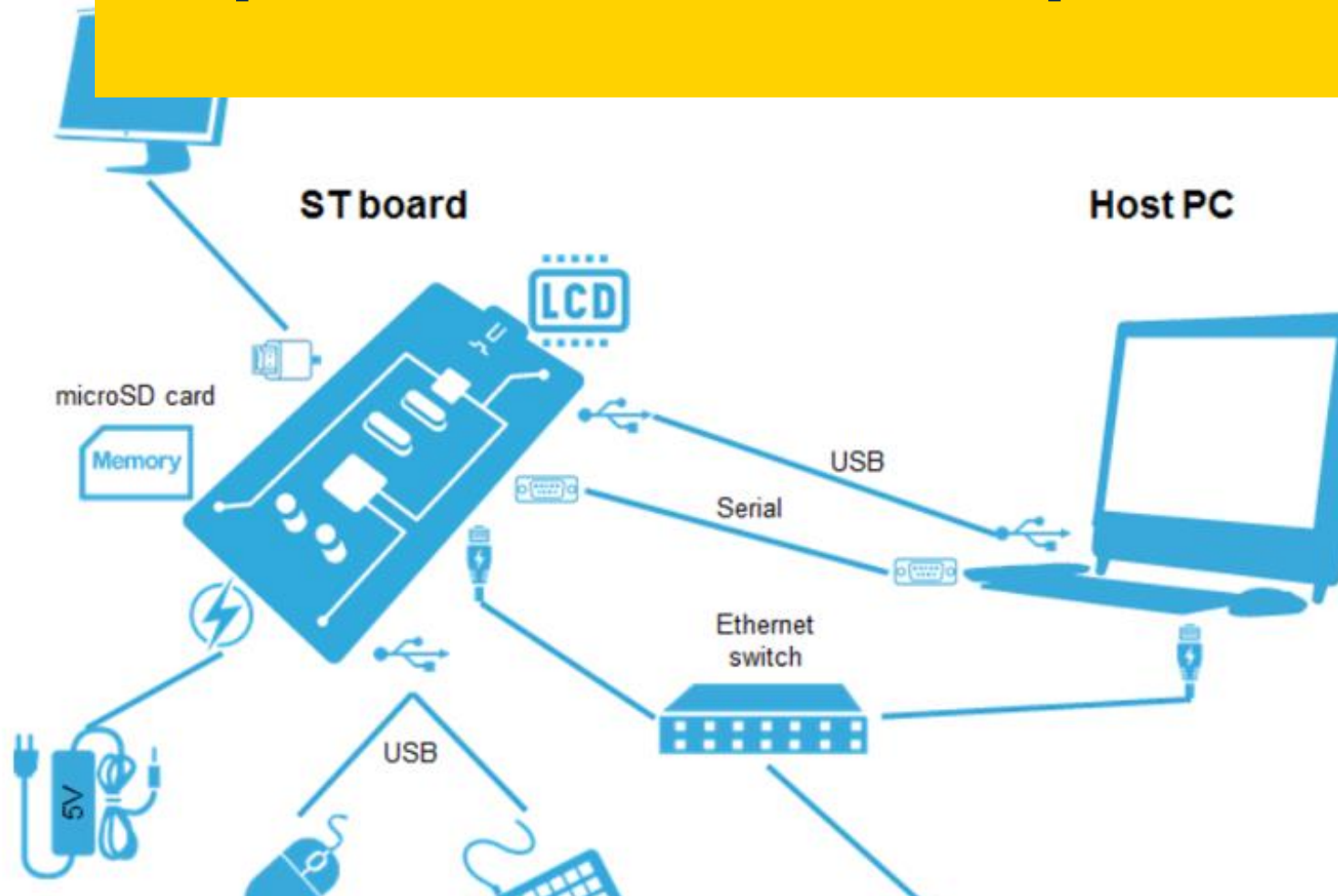


OpenSTLinux Developer Package



WIKI PAGE for OpenSTLinux Developer Package

Refer to:

https://wiki.st.com/stm32mpu/wiki/STM32MPU_Developer_Package

The screenshot shows the STM32 MPU ecosystem v6 wiki page. The left sidebar contains a navigation menu with the following items: embedded software, OpenSTLinux distribution, FwST-M Packages, OpenSTLinux starter packages, OpenSTLinux developer packages (highlighted with a yellow circle), STM32MPU Developer Package (highlighted with a yellow circle), OpenSTLinux distribution packages, OpenSTLinux expansion packages, Bare metal - RTOS embedded software, and Android-based OpenSTDroid embedded software. The main content area has a top navigation bar with links: Welcome, Getting started, Deep dive (active), Legal notice, and Wiki archives. The title of the page is "STM32MPU Developer Package". Below the title, it states "Applicable for STM32MP13x lines STM32MP15x lines STM32MP23x lines STM32MP25x lines". The main text describes how to get and use the Developer Package of the STM32MPU Embedded Software for any development platform of the STM32MP1 series (STM32MP15 boards and STM32MP13 boards) and STM32MP2 series (STM32MP23 boards and STM32MP25 boards), in order to modify some of its pieces of software, or to add applications on top of it. It lists some prerequisites in terms of knowledge and development environment, and gives the step-by-step approach to download and install the STM32MPU Embedded Software components for this Package. Finally, it proposes some guidelines to upgrade (add, remove, configure, improve...) any piece of software. At the bottom, there is a "Contents" section with a list of links: 1 Developer Package content, 2 Developer Package step-by-step overview, and 3 Checking the prerequisites. In the bottom right corner, there is a pink square with the binary code 0100101, 0110010, and 1001101.

STM32 MPU ecosystem v6

embedded software

- OpenSTLinux distribution
- FwST-M Packages
- OpenSTLinux starter packages
- OpenSTLinux developer packages
- STM32MPU Developer Package**
- OpenSTLinux distribution packages
- OpenSTLinux expansion packages
- Bare metal - RTOS embedded software
- Android-based OpenSTDroid embedded software

Welcome Getting started **Deep dive** Legal notice Wiki archives

STM32MPU Developer Package

Applicable for [STM32MP13x lines](#) [STM32MP15x lines](#) [STM32MP23x lines](#) [STM32MP25x lines](#)

This article describes how to get and use the **Developer Package** of the **STM32MPU Embedded Software** for any development platform of the **STM32MP1 series** ([STM32MP15 boards](#) and [STM32MP13 boards](#)) and **STM32MP2 series** ([STM32MP23 boards](#) and [STM32MP25 boards](#)), in order to modify some of its pieces of software, or to add applications on top of it.

It lists some **prerequisites** in terms of knowledge and development environment, and gives the **step-by-step** approach to download and install the STM32MPU Embedded Software components for this Package.

Finally, it proposes some guidelines to upgrade (add, remove, configure, improve...) any piece of software.

Contents [\[hide\]](#)

- [Developer Package content](#)
- [Developer Package step-by-step overview](#)
- [Checking the prerequisites](#)

0100101
0110010
1001101

OpenSTLinux Developer Package - **DOWNLOAD**

Refer to:

<https://www.st.com/en/embedded-software/stm32mp2dev.html>

The screenshot shows the STMicroelectronics website interface. At the top, there is a navigation bar with links for Careers, Sample & buy, and Support & community. Below this is a secondary navigation bar with the ST logo, a search icon, and links for Products, Tools & software, Applications, Solutions, and ST Developer Zone. A breadcrumb trail indicates the current location: Embedded software > MCU and MPU embedded software > STM32 Embedded Software > STM32 MPU OpenSTLinux Distribution > STM32MP2Dev >. The main heading is 'STM32MP2Dev' with an 'ACTIVE' status tag. Below this is the title 'STM32MP2 OpenSTLinux Developer Package'. Two buttons are visible: 'Get Software' (highlighted with a yellow oval) and 'Download databrief'. At the bottom, there is a tabbed interface with 'Overview' selected, and other tabs for 'Documentation' and 'Tools & Software'.

OpenSTLinux Developer Package - **DOWNLOAD**

Refer to:

<https://www.st.com/en/embedded-software/stm32mp2dev.html>

Get Software

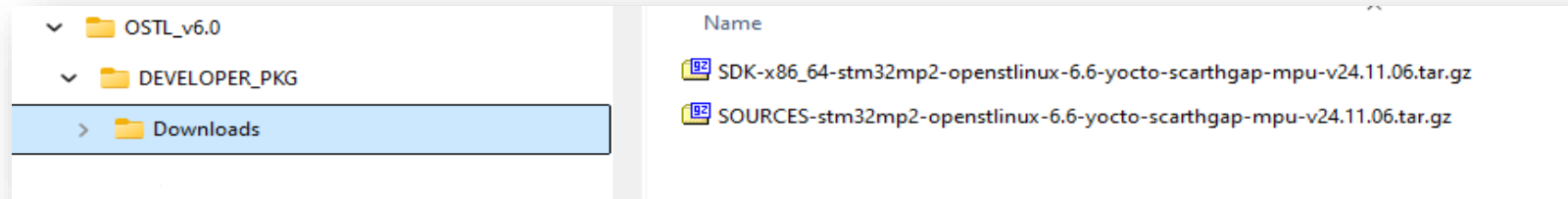
Part Number	Download	All versions
+ MP2-DEV-Arm	Get latest	Select version ▼
+ MP2-DEV-SRC	Get latest	Select version ▼
+ MP2-DEV-x86	Get latest	Select version ▼
+ MP2-DEV-x86-RUST	Get latest	Select version ▼

SDK ENVIRONMENT SETUP

OpenSTLinux Developer Package - **SETUP**

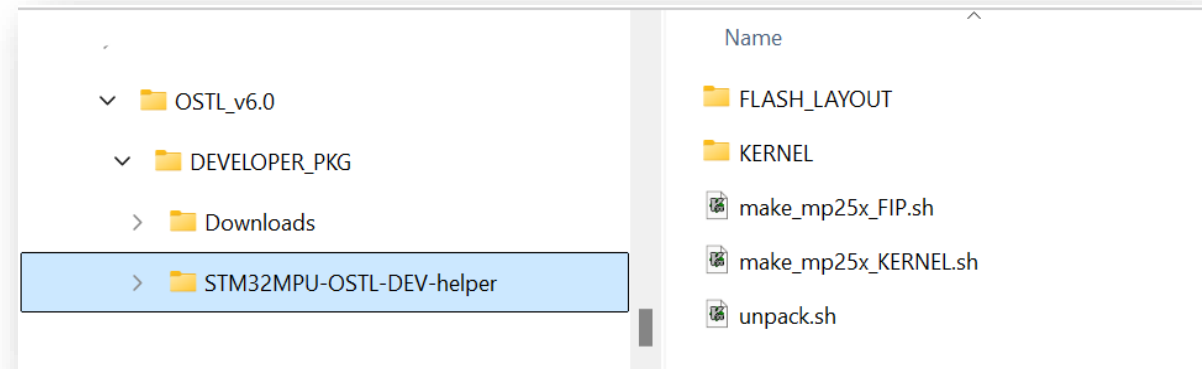
Materials:

1. Toolchain and SOURCES:



2. STM32MPU-OSTL-DEV-helper:

- From: <https://github.com/stm32-hotspot/STM32MPU-OSTL-DEV-helper>



OpenSTLinux Developer Package - **SETUP**

Tree operations:

1. Unpack the 2 tar.gz archives
2. Install the cross compiler toolchain
3. Extract and patch the lowlevel firmware sources



OpenSTLinux Developer Package - **SETUP**

1. Unpack tar.gz archives

```
$ cd ~/OSTL_v6.0/DEVELOPER_PKG/Downloads/
```

```
$ tar xzf en.SDK-x86_64-stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06.tar.gz &
```

```
$ tar xzf en.SOURCES-stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06.tar.gz -C ../ &
```

```
$ terminator &
```

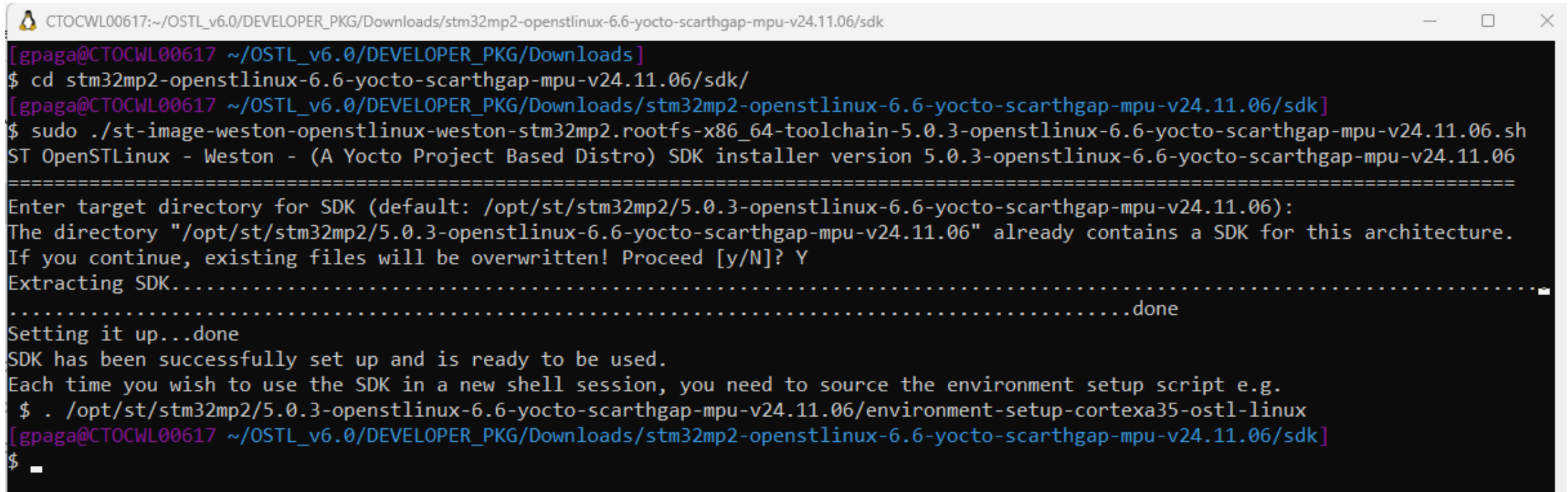
```
CTOCWL00617:~/OSTL_v6.0/DEVELOPER_PKG/Downloads
[gpaga@CTOCWL00617 ~/OSTL_v6.0/DEVELOPER_PKG/Downloads]
$ ls -lh
total 1.3G
-rwxr-xr-x 1 gpaga gpaga 900M Nov 25 14:33 SDK-x86_64-stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06.tar.gz
-rwxr-xr-x 1 gpaga gpaga 430M Nov 25 14:33 SOURCES-stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06.tar.gz
[gpaga@CTOCWL00617 ~/OSTL_v6.0/DEVELOPER_PKG/Downloads]
$ tar xzf SDK-x86_64-stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06.tar.gz &
[1] 1431119
[gpaga@CTOCWL00617 ~/OSTL_v6.0/DEVELOPER_PKG/Downloads]
$ tar xzf SOURCES-stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06.tar.gz -C ../ &
[2] 1431139
[1] Done tar xzf SDK-x86_64-stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06.tar.gz
[gpaga@CTOCWL00617 ~/OSTL_v6.0/DEVELOPER_PKG/Downloads]
$ terminator &
[3] 1431159
[gpaga@CTOCWL00617 ~/OSTL_v6.0/DEVELOPER_PKG/Downloads]
$
[2]- Done tar xzf SOURCES-stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06.tar.gz -C ../
[gpaga@CTOCWL00617 ~/OSTL_v6.0/DEVELOPER_PKG/Downloads]
```


OpenSTLinux Developer Package - **SETUP**

2. Install the cross compiler toolchain

```
$ cd stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sdk/
```

```
$ sudo ./st-image-weston-openstlinux-weston-stm32mp2.rootfs-x86_64-toolchain-5.0.3-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06.sh
```

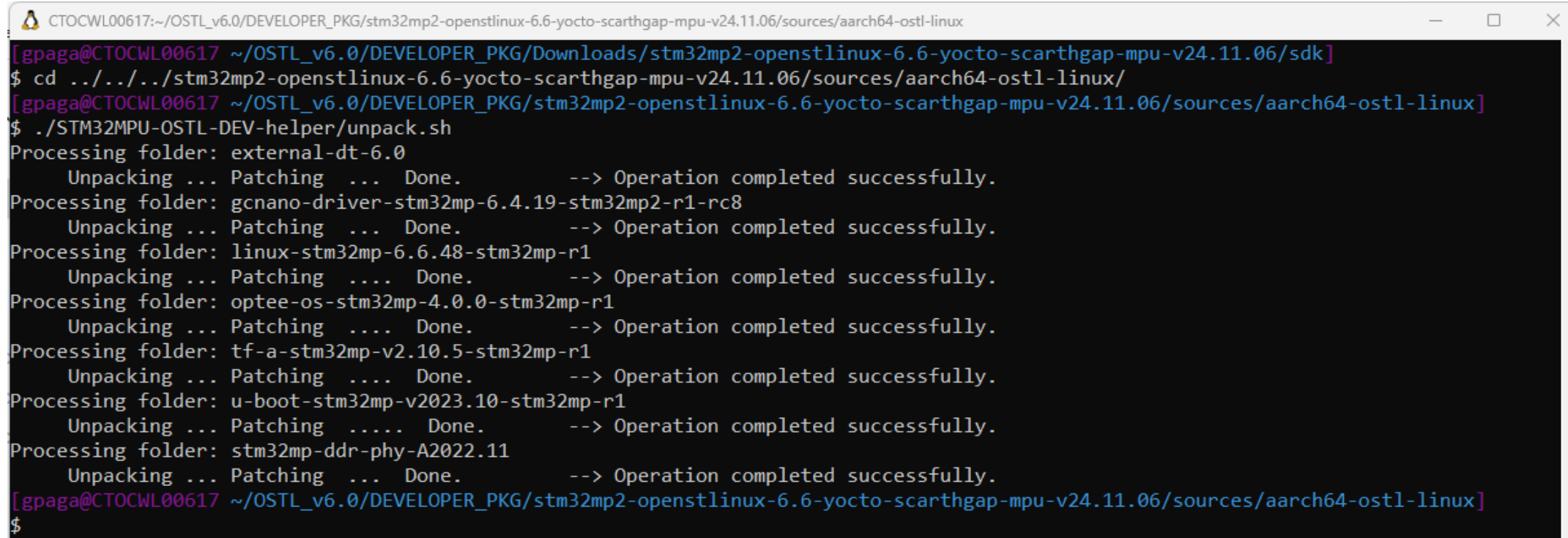


```
CTOCWL00617:~/OSTL_v6.0/DEVELOPER_PKG/Downloads/stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sdk
[gpaga@CTOCWL00617 ~/OSTL_v6.0/DEVELOPER_PKG/Downloads]
$ cd stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sdk/
[gpaga@CTOCWL00617 ~/OSTL_v6.0/DEVELOPER_PKG/Downloads/stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sdk]
$ sudo ./st-image-weston-openstlinux-weston-stm32mp2.rootfs-x86_64-toolchain-5.0.3-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06.sh
ST OpenSTLinux - Weston - (A Yocto Project Based Distro) SDK installer version 5.0.3-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06
=====
Enter target directory for SDK (default: /opt/st/stm32mp2/5.0.3-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06):
The directory "/opt/st/stm32mp2/5.0.3-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06" already contains a SDK for this architecture.
If you continue, existing files will be overwritten! Proceed [y/N]? Y
Extracting SDK.....done
.....done
Setting it up...done
SDK has been successfully set up and is ready to be used.
Each time you wish to use the SDK in a new shell session, you need to source the environment setup script e.g.
$ . /opt/st/stm32mp2/5.0.3-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/environment-setup-cortexa35-ostl-linux
[gpaga@CTOCWL00617 ~/OSTL_v6.0/DEVELOPER_PKG/Downloads/stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sdk]
$ _
```

OpenSTLinux Developer Package - **SETUP**

3. Extract and patch the lowlevel firmware sources

```
$ cd ../stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sources/aarch64-ostl-linux/  
$ cp -r ../../STM32MPU-OSTL-DEV-helper/ .  
$ ./STM32MPU-OSTL-DEV-helper/unpack.sh
```

A terminal window with a title bar showing the path ~/OSTL_v6.0/DEVELOPER_PKG/stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sources/aarch64-ostl-linux. The terminal output shows the execution of the unpack.sh script, which processes several folders: external-dt-6.0, gcnano-driver-stm32mp-6.4.19-stm32mp-r1-rc8, linux-stm32mp-6.6.48-stm32mp-r1, optee-os-stm32mp-4.0.0-stm32mp-r1, tf-a-stm32mp-v2.10.5-stm32mp-r1, u-boot-stm32mp-v2023.10-stm32mp-r1, and stm32mp-ddr-phy-A2022.11. Each folder is processed by unpacking and patching, with each step reporting 'Done.' and 'Operation completed successfully.' The prompt returns to the shell after the script finishes.

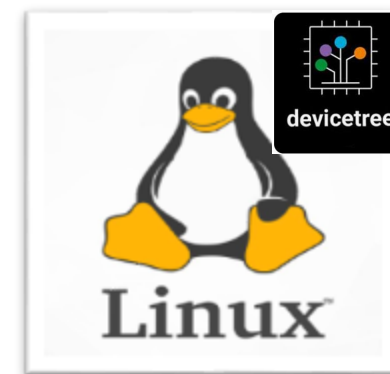
```
CTOCWL00617:~/OSTL_v6.0/DEVELOPER_PKG/stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sources/aarch64-ostl-linux  
[gpaga@CTOCWL00617 ~/OSTL_v6.0/DEVELOPER_PKG/Downloads/stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sdk]  
$ cd ../../stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sources/aarch64-ostl-linux/  
[gpaga@CTOCWL00617 ~/OSTL_v6.0/DEVELOPER_PKG/stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sources/aarch64-ostl-linux]  
$ ./STM32MPU-OSTL-DEV-helper/unpack.sh  
Processing folder: external-dt-6.0  
  Unpacking ... Patching ... Done.      --> Operation completed successfully.  
Processing folder: gcnano-driver-stm32mp-6.4.19-stm32mp-r1-rc8  
  Unpacking ... Patching ... Done.      --> Operation completed successfully.  
Processing folder: linux-stm32mp-6.6.48-stm32mp-r1  
  Unpacking ... Patching .... Done.     --> Operation completed successfully.  
Processing folder: optee-os-stm32mp-4.0.0-stm32mp-r1  
  Unpacking ... Patching .... Done.     --> Operation completed successfully.  
Processing folder: tf-a-stm32mp-v2.10.5-stm32mp-r1  
  Unpacking ... Patching .... Done.     --> Operation completed successfully.  
Processing folder: u-boot-stm32mp-v2023.10-stm32mp-r1  
  Unpacking ... Patching ..... Done.    --> Operation completed successfully.  
Processing folder: stm32mp-ddr-phy-A2022.11  
  Unpacking ... Patching ... Done.      --> Operation completed successfully.  
[gpaga@CTOCWL00617 ~/OSTL_v6.0/DEVELOPER_PKG/stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sources/aarch64-ostl-linux]  
$
```

SDK BUILD

OpenSTLinux Developer Package - **BUILD**

We are now ready to build the low level components of our BSP:

1. TF-A + devicetree
2. OP-TEE + devicetree
3. U-BOOT + devicetree
4. Linux kernel + devicetree



FIP = Firmware Image Package

OpenSTLinux Developer Package - BUILD

FIP build:

`./STM32MPU-OSTL-DEV-helper/make_mp25x_FIP.sh`

```
CTOCWL00617:~/OSTL_v6.0/DEVELOPER_PKG/stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sources/aarch64-ostl-linux
gpaga@CTOCWL00617 ~/OSTL_v6.0/DEVELOPER_PKG/stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sources/aarch64-ostl-linux]
$ ./STM32MPU-OSTL-DEV-helper/make_mp25x_FIP.sh
make -C /home/gpaga/OSTL_v6.0/DEVELOPER_PKG/stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sources/aarch64-ostl-linux/u-boot-
stm32mp-v2023.10-stm32mp-r1-r0/u-boot-stm32mp-v2023.10-stm32mp-r1 O=/home/gpaga/OSTL_v6.0/DEVELOPER_PKG/stm32mp2-openstlinux-6.6-yoct
o-scarthgap-mpu-v24.11.06/sources/aarch64-ostl-linux/u-boot-stm32mp-v2023.10-stm32mp-r1-r0/u-boot-stm32mp-v2023.10-stm32mp-r1/../../buil
d/stm32mp25_defconfig stm32mp25_defconfig || exit 1
make[1]: Entering directory '/home/gpaga/OSTL_v6.0/DEVELOPER_PKG/stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sources/aarch
64-ostl-linux/u-boot-stm32mp-v2023.10-stm32mp-r1-r0/u-boot-stm32mp-v2023.10-stm32mp-r1'
make[2]: Entering directory '/home/gpaga/OSTL_v6.0/DEVELOPER_PKG/stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sources/aarch
64-ostl-linux/u-boot-stm32mp-v2023.10-stm32mp-r1-r0/u-boot-stm32mp-v2023.10-stm32mp-r1'
fip/fip-stm32mp257f-dk-ddr-opteemin-emmc.bin' -> 'BUILD_OUTPUT/fip/fip-ddr.bin'
'/home/gpaga/OSTL_v6.0/DEVELOPER_PKG/stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sources/aarch64-ostl-linux/FIP_artifacts/
fip/fip-stm32mp257f-dk-opteemin-emmc.bin' -> 'BUILD_OUTPUT/fip/fip.bin'
'/home/gpaga/OSTL_v6.0/DEVELOPER_PKG/stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sources/aarch64-ostl-linux/FIP_artifacts/
arm-trusted-firmware/tf-a-stm32mp257f-dk-opteemin-programmer-usb.stm32' -> 'BUILD_OUTPUT/tfa/tfa_usb.stm32'
'STM32MPU-OSTL-DEV-helper/FLASH_LAYOUT/flash_layout_emmc.tsv' -> 'BUILD_OUTPUT/FLASH_LAYOUT/flash_layout_emmc.tsv'
'STM32MPU-OSTL-DEV-helper/FLASH_LAYOUT/flash_layout_sdcard.tsv' -> 'BUILD_OUTPUT/FLASH_LAYOUT/flash_layout_sdcard.tsv'
'STM32MPU-OSTL-DEV-helper/FLASH_LAYOUT/flash.bat' -> 'BUILD_OUTPUT/FLASH_LAYOUT/flash.bat'
'STM32MPU-OSTL-DEV-helper/FLASH_LAYOUT/flash.sh' -> 'BUILD_OUTPUT/FLASH_LAYOUT/flash.sh'
'STM32MPU-OSTL-DEV-helper/FLASH_LAYOUT/metadata.bin' -> 'BUILD_OUTPUT/FLASH_LAYOUT/metadata.bin'

-rw-r--r-- 1 gpaga gpaga 13M Nov 27 14:55 /tmp/stm32mp257f-dk_binaries.tar.gz

[gpaga@CTOCWL00617 ~/OSTL_v6.0/DEVELOPER_PKG/stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sources/aarch64-ostl-linux]
$
```

OpenSTLinux Developer Package - BUILD

KERNEL build:

`./STM32-OSTL-DEV-helper/make_mp25x_KERNEL.sh`

```
Select CTOCWL00617:~/OSTL_v6.0/DEVELOPER_PKG/stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sources/aarch64-ostl-linux
[gpaga@CTOCWL00617 ~/OSTL_v6.0/DEVELOPER_PKG/stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sources/aarch64-ostl-linux]
$ ./STM32MPU-OSTL-DEV-helper/make_mp25x_KERNEL.sh
make[1]: Entering directory '/home/gpaga/OSTL_v6.0/DEVELOPER_PKG/stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sources/aarch64-ostl-linux/linux-stm32mp-6.6.48-stm32mp-r1-r0/build'
  GEN      Makefile
*** Default configuration is based on 'defconfig'
#
# No change to .config
#
make[1]: Leaving directory '/home/gpaga/OSTL_v6.0/DEVELOPER_PKG/stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sources/aarch64-ostl-linux/linux-stm32mp-6.6.48-stm32mp-r1-r0/build'
Using ../build/.config as base

64-ostl-linux/linux-stm32mp-6.6.48-stm32mp-r1-r0/build'
  INSTALL ../BUILD_OUTPUT/kernel/lib/modules/6.6.48/modules.order
  INSTALL ../BUILD_OUTPUT/kernel/lib/modules/6.6.48/modules.builtin
  INSTALL ../BUILD_OUTPUT/kernel/lib/modules/6.6.48/modules.builtin.modinfo
  SYMLINK ../BUILD_OUTPUT/kernel/lib/modules/6.6.48/build
  DEPMOD  ../BUILD_OUTPUT/kernel/lib/modules/6.6.48
make[1]: Leaving directory '/home/gpaga/OSTL_v6.0/DEVELOPER_PKG/stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sources/aarch64-ostl-linux/linux-stm32mp-6.6.48-stm32mp-r1-r0/build'
'../build/arch/arm64/boot/Image.gz' -> '../BUILD_OUTPUT/kernel/Image.gz'
'../build/arch/arm64/boot/dts/st/stm32mp257f-dk.dtb' -> '../BUILD_OUTPUT/kernel/stm32mp257f-dk.dtb'
[gpaga@CTOCWL00617 ~/OSTL_v6.0/DEVELOPER_PKG/stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sources/aarch64-ostl-linux]
$
```


OpenSTLinux Developer Package - BUILD OUTPUT

- BUILD_OUTPUT/tfa/tfa_usb.stm32
- BUILD_OUTPUT/tfa/tfa_emmc.stm32
- BUILD_OUTPUT/fip/fip.bin
- BUILD_OUTPUT/fip/fip-ddr.bin
- BUILD_OUTPUT/kernel/Image.gz
- BUILD_OUTPUT/kernel/stm32mp257f-dk.dtb
- BUILD_OUTPUT/kernel/lib/modules/

```
[gpaga@CTOCWL00617 ~/OSTL_v6.0/DEVELOPER_PKG/stm32mp2-openstlinux-6.1-
$ ls -1 BUILD_OUTPUT/tfa/* BUILD_OUTPUT/fip/* BUILD_OUTPUT/kernel/*
BUILD_OUTPUT/fip/fip.bin
BUILD_OUTPUT/fip/fip-ddr.bin
BUILD_OUTPUT/kernel/Image.gz
BUILD_OUTPUT/kernel/stm32mp257f-dk.dtb
BUILD_OUTPUT/tfa/metadata.bin
BUILD_OUTPUT/tfa/tfa_emmc.stm32
BUILD_OUTPUT/tfa/tfa_usb.stm32

BUILD_OUTPUT/kernel/lib:
modules
[gpaga@CTOCWL00617 ~/OSTL_v6.0/DEVELOPER_PKG/stm32mp2-openstlinux-6.1-
$
```

Opt	Part	Name	Type	Device	Offset	Binary
-	0x01	fsbl-boot	Binary	none	0x0	tf-a-usb.stm32
-	0x02	fip-ddr	FIP	none	0x0	fip-ddr.bin
-	0x03	fip-boot	FIP	none	0x0	fip.bin
P	0x04	fsbla1	Binary	mmc1	boot1	tf-a-emmc.stm32
P	0x05	fsbla2	Binary	mmc1	boot2	tf-a-emmc.stm32
P	0x06	metadata1	FWU_MDATA	mmc1	0x00080000	metadata.bin
P	0x07	metadata2	FWU_MDATA	mmc1	0x00100000	metadata.bin
P	0x08	fip-a	FIP	mmc1	0x00180000	fip.bin

BOARD UPDATE

OpenSTLinux Developer Package - FLUSH

```
CTOCWL00617:~/OSTL_v6.0/DEVELOPER_PKG/stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sources/aarch64-ostl-linux
gpaga@CTOCWL00617 ~/OSTL_v6.0/DEVELOPER_PKG/stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sources/aarch64-ostl-linux]
cp -rvL BUILD_OUTPUT /mnt/c/Users/.../BUILD_OUTPUT/flash.bat'
BUILD_OUTPUT/flash.sh' -> '/mnt/c/Users/.../BUILD_OUTPUT/flash.sh'
BUILD_OUTPUT/FLASH_LAYOUT/flash_layout_emmc.tsv' -> '/mnt/c/Users/.../BUILD_OUTPUT/FLASH_LAYOUT/flash_layout_emmc.tsv'
BUILD_OUTPUT/FLASH_LAYOUT/flash_layout_sdcard.tsv' -> '/mnt/c/Users/.../BUILD_OUTPUT/FLASH_LAYOUT/flash_layout_sdcard.tsv'
BUILD_OUTPUT/FLASH_LAYOUT/metadata.bin'
BUILD_OUTPUT/kernel/Image.gz'
BUILD_OUTPUT/kernel/stm32mp257f-dk.dtb'
BUILD_OUTPUT/fip/fip-ddr.bin'
BUILD_OUTPUT/fip/fip.bin'
BUILD_OUTPUT/tfa/metadata.bin'
BUILD_OUTPUT/tfa/tfa_emmc.stm32'
BUILD_OUTPUT/tfa/tfa_sdcard.stm32'
BUILD_OUTPUT/tfa/tfa_usb.stm32'
~/OSTL_v6.0/DEVELOPER_PKG/stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sources/aarch64-ostl-linux]

Command Prompt
C:\Users\... \BUILD_OUTPUT>flash.bat
C:\Users\... \BUILD_OUTPUT>"C:\Program Files\STMicroelectronics\STM32Cube\STM32Cube
Programmer\bin\STM32_Programmer_CLI.exe" -c port=USB1 -w FLASH_LAYOUT\flash_layout_emmc
.tsv
-----
STM32CubeProgrammer v2.17.0
-----
USB speed : High Speed (480MBit/s)
Manuf. ID : STMicroelectronics
Product ID : DFU in HS Mode @Device ID /0x505, @Revision ID /0x2000
SN : 002F002C4136500800373653
DFU protocol: 1.1
Board : ...

Download in Progress:
100%
File download complete
Time elapsed during download operation: 00:00:00.900
RUNNING Program ...
PartID: :0x08
Start operation done successfully at partition 0x08
Flashing service completed successfully
C:\Users\p... \BUILD_OUTPUT>rem "C:\Program Files\STMicroelectronics\STM32Cube\STM32
```

STM32MP2x power and flexibility 2/2



OpenSTLinux Distribution Package



WIKI PAGE for OpenSTLinux Distribution Package

Refer to:

https://wiki.st.com/stm32mpu/wiki/STM32MPU_Distribution_Package

STM32 MPU ecosystem v6

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STM32MPU Distribution Package

STM32MPU Distribution Package OpenSTLinux distribution - STM32MPU-Ecosystem-6.0.0 release	
Installation	<ul style="list-style-type: none">Go to the host PC directory where to install the Distribution Package (Distribution Package installation directory). Example, if following the proposition to organize the working directory:<pre>PC \$> cd <working directory path>/Distribution-Package</pre>Initialize repo in the current directory (More details on 'repo init' here). <pre>> repo init -u https://github.com/STMicroelectronics/oe-manifest.git -b refs/tags/openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06</pre> <p>Note: "ERROR 404" may appear during "repo init" command without any impact on the process</p> <ul style="list-style-type: none">Synchronize the local project directories with the remote repositories specified in the manifest (more details on 'repo sync' here) <pre>PC \$> repo sync</pre> <p>Note: Distribution package needs around 140MB to be installed (and around 25GB once distribution package is compiled).</p>
Release note	<p>Details about the content of this software package are available in the associated STM32 MPU ecosystem release note.</p> <p> If interested in previous releases, go through the archives of the ecosystem release note.</p>

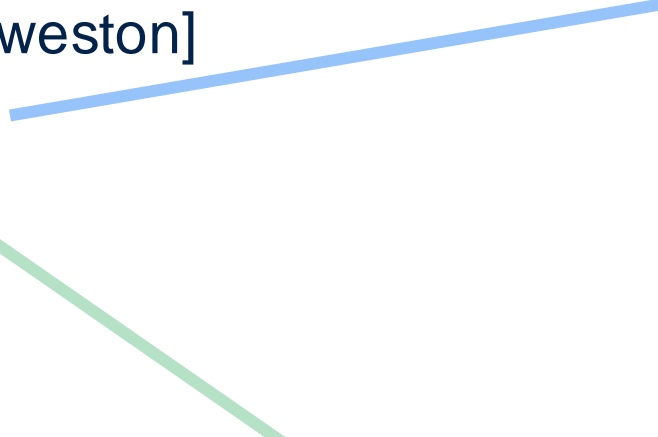
OpenSTLinux Distribution Package - **SETUP**

- Setup commands:
 - \$ mkdir -p ~/OSTL_v6.0/DISTRIBUTION_PKG
 - \$ cd ~/OSTL_v6.0/DISTRIBUTION_PKG
 - \$ repo init -u <https://github.com/STMicroelectronics/oe-manifest.git> -b refs/tags/openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06
 - \$ repo -j8 sync

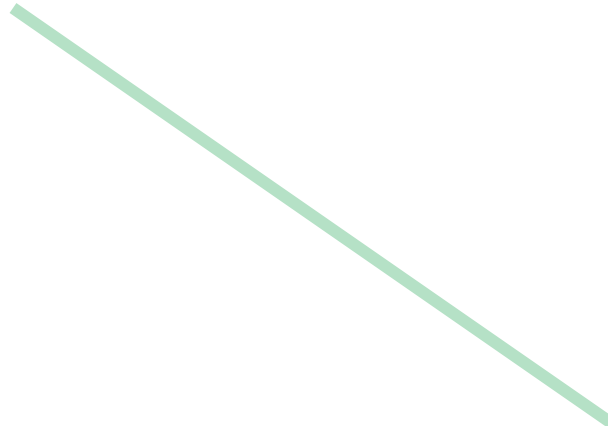
OpenSTLinux Distribution Package – OpenSTLinux

Brief Yocto ABC:

- 3 main definitions/variables:
 - DISTRO [openstlinux-weston]
 - MACHINE [MyBoard]
 - IMAGE [MyImage]
- 2 concepts
 - Overlay
 - Recipe
- 1 tool:
 - bitbake



- stm32mp13-disco.conf
- stm32mp15-disco.conf
- stm32mp15-eval.conf
- stm32mp21-disco.conf
- stm32mp23-disco.conf
- stm32mp25-disco.conf
- stm32mp25-eval.conf



- st-image-core.bb
- st-image-weston.bb

OpenSTLinux Distribution Package – OpenSTLinux

Yocto ABC:

- DISTRO [openstlinux-weston]
- MACHINE [MyBoard]
- IMAGE [MyImage]

5.1. Initializing the OpenEmbedded build environment↑

The OpenEmbedded environment setup script must be run once in each new working terminal in which you use the BitBake or devtool tools (see later):

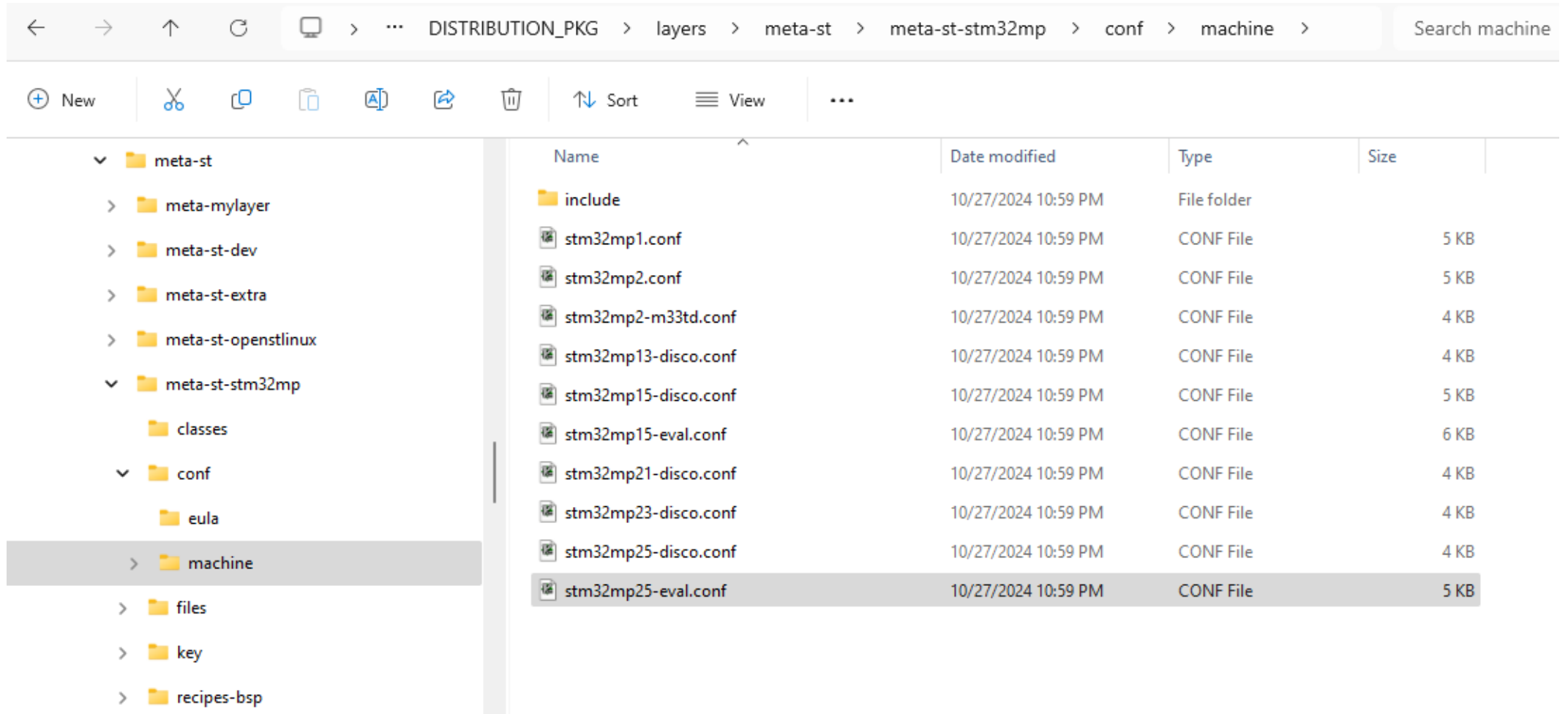
```
PC $> DISTRO=openstlinux-weston MACHINE=<machine> source layers/meta-st/scripts/envsetup.sh
```

The *bitbake* <image> command is used to build the image. <image> specifies the targeted image, *st-image-weston* here (Weston image support).

```
PC $> bitbake st-image-weston
```

OpenSTLinux Distribution Package – MACHINE defs

<https://github.com/STMicroelectronics/meta-st-stm32mp/tree/scarthgap/conf/machine>



Navigation: DISTRIBUTION_PKG > layers > meta-st > meta-st-stm32mp > conf > machine

Search: Search machine

Actions: New, Copy, Paste, Download, Upload, Sort, View

Name	Date modified	Type	Size
include	10/27/2024 10:59 PM	File folder	
stm32mp1.conf	10/27/2024 10:59 PM	CONF File	5 KB
stm32mp2.conf	10/27/2024 10:59 PM	CONF File	5 KB
stm32mp2-m33td.conf	10/27/2024 10:59 PM	CONF File	4 KB
stm32mp13-disco.conf	10/27/2024 10:59 PM	CONF File	4 KB
stm32mp15-disco.conf	10/27/2024 10:59 PM	CONF File	5 KB
stm32mp15-eval.conf	10/27/2024 10:59 PM	CONF File	6 KB
stm32mp21-disco.conf	10/27/2024 10:59 PM	CONF File	4 KB
stm32mp23-disco.conf	10/27/2024 10:59 PM	CONF File	4 KB
stm32mp25-disco.conf	10/27/2024 10:59 PM	CONF File	4 KB
stm32mp25-eval.conf	10/27/2024 10:59 PM	CONF File	5 KB

OpenSTLinux Distribution Package – MACHINE defs

<https://github.com/STMicroelectronics/meta-st-stm32mp/blob/scathgap/conf/machine/stm32mp25-eval.conf>

```
# Chip architecture
# =====
DEFAULTTUNE = "cortexa35"
include conf/machine/include/arm/armv8a/tune-cortexa35.inc

# =====
# boot scheme
# =====
BOOTSCHHEME_LABELS = "optee"

# =====
# boot device
# =====
# Define the boot device supported
BOOTDEVICE_LABELS += "emmc"
BOOTDEVICE_LABELS += "nor-sdcard"
BOOTDEVICE_LABELS += "sdcard"

# =====
# Machine settings
# =====
# activate external dt
EXTERNAL_DT_ENABLED = "1"

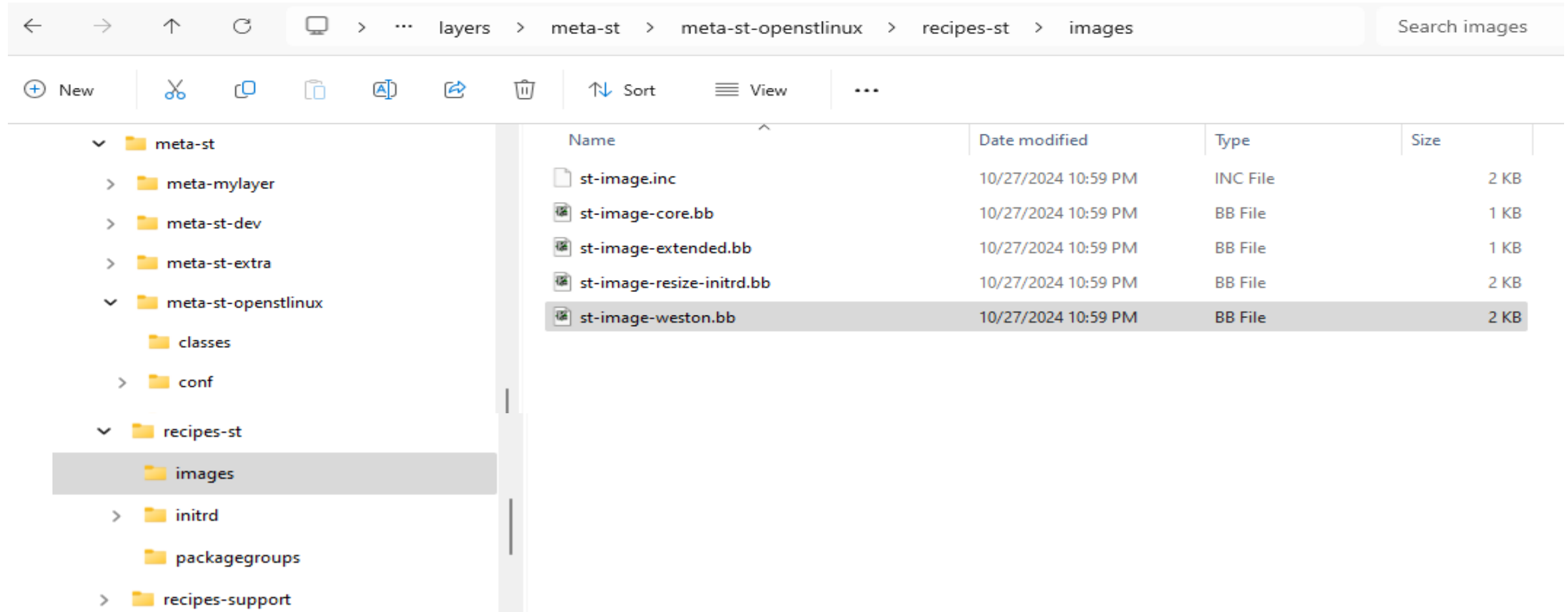
# Define list of devicetree per supported storage
STM32MP_DT_FILES_EMMC += "stm32mp257f-ev1"
STM32MP_DT_FILES_SD CARD += "stm32mp257f-ev1"
STM32MP_DT_FILES_NOR += "stm32mp257f-ev1"

EXTERNAL_DEVICETREE_SD CARD = "stm32mp257f-ev1-ca35tdcid-ost1"
EXTERNAL_DEVICETREE_SD CARD += "stm32mp257f-ev1-ca35tdcid-ost1-m33-examples"

EXTERNAL_DEVICETREE_EMMC = "stm32mp257f-ev1-ca35tdcid-ost1"
```

OpenSTLinux Distribution Package – **IMAGE** defs

<https://github.com/STMicroelectronics/meta-st-openstlinux/tree/scarthgap/recipes-st/images>



Navigation: layers > meta-st > meta-st-openstlinux > recipes-st > images

Search: Search images

Actions: New, Cut, Copy, Paste, Open, Share, Delete, Sort, View, ...

Name	Date modified	Type	Size
st-image.inc	10/27/2024 10:59 PM	INC File	2 KB
st-image-core.bb	10/27/2024 10:59 PM	BB File	1 KB
st-image-extended.bb	10/27/2024 10:59 PM	BB File	1 KB
st-image-resize-initrd.bb	10/27/2024 10:59 PM	BB File	2 KB
st-image-weston.bb	10/27/2024 10:59 PM	BB File	2 KB

Directory structure (Left Panel):

- meta-st
 - meta-mylayer
 - meta-st-dev
 - meta-st-extra
 - meta-st-openstlinux
 - classes
 - conf
- recipes-st
 - images**
 - initrd
 - packagegroups
 - recipes-support

OpenSTLinux Distribution Package – IMAGE defs

<https://github.com/STMicroelectronics/meta-st-openstlinux/blob/scarthgap/recipes-st/images/st-image-weston.bb>

```
SUMMARY = "OpenSTLinux weston image with basic Wayland support (if enable in distro)."  
LICENSE = "Proprietary"  
  
include recipes-st/images/st-image.inc  
  
inherit core-image features_check  
  
# let's make sure we have a good image...  
REQUIRED_DISTRO_FEATURES = "wayland"  
  
IMAGE_LINGUAS = "en-us"  
  
IMAGE_FEATURES += "\n    splash\n    package-management\n    ssh-server-dropbear\n    hwcodecs\n    tools-profile\n    eclipse-debug\n    "  
  
#  
# INSTALL addons  
#  
CORE_IMAGE_EXTRA_INSTALL += " \n    resize-helper \n    st-hostname \n    \n    packagegroup-framework-core-base\n    packagegroup-framework-tools-base\n    \n    packagegroup-framework-core\n    packagegroup-framework-tools\n    \n    packagegroup-framework-core-extra\n    \n    ${@bb.utils.contains('COMBINED_FEATURES', 'optee', 'packagegroup-optee-core', '', d)} \n    ${@bb.utils.contains('COMBINED_FEATURES', 'optee', 'packagegroup-optee-test', '', d)} \n    "
```

OpenSTLinux Distribution Package – ENV SETUP

Rif: https://wiki.st.com/stm32mpu/wiki/STM32MPU_Distribution_Package

DISTRO=openstlinux-weston MACHINE=<machine> source layers/meta-st/scripts/envsetup.sh

The image shows a screenshot of the STM32 MPU ecosystem v6 website and a file explorer. The website has a yellow header with "STM32 MPU ecosystem v6" and a dark blue navigation bar with "Welcome" and "Getting started" links. The main content area is titled "STM32MPU Distribution Package" and includes a pink text box stating: "The OpenEmbedded environment setup script must be run once in each". Below this, a terminal window shows the command: `PC $> DISTRO=openstlinux-weston MACHINE=<machine> source layers/meta-st/scripts/envsetup.sh`. The file explorer on the right shows the directory structure of the package, with the `machine` folder selected. The `stm32mp25-disco.conf` file is highlighted in the file list.

STM32 MPU ecosystem v6

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STM32MPU Distribution Package

The OpenEmbedded environment setup script must be run once in each

PC \$> DISTRO=openstlinux-weston MACHINE=<machine> source layers/meta-st/scripts/envsetup.sh

meta-st-stm32mp

- classes
- conf
- eula
- machine
- files
- key
- recipes-bsp
- recipes-connectivity
- recipes-core
- recipes-devtools

Name

- include
- stm32mp1.conf
- stm32mp2.conf
- stm32mp2-m33td.conf
- stm32mp13-disco.conf
- stm32mp15-disco.conf
- stm32mp15-eval.conf
- stm32mp21-disco.conf
- stm32mp25-disco.conf
- stm32mp25-eval.conf

OpenSTLinux Distribution Package – BUILD image

Rif: https://wiki.st.com/stm32mpu/wiki/STM32MPU_Distribution_Package

bitbake st-image-weston

STM32 MPU ecosystem v6

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The *bitbake* *<image>* command is used to build the image. *<image>* specifies the targeted image, *st-image-weston* here (Weston image for OpenSTLinux with basic Wayland support).

```
PC $> bitbake st-image-weston
```

BitBake is a core component of the [Yocto Project](#) and is used by the OpenEmbedded build system to build images. This build engine executes shell and Python tasks according to

> recipes-samples

> recipes-security

▼ recipes-st

images

> initrd

packagegroups

> recipes-support

Name

.st-image-weston.bb.swp

st-image.inc

st-image-core.bb

st-image-extended.bb

st-image-resize-initrd.bb

st-image-weston.bb

CUSTOMIZATION of OpenSTLinux Distribution Package



OpenSTLinux Distribution Package – CUSTOMIZATION

https://wiki.st.com/stm32mpu/wiki/How_to_create_your_own_image

The image displays two screenshots of the STM32 MPU ecosystem v6 wiki pages. Both screenshots feature a yellow header bar with the text "STM32 MPU ecosystem v6".

The top screenshot shows the page "How to create your own image". It has a dark blue navigation bar with links: "Welcome", "Getting started", and "Deep dive". The main content area has a table of contents with the following items:

- 2 Prerequisites
- 3 Available ST images
 - 3.1 OpenEmbedded images

The bottom screenshot shows the page "How to create your own machine". It also has a dark blue navigation bar with links: "Welcome", "Getting started", and "Deep dive". The main content area has a table of contents with the following items:

- 2 Generate device tree
- 3 Create a customer machine
 - 3.1 Create the new machine

https://wiki.st.com/stm32mpu/wiki/How_to_create_your_own_machine

OSTL Distribution Package – CUSTOMIZATION

```
$ DISTRO=openstlinux-weston MACHINE=stm32mp25-myboard \  
    source layers/meta-st/scripts/envsetup.sh  
  
$ bitbake-layers -h  
$ bitbake-layers create-layer ../layers/meta-st/meta-my-new-layer/  
  
$ mkdir -p ../layers/meta-st/meta-my-new-layer/conf/machine/  
$ cp -v ../layers/meta-st/meta-st-stm32mp/conf/machine/stm32mp25-disco.conf \  
    ../layers/meta-st/meta-my-new-layer/conf/machine/stm32mp25-myboard.conf  
  
$ mkdir -p ../layers/meta-st/meta-my-new-layer/recipes-st/images/  
$ cp -v ../layers/meta-st/meta-st-openstlinux/recipes-st/images/st-image-core.bb \  
    ../layers/meta-st/meta-my-new-layer/recipes-st/images/myimage.bb  
  
$ bitbake-layers add-layer ../layers/meta-st/meta-my-new-layer/  
  
$ bitbake myimage
```


OpenSTLinux Distribution Package – ENV SETUP

\$ DISTRO=openstlinux-weston MACHINE=stm32mp25-myboard source layers/meta-st/scripts/envsetup.sh

```
$ DISTRO=openstlinux-weston MACHINE=stm32mp25-myboard source layers/meta-st/scripts/envsetup.sh
[HOST DISTRIB check]
Linux Distrib: Ubuntu
Linux Release: 22.04

Required packages for Linux Distrib:
bsdmainutils build-essential chrpath cpio debianutils diffstat gawk gcc-multilib git git-lfs iputils-ping libegl1-mesa l
ect python3-pip socat texinfo unzip wget xterm xz-utils zstd

Check OK: all required packages are installed on host.

[source layers/openembedded-core/oe-init-build-env][with previous config]

=====
Configuration files have been created for the following configuration:

  DISTRO           : openstlinux-weston
  DISTRO_CODENAME   : scarthgap
  MACHINE           : stm32mp25-myboard
  BB_NUMBER_THREADS : 8
  PARALLEL_MAKE     : -j 8

  BUILDDIR          : build-openstlinuxweston-stm32mp25-myboard
  DOWNLOAD_DIR      : /home/gpaga/Public/oe-downloads
  SSTATE_DIR        : /home/gpaga/OSTL_v6.0/DISTRIBUTION_PKG/sstate-cache

  SOURCE_MIRROR_URL : http://freenas.gnb.st.com/pub/yocto/stm-opensdk/scarthgap/downloads
  SSTATE_MIRRORS     : <disable>

  WITH_EULA_ACCEPTED: YES

=====

Available images for OpenSTLinux layers are:

- Official OpenSTLinux images:
  st-image-weston - OpenSTLinux weston image with basic Wayland support (if enable in distro)

- Other OpenSTLinux images:
  - Supported images:
    st-image-core - OpenSTLinux core image

You can now run 'bitbake <image>'

*[gpaga@HOSTPC ~/OSTL_v6.0/DISTRIBUTION_PKG/build-openstlinuxweston-stm32mp25-myboard]
$
```

OSTL Distribution Package – CREATE NEW LAYER

\$ bitbake-layers -h

```
$ bitbake-layers -h
NOTE: Starting bitbake server...
NOTE: Started PRServer with DBfile: /home/gpaga/OSTL_v6.0/DISTRIBUTION_PKG/build-openstlinuxweston
usage: bitbake-layers [-d] [-q] [-F] [--color COLOR] [-h] <subcommand> ...

BitBake layers utility

options:
  -d, --debug           Enable debug output
  -q, --quiet           Print only errors
  -F, --force           Force add without recipe parse verification
  --color COLOR         Colorize output (where COLOR is auto, always, never)
  -h, --help           show this help message and exit

subcommands:
  <subcommand>
  add-layer            Add one or more layers to bblayers.conf.
  remove-layer        Remove one or more layers from bblayers.conf.
  flatten             flatten layer configuration into a separate output directory.
  show-layers         show current configured layers.
  show-overlaid       list overlaid recipes (where the same recipe exists in another layer)
  show-recipes        list available recipes, showing the layer they are provided by
  show-appends        list bbappend files and recipe files they apply to
  show-cross-depends  Show dependencies between recipes that cross layer boundaries.
  layerindex-fetch    Fetches a layer from a layer index along with its dependent layers, and ad
  layerindex-show-depends
                      Find layer dependencies from layer index.
  create-layer        Create a basic layer
  create-layers-setup
                      Writes out a configuration file and/or a script that replicate the directo
  save-build-conf     Save the currently active build configuration (conf/local.conf, conf/bblay

Use bitbake-layers <subcommand> --help to get help on a specific command
*[gpaga@HOSTPC ~/OSTL_v6.0/DISTRIBUTION_PKG/build-openstlinuxweston-stm32mp25-myboard]
$
```

OSTL Distribution Package – CREATE NEW LAYER

\$ bitbake-layers create-layer ../layers/meta-st/meta-my-new-layer/

```
$ bitbake-layers create-layer ../layers/meta-st/meta-my-new-layer
NOTE: Starting bitbake server...
NOTE: Started PRServer with DBfile: /home/gpaga/OSTL_v6.0/DISTRIBUTION_PKG/build-openstl
Add your new layer with 'bitbake-layers add-layer ../layers/meta-st/meta-my-new-layer'
*[gpaga@HOSTPC ~/OSTL_v6.0/DISTRIBUTION_PKG/build-openstlinuxweston-stm32mp25-myboard]
$
```

OSTL Distribution Package – **POPULATE NEW LAYER**

```
$ mkdir -p ../layers/meta-st/meta-my-new-layer/conf/machine/  
$ cp -v ../layers/meta-st/meta-st-stm32mp/conf/machine/stm32mp25-disco.conf \  
    ../layers/meta-st/meta-my-new-layer/conf/machine/stm32mp25-myboard.conf  
  
$ mkdir -p ../layers/meta-st/meta-my-new-layer/recipes-st/images/  
$ cp -v ../layers/meta-st/meta-st-openstlinux/recipes-st/images/st-image-core.bb \  
    ../layers/meta-st/meta-my-new-layer/recipes-st/images/my-image.bb
```

```
$ mkdir -p ../layers/meta-st/meta-my-new-layer/conf/machine/  
*[gpaga@HOSTPC ~/OSTL_v6.0/DISTRIBUTION_PKG/build-openstlinuxweston-stm32mp25-myboard]  
$ cp -v ../layers/meta-st/meta-st-stm32mp/conf/machine/stm32mp25-disco.conf ../layers/meta-st/meta-my-new-layer/conf/machine/stm32mp25-myboard.conf  
'../layers/meta-st/meta-st-stm32mp/conf/machine/stm32mp25-disco.conf' -> '../layers/meta-st/meta-my-new-layer/conf/machine/stm32mp25-myboard.conf'  
*[gpaga@HOSTPC ~/OSTL_v6.0/DISTRIBUTION_PKG/build-openstlinuxweston-stm32mp25-myboard]  
$ mkdir -p ../layers/meta-st/meta-my-new-layer/recipes-st/images/  
*[gpaga@HOSTPC ~/OSTL_v6.0/DISTRIBUTION_PKG/build-openstlinuxweston-stm32mp25-myboard]  
$ cp -v ../layers/meta-st/meta-st-openstlinux/recipes-st/images/st-image-core.bb ../layers/meta-st/meta-my-new-layer/recipes-st/images/my-image.bb  
'../layers/meta-st/meta-st-openstlinux/recipes-st/images/st-image-core.bb' -> '../layers/meta-st/meta-my-new-layer/recipes-st/images/my-image.bb'  
*[gpaga@HOSTPC ~/OSTL_v6.0/DISTRIBUTION_PKG/build-openstlinuxweston-stm32mp25-myboard]  
$
```

OSTL Distribution Package – ADD NEW LAYER

\$ bitbake-layers add-layer ../layers/meta-st/meta-my-new-layer/

```
$ bitbake-layers add-layer ../layers/meta-st/meta-my-new-layer
NOTE: Starting bitbake server...
NOTE: Started PRServer with DBfile: /home/gpaga/OSTL_v6.0/DISTRIBUTION_PKG/build-openst
*[gpaga@HOSTPC ~/OSTL_v6.0/DISTRIBUTION_PKG/build-openstlinuxweston-stm32mp25-myboard]
$
```

OSTL Distribution Package – BUILD THE NEW IMAGE

\$ bitbake myimage

```
*[gpaga@HOSTPC ~/OSTL_v6.0/DISTRIBUTION_PKG/build-openstlinuxweston-stm32mp25-myboard]
$ bitbake myimage
NOTE: Started PRServer with DBfile: /home/gpaga/OSTL_v6.0/DISTRIBUTION_PKG/build-openstlinuxweston-stm32mp25-myboard
Loading cache: 100% | ETA: --:--:
NOTE: /home/gpaga/OSTL_v6.0/DISTRIBUTION_PKG/layers/meta-st/meta-st-openstlinux/recipes-st/images/st-image-1
Parsing recipes: 100% |#####
Parsing of 3034 .bb files complete (0 cached, 3034 parsed). 4982 targets, 739 skipped, 0 masked, 0 errors.
NOTE: Resolving any missing task queue dependencies

Build Configuration:
BB_VERSION           = "2.8.0"
BUILD_SYS            = "x86_64-linux"
NATIVELSBSTRING      = "universal"
TARGET_SYS           = "aarch64-ostl-linux"
MACHINE              = "stm32mp25-myboard"
DISTRO               = "openstlinux-weston"
DISTRO_VERSION        = "5.0.3-snapshot-20241102"
TUNE_FEATURES        = "aarch64 crc cortexa35"
TARGET_FPU           = ""
DISTRO_CODENAME       = "scarthgap"
ACCEPT_EULA_stm32mp25-myboard = "1"
GCCVERSION           = "13.%"
PREFERRED_PROVIDER_virtual/kernel = "linux-stm32mp"
meta-mylayer         = "<unknown>:<unknown>"
meta-python
meta-oe
meta-gnome
meta-multimedia
meta-networking
meta-webserver       = "HEAD:1235dd4ed4a57e67683c045ad76b6a0f9e896b45"
meta-st-stm32mp      = "HEAD:0831ee6057b49692e88dcca169250cb3e8f6c597"
meta-st-openstlinux  = "HEAD:6efa32c7e8162950b39827d18ffba23af01483d8"
meta                 = "HEAD:236ac1b43308df722a78d3aa20aef065dfae5b2b"
meta-my-new-layer    = "<unknown>:<unknown>"

Sstate summary: Wanted 60 Local 59 Mirrors 0 Missed 1 Current 1453 (98% match, 99% complete)#####
Initialising tasks: 100% |#####
NOTE: Executing Tasks
NOTE: Tasks Summary: Attempted 3445 tasks of which 3441 didn't need to be rerun and all succeeded.
NOTE: Writing buildhistory
NOTE: Writing buildhistory took: 4 seconds
*[gpaga@HOSTPC ~/OSTL_v6.0/DISTRIBUTION_PKG/build-openstlinuxweston-stm32mp25-myboard]
```

OSTL Distribution Package – myboard.conf machine file

```
$ cat ../layers/meta-st/meta-mylayer/conf/machine/stm32mp25-myboard.conf
```

```
##@TYPE: Machine
##@NAME: stm32mp25-myboard
##@DESCRIPTION: Configuration for all STM32MP25 myboard boards (MYBOARD)
##@NEEDED_BSPLAYERS: layers/meta-openembedded/meta-oe layers/meta-openembedded/meta-python

# Define specific family common machine name
MACHINEOVERRIDES =. "stm32mp2common:stm32mp25common:"

include conf/machine/include/st-machine-common-stm32mp.inc
include conf/machine/include/st-machine-providers-stm32mp.inc

# =====
# Chip architecture
# =====
DEFAULTTUNE = "cortexa35"
include conf/machine/include/arm/armv8a/tune-cortexa35.inc

# =====
# boot scheme
# =====
BOOTSCHHEME_LABELS = "optee"

# =====
# boot device
# =====
# Define the boot device supported
BOOTDEVICE_LABELS += "emmc"
BOOTDEVICE_LABELS += "nor-sdcard"
BOOTDEVICE_LABELS += "sdcard"

# =====
# Machine settings
# =====
# activate external dt
EXTERNAL_DT_ENABLED = "1"

# Define list of devicetree per supported storage
STM32MP_DT_FILES_EMMC = "stm32mp257f-myboard"
STM32MP_DT_FILES_SD CARD = "stm32mp257f-myboard"
STM32MP_DT_FILES_NOR = "stm32mp257f-myboard"

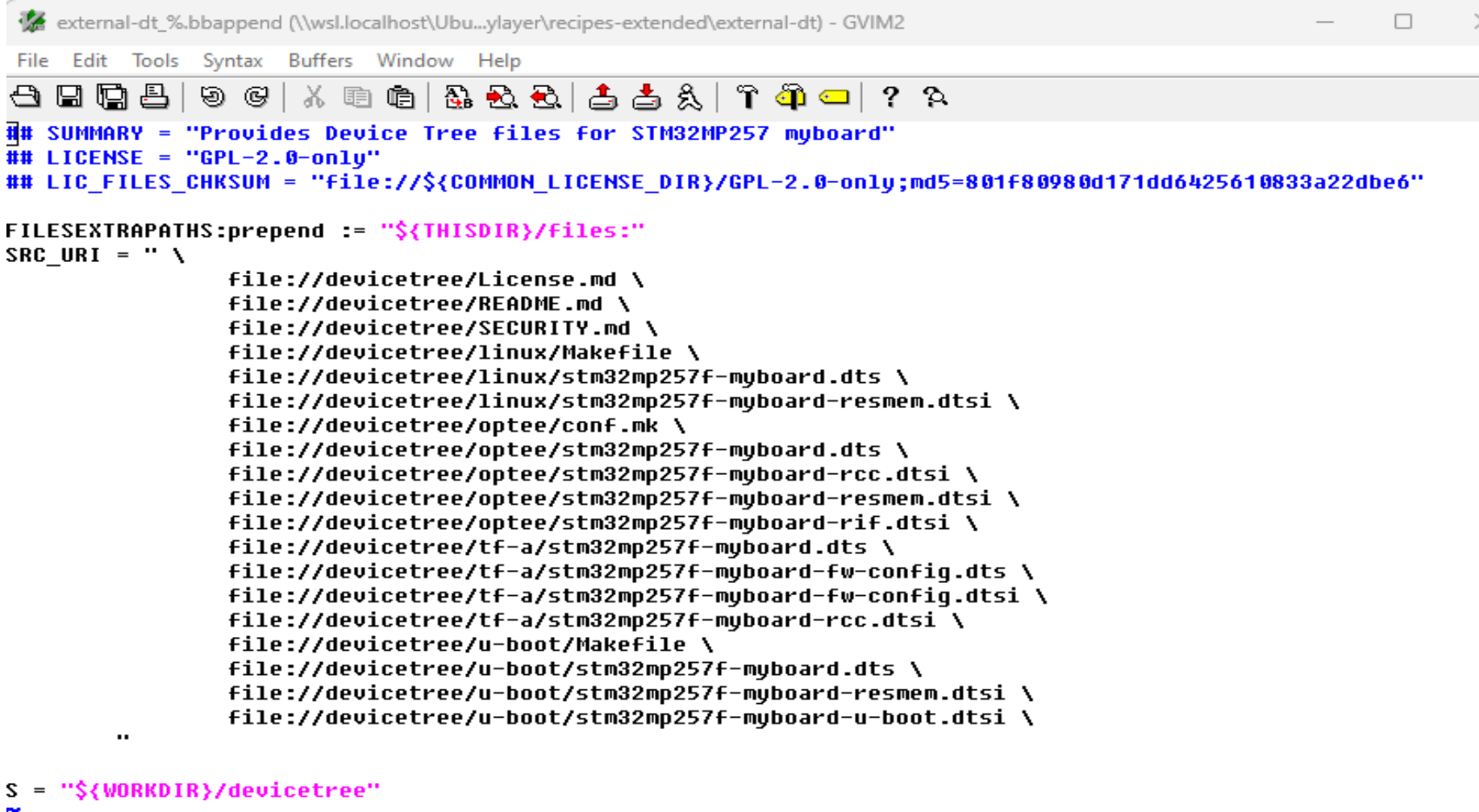
EXTERNAL_DEVICETREE_SD CARD = "stm32mp257f-myboard"
EXTERNAL_DEVICETREE_EMMC = "stm32mp257f-myboard"

UBOOT_CONFIG[default_stm32mp25] = "stm32mp25_myboard_defconfig,u-boot.dtb"

# =====
# Machine features
# =====
# MACHINE_FEATURES += "splashscreen"
# MACHINE_FEATURES += "watchdog"
# MACHINE_FEATURES += "bluetooth"
# MACHINE_FEATURES += "wifi"
```

OSTL Distribution Package – ext devicetree files

```
$ cat ../layers/meta-st/meta-mylayer/recipes-extended/external-dt/external-dt_%.bbappend
```



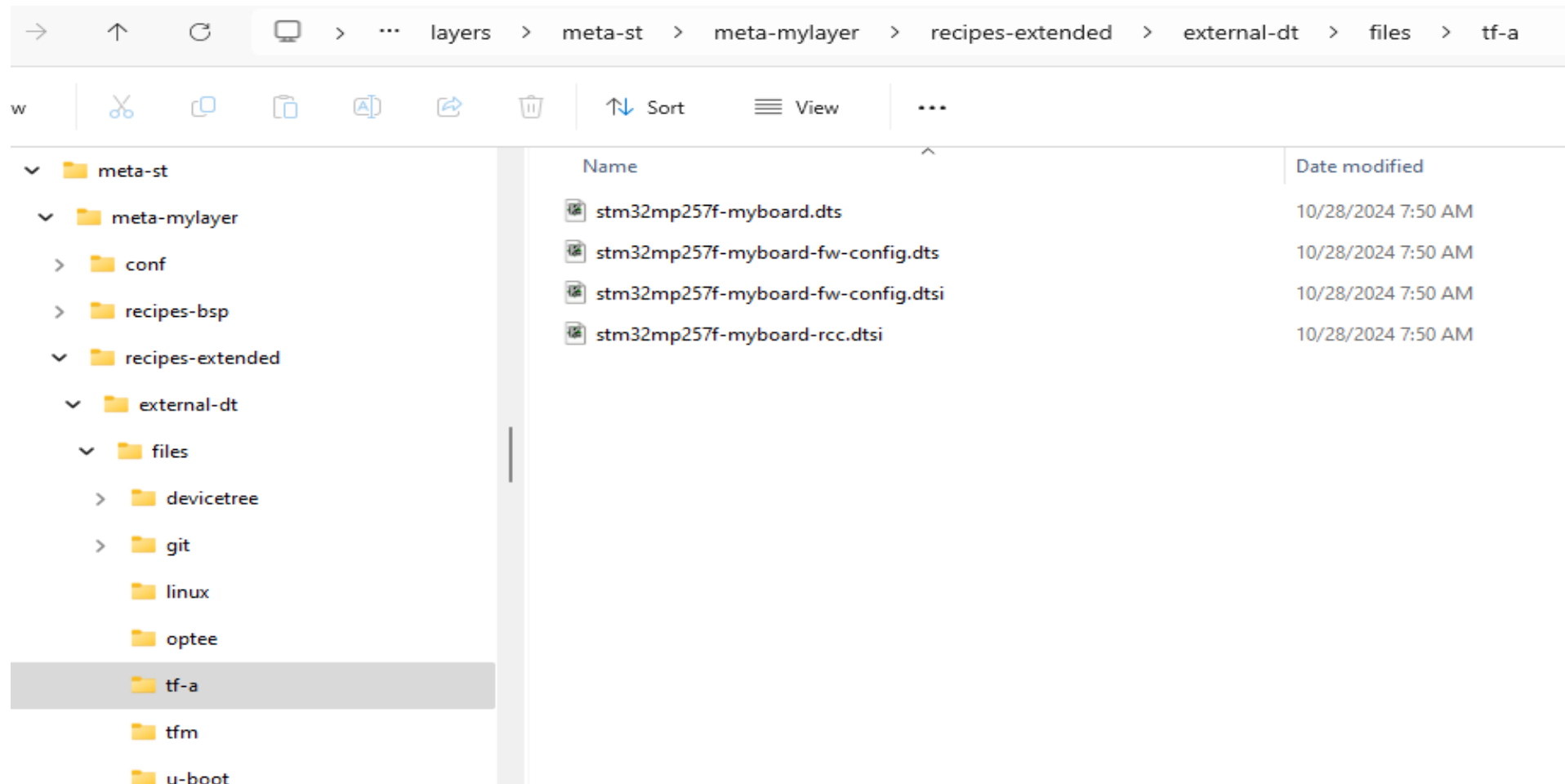
```
## SUMMARY = "Provides Device Tree files for STM32MP257 myboard"
## LICENSE = "GPL-2.0-only"
## LIC_FILES_CHKSUM = "file://${COMMON_LICENSE_DIR}/GPL-2.0-only;md5=801f80980d171dd6425610833a22dbe6"

FILESEXTRAPATHS:prepend := "${THISDIR}/files:"
SRC_URI = " \
    file:///devicetree/License.md \
    file:///devicetree/README.md \
    file:///devicetree/SECURITY.md \
    file:///devicetree/linux/Makefile \
    file:///devicetree/linux/stm32mp257f-myboard.dts \
    file:///devicetree/linux/stm32mp257f-myboard-resmem.dtsi \
    file:///devicetree/optee/conf.mk \
    file:///devicetree/optee/stm32mp257f-myboard.dts \
    file:///devicetree/optee/stm32mp257f-myboard-rcc.dtsi \
    file:///devicetree/optee/stm32mp257f-myboard-resmem.dtsi \
    file:///devicetree/optee/stm32mp257f-myboard-rif.dtsi \
    file:///devicetree/tf-a/stm32mp257f-myboard.dts \
    file:///devicetree/tf-a/stm32mp257f-myboard-fw-config.dts \
    file:///devicetree/tf-a/stm32mp257f-myboard-fw-config.dtsi \
    file:///devicetree/tf-a/stm32mp257f-myboard-rcc.dtsi \
    file:///devicetree/u-boot/Makefile \
    file:///devicetree/u-boot/stm32mp257f-myboard.dts \
    file:///devicetree/u-boot/stm32mp257f-myboard-resmem.dtsi \
    file:///devicetree/u-boot/stm32mp257f-myboard-u-boot.dtsi \
    ..
"

S = "${WORKDIR}/devicetree"
```

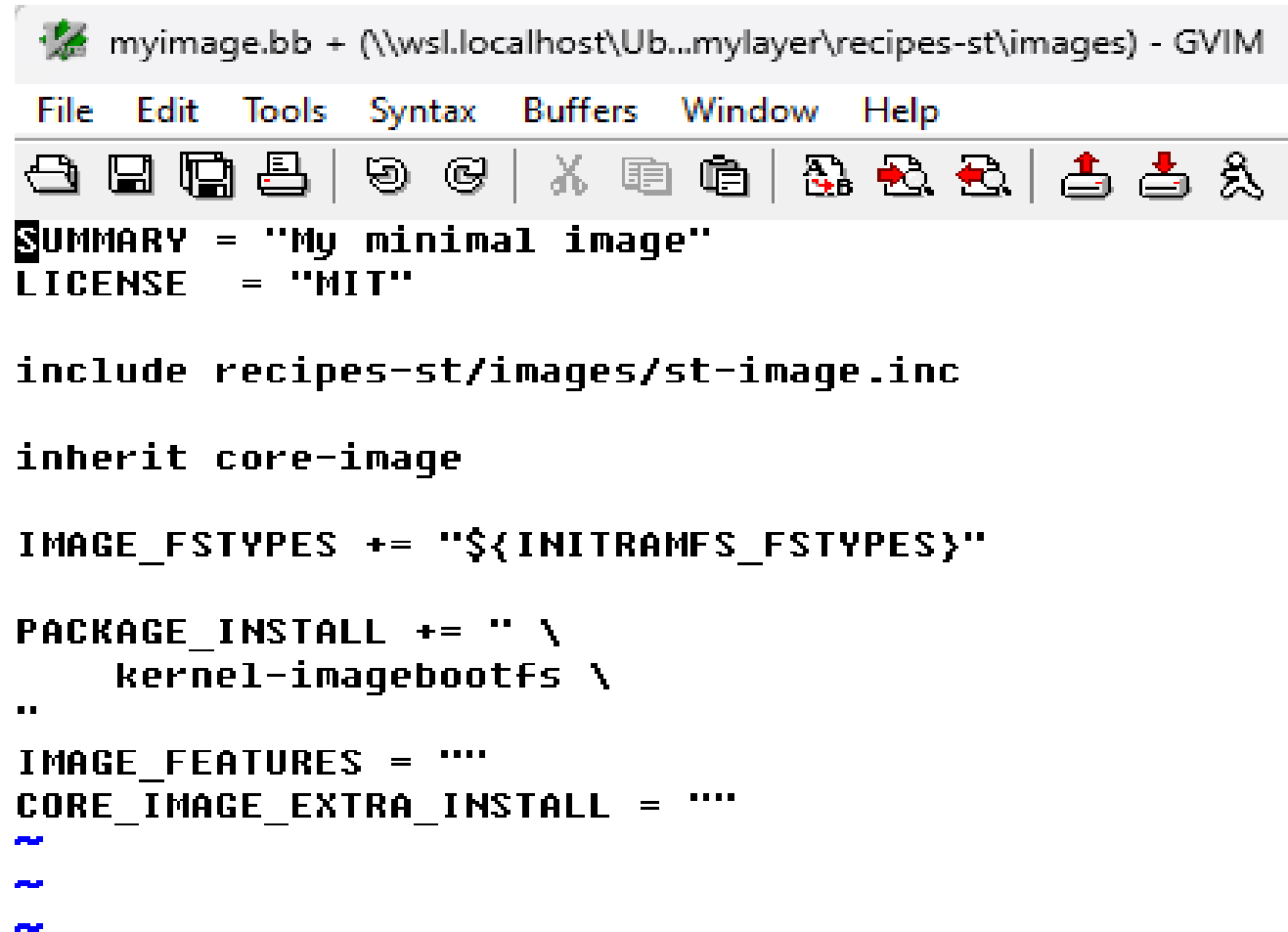

OSTL Distribution Package – ext devicetree files

\$ ls ../layers/meta-st/meta-mylayer/recipes-extended/external-dt/files



OSTL Distribution Package – **myimage.bb** image file

```
$ gvim ../layers/meta-st/meta-mylayer/recipes-st/images/myimage.bb
```



```
SUMMARY = "My minimal image"
LICENSE = "MIT"

include recipes-st/images/st-image.inc

inherit core-image

IMAGE_FSTYPES += "${INITRAMFS_FSTYPES}"

PACKAGE_INSTALL += " \
    kernel-imagebootfs \
    ..
IMAGE_FEATURES = ""
CORE_IMAGE_EXTRA_INSTALL = ""
~
~
~
```

OpenSTLinux Distribution Package – MY IMAGE

← → ↑ ↺ 🖥️ > ... OSTL_v6.0 > DISTRIBUTION_PKG > build-openstlinuxweston-stm32mp25-myboard > tmp-glibc > deploy > images > stm32mp25-myboard > Search stm32mp25-my...				
+ New ▾ ✂️ 📄 📁 📧 📧 🗑️ ⬆️ Sort ▾ ≡ View ▾ ...				
▼ stm32mp25-myboard				
> arm-trusted-firmware				
fip				
> flashlayout_myimage				
> kernel				
> optee				
scripts				
> u-boot				
> myimage-openstlinux-weston-stm32r				
> myimage-openstlinux-weston-stm32r				
myimage-openstlinux-weston-stm32r				
> myimage-openstlinux-weston-stm32r				
> licenses				
> spdx				
hosttools				
> log				
> pkgdata				
sstate-control				
> stamps				
sysroots				
Name				
arm-trusted-firmware	10/28/2024 9:14 AM	File folder		
fip	10/28/2024 9:29 AM	File folder		
flashlayout_myimage	11/2/2024 6:10 PM	File folder		
kernel	10/28/2024 9:19 AM	File folder		
optee	10/28/2024 9:29 AM	File folder		
scripts	11/2/2024 5:52 PM	File folder		
u-boot	10/28/2024 8:25 AM	File folder		
myimage-openstlinux-weston-stm32mp25-myboard.rootfs.cpio.gz	11/2/2024 6:10 PM	gz Archive		1 KB
myimage-openstlinux-weston-stm32mp25-myboard.rootfs.ext4	11/2/2024 6:10 PM	EXT4 File		1 KB
myimage-openstlinux-weston-stm32mp25-myboard.rootfs.manifest	11/2/2024 6:10 PM	MANIFEST File		1 KB
myimage-openstlinux-weston-stm32mp25-myboard.rootfs.spdx.tar.zst	11/2/2024 6:10 PM	Compressed Archive Folder		1 KB
myimage-openstlinux-weston-stm32mp25-myboard.rootfs.tar.xz	11/2/2024 6:10 PM	Compressed Archive Folder		1 KB
myimage-openstlinux-weston-stm32mp25-myboard.rootfs.testdata.json	11/2/2024 6:10 PM	JSON Source File		1 KB
myimage-openstlinux-weston-stm32mp25-myboard.rootfs-20241102170938.cpio.gz	11/2/2024 6:10 PM	gz Archive		6,937 KB
myimage-openstlinux-weston-stm32mp25-myboard.rootfs-20241102170938.ext4	11/2/2024 6:10 PM	EXT4 File		65,536 KB
myimage-openstlinux-weston-stm32mp25-myboard.rootfs-20241102170938.manifest	11/2/2024 6:10 PM	MANIFEST File		1 KB
myimage-openstlinux-weston-stm32mp25-myboard.rootfs-20241102170938.spdx.tar.zst	11/2/2024 6:10 PM	Compressed Archive Folder		102 KB
myimage-openstlinux-weston-stm32mp25-myboard.rootfs-20241102170938.tar.xz	11/2/2024 6:10 PM	Compressed Archive Folder		3,873 KB
myimage-openstlinux-weston-stm32mp25-myboard.rootfs-20241102170938.testdata.json	11/2/2024 6:10 PM	JSON Source File		459 KB
myimage-openstlinux-weston-stm32mp25-myboard.rootfs-20241102170938-license_content.html	11/2/2024 6:10 PM	Chrome HTML Document		88 KB
myimage-openstlinux-weston-stm32mp25-myboard.rootfs-license_content.html	11/2/2024 6:10 PM	Chrome HTML Document		1 KB

OpenSTLinux Distribution Package – IMAGE FLUSH

```
COM60 - Tera Term VT
File Edit Setup Control Window Help
UPLOAD ... done
Ctrl+C to exit ...
$
UPLOAD ... done
Ctrl+C to exit ...
$DOWNLOAD ... OK
Ctrl+C to exit ...
$
UPLOAD ... done
Ctrl+C to exit ...
$
UPLOAD ... done
Ctrl+C to exit ...
$#####Phase=END
DOWNLOAD ... OK
Ctrl+C to exit ...
$
UPLOAD ... done
Ctrl+C to exit ...
$
UPLOAD ... done
Ctrl+C to exit ...
$
```

```
Select Windows PowerShell
PS C:\Users\paganog1\BUILD_OUTPUT\stm32mp25-myboard>
PS C:\Users\paganog1\BUILD_OUTPUT\stm32mp25-myboard> .\flash.bat

C:\Users\paganog1\BUILD_OUTPUT\stm32mp25-myboard>"C:\Program Files\STMicroelectronics\STM32Cube\STM32CubeProgrammer\bin\STM32_Programmer_CLI.exe" -c port=USB1 -w flashlayout_myimage\optee\FlashLayout_emmc_stm32mp257f-myboard-optee.tsv

-----
                        STM32CubeProgrammer v2.17.0
-----

USB speed   : High Speed (480MBit/s)
Manuf. ID   : STMicroelectronics
Product ID  : DFU in HS Mode @Device ID /0x505, @Revision ID /0x2000
SN          : 002900234136500B00363653
DFU protocol: 1.1
Board       : --
Device ID   : 0x0505
```

OpenSTLinux Distribution Package – playing with ramfs

```
COM60 - Tera Term VT
File Edit Setup Control Window Help

Booting using the fdt blob at 0x90000000
Working FDT set to 90000000
Loading Device Tree to 000000008ffe1000, end 000000008ffff82d ... OK
Working FDT set to 8ffe1000
Starting kernel ...

I/TC: Secondary CPU 1 initializing
I/TC: Secondary CPU 1 switching to normal world
I/TC: Reserved shared memory is disabled
I/TC: Dynamic shared memory is enabled
I/TC: Normal World virtualization support is disabled
I/TC: Asynchronous notifications are enabled
[ 0.321152] stm32-ipcc 46250000.mailbox: Unavailable
[ 0.522802] Initramfs unpacking failed: invalid archive
[ 1.901183] stm32-rproc 0.m33: mbox_request_send: no channel named "detach"
[ 1.927837] Failed to execute /init (error -1)
/bin/sh: can't access tty; job control turned off
#
#
#
```

```
Select Windows PowerShell
PS C:\Users\paganog1\BUILD_OUTPUT\stm32mp25-myboard> .\flash3.bat
C:\Users\paganog1\BUILD_OUTPUT\stm32mp25-myboard>"C:\Program Files\STMicroelectronics\STM32Cube\STM32CubeProgrammer\bin\STM32_Programmer_CLI.exe" -c port=USB1 -d arm-trusted-firmware\tf-a-stm32mp257f-myboard-optee-programmer-usb.stm32 0x1 -s 0x1 -d fip\
fip-stm32mp257f-myboard-ddr-optee-programmer-usb.bin 0x2 -s 0x2 -d fip\fip-stm32mp257f-myboard-optee-emmc.bin 0x3 -s 0x3 -d flashlayout_myimage\optee\script.BIN 0x0 -s 0x0 --detach

-----
STM32CubeProgrammer v2.17.0
-----

USB speed      : High Speed (480MBit/s)
Manuf. ID      : STMicroelectronics
Product ID     : DFU in HS Mode @Device ID /0x505, @Revision ID /0x2000
SN             : 002900234136500B00363653
DFU protocol   : 1.1
```

OpenSTLinux installation check

Use serial console to run some simple commands:

- `free` Discover how much DDR RAM is available on your system
- `uptime` Print load of your system
- `df -h` Print occupation of your storage [Disk Free]
- `dmesg` Show debug messages from Linux kernel
- `dmesg | grep "version"` Extract version string from debug Linux kernel messages
- `ps ax` Show active processes running on your Linux system
- `gdisk -l` Print GPT disk partition table

WRAP UP



- Rich Ecosystem:
 - HW => EVAL + DISCOVERY board + expansion boards + PCB examples
 - SW => Android + OpenSTLinux + BuildRoot + OpenWrt + CubeMP2
 - TOOLS => STM32CubeMX + STM32CubeIDE + STM32CubeProgrammer + STLink debugger
- Easy methods for customizing OpenSTLinux Distribution:
 - MyImage
 - MyBoard
 - External device tree

Thank you

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