How to customize the Linux kernel

How to customize the Linux kernel

Stable: 03.02.2020 - 07:56 / Revision: 03.02.2020 - 07:50

Contents

1 Purpose of article

This article gives the main steps needed to add kernel customization within the Yocto build process (with a Distribution Package).

2 Pre-requesites

You are already familiar with the Yocto build process and OpenSTLinux distribution.

You have already created a customer layer (How to create a new open embedded layer) to update, for your own needs, the OpenSTLinux distribution.

We describe here what you must do once you have:

- modified the kernel configuration
- modified the Linux kernel device tree
- modified a built-in device driver

so that these modifications are taken into account in your build process.

3 Adding kernel customization (including Linux kernel device tree, configuration, driver modification)

- First, create (in your custom layer) a <name of kernel recipe>.bbappend file

```
PC $> touch ../meta-my-custo-layer/recipes-kernel/linux/<name of kernel recipe>.
bbappend
```

3.1 Adding kernel configuration modifications

- Identify all new configs you set or unset with: **PC $>** bitbake <name of kernel recipe> -c menuconfig
- Put them inside a new fragment file and copy the fragment here:

```
PC $> cp <custom-fragment>.config  ../meta-my-custo-layer/recipes-kernel/linux/<name
of kernel recipe>/<kernel version>/
```

- Update accordingly <name of kernel recipe>.bbappend:

```
KERNEL_CONFIG_FRAGMENTS_append += "${WORKDIR}/fragments/<kernel version>/<custom-
fragment>.config"
SRC_URI_append = " file://<kernel version>/<custom-fragment>.config;subdir=fragments "
```

For the use case described in the How to cross-compile with the Distribution Package#modifying_kernel_configuration example, you should:

- Create fragment-cma-size.config with the following line:

CONFIG_CMA_SIZE_MBYTES=256

- Copy fragment-cma-size.config to ../meta-my-custo-layer/recipes-kernel/linux/linux-stm32mp/4.14/
- Update ../meta-my-custo-layer/recipes-kernel/linux/linux-stm32mp.bbappend accordingly by adding these lines:

```
KERNEL_CONFIG_FRAGMENTS_append += "${WORKDIR}/fragments/4.14/fragment-cma-size.config"
SRC_URI_append = " file://4.14/fragment-cma-size.config;subdir=fragments "
```

3.2 Adding kernel driver or device tree modifications

The example given below is associated with the STM32MP15 Evaluation board, but the method is independent of the board.

Once you have made the changes for the device tree in <build dir>/workspace/sources/<name of kernel recipe>/arch/arm /boot/dts/stm32mp157c-ed1.dts **AND**, for built-in device driver in <build dir>/workspace/sources/<name of kernel recipe> /drivers/gpu/drm/stm/drv.c, you must:

- Create the corresponding patch files:

```
PC $> cd <build dir>/workspace/sources/<name of kernel recipe>/
PC $> git format-patch -2
```

- Copy these patch files into the custom layer

```
PC $> cp *.patch ../meta-my-custo-layer/recipes-kernel/linux/<name of kernel recipe>
/<kernel version>/<kernel version>.<revision>/
```

Patches are linked to a kernel version, which means that these patches are rebuilt if the kernel version changes, and copied to the according kernel version sub-folder

- Update <name of kernel recipe>.bbappend accordingly:

```
SRC_URI_append = " \
   file://<kernel version>/<kernel version>.<revision>/0001-DT-leds-change.patch \
   file://<kernel version>/<kernel version>.<revision>/0002-Driver-change.patch \
   "
```

Device Tree