How to install the linux-rt (Real-Time) patch

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This is a short step-by-step description on how to apply the linux-rt realtime patch on the petalinux kernel.

Do as follows:

1. Make a copy of the petalinux kernel sources in

   `<petalinux-root>/components/linux-kernel/xlnx-*`

   (petalinux-root is the folder with the settings.sh file, * is the kernel revision number)

   or clone the latest xilinx petalinux version from

   https://github.com/Xilinx/linux-xlnx

   and copy the folder to

   `<petalinux-root>/components/linux-kernel/`

2. Rename the copy to xlnx-*_rt
3. Get the appropriate linux-rt patch version for your kernel from

   https://www.kernel.org/pub/linux/kernel/projects/rt/

   Patches for older kernel revisions can be found in the older/ directory

   a. Make sure you download the patch version whose kernel version matches exactly with your kernel version
   b. Make sure to download the *.patch.gz version of the patch. The .tar.* versions contain mulitple files and are more difficult to patch.

   tested versions are:

   - "patch-4.6-rc7-rt1.patch.gz" for the xlnx-4.6 kernel (most recent kernel version from the repository above)
   - "patch-4.0.8-rt6-patch.gz" for the xlnx-4.0 kernel (for the petalinux-v2015.4-final version)

4. Copy the *-patch.gz file to

   `petalinux-root>/components/linux-kernel/`

5. Open a terminal and go into your kernel directory

   `cd xlnx-*/`

6. Patch the kernel sources by executing

   `zcat ../*.patch.gz | patch -p1`

7. Make sure all operations are successful. the kernel compilation will most probably fail if the patch is not successful
8. Go to the petalinux project root and run

   `petalinux-config`

9. Go to

   `linux Components Selection/kernel`

10. Select your patched linux kernel (referenced by the folder name)

11. Exit the configuration program and wait until the petalinux configuration has been generated

12. Run

    `petalinux-config -c kernel`

13. Go to

```
General setup / Timers subsystem /
```

and make sure the "High Resolution Timer Support" is selected
14. Go back to the main menu and to

```
Kernel Features / Preemption Model
```

Select "Fully Preemptive Kernel (RT)" to activate the linux-rt features
15. Go back to Kernel Features, select Timer frequency and set it to 1000 Hz
16. Go back to the main menu and select

```
CPU power Management
```

Disable the CPU frequency scaling
17. Exit the configuration and wait until the generation has finished

18. Run

petalinux-build

and copy the generated image.ub to your sd-card.
19. boot the fpga and check the kernel version with

```
uname -a
```