/18.04/

Install Ubuntu 18.04 to a new computer.

After installing the system, let's install the rt-kernel.

type "sudo -s"

First, we need to find our patch and the compatible Linux kernel edition.

1. go to https://mirrors.edge.kernel.org/pub/linux/kernel/projects/rt/

2. Choose 4.16

3. Copy the link address

4. type "wget *link address just copied*"

5. go to https://mirrors.edge.kernel.org/pub/linux/kernel/v4.x/

6. Choose 4.16.18

7. Copy the link address

8. type "wget *https://mirrors.edge.kernel.org/pub/linux/kernel/v4.x/linux-4.16.18.tar.xz*" between the * is the link just copied

9. type "xz -cd linux-4.16.18.tar.xz | tar xvf -"

10. type "cd linux-4.16.18"

11. type "xzcat ../patch-4.16.18-rt12.patch.xz | patch -p1"

12. type "sudo apt-get install qt5-default libssl-dev libelf-dev"

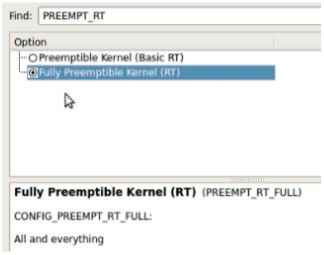
13. type "sudo apt-get install qt5-default libssl-dev libelf-dev"

14. type "yes "" | make oldconfig"

15. type "make xconfig"

The only necessary configuration for real-time Linux kernel is the choice of the "Fully Preemptible Kernel" preemption model (CONFIG_PREEMPT_RT_FULL). All other kernel configuration parameters depend on system requirements. For detailed information about how to configure a kernel have a look at Linux kernel documentation.

** CONFIG_PREEMPT_RT_FULL (Enable)*



Recommendation Configuration ***(if you cannot change some configuration, just forget about it)***

```
* General setup
  --> Timers subsystem
      --> High Resolution Timer Support (Enable)
* Power management and ACPI options
  --> ACPI (Advanced Configuration and Power Interface) Support
      --> Processor (Disable)
  --> CPU Frequency scaling
      --> CPU Frequency scaling (Disable)
  --> CPU Idle
      --> CPU idle PM support (Disable)
* Processor type and features
  --> Enable maximum number of SMP processors and NUMA nodes (Disable)
  --> Processor family
      --> Core 2/newer Xeon        if "cat /proc/cpuinfo | grep family" returns 6,
      --> set as Generic           otherwise
  --> Transparent Hugepage Support (Disable)
  --> Allow for memory compaction (Disable)
  --> Contiguous Memory Allocation (Disable)
  --> Allow for memory compaction
    --> Page Migration (Disable)

* Device Drivers
  --> Staging drivers
      --> Unisys SPAR driver support
        --> Unisys visorbus driver (Disable)
```

Save configuration CTRL+S .

Build the kernel

1. "-j4" is for my quad-core CPU. This can take a long time.

2. Type "make –j4"

3. Type "make –j4 modules"

4. Type “make –j4 modules_install”

5. Type “make -j4 install”

6. Type “sudo reboot”

7. Select “Advanced options for Ubuntu”

8. Choose “-rtXX”

9. Type “uname -a” too see the current kernel

Test latency

1. Type “sudo –s #we need root permission”

2. Type “./cyclictest_run.sh 100000 > result”, then the latency picture should appear like the following