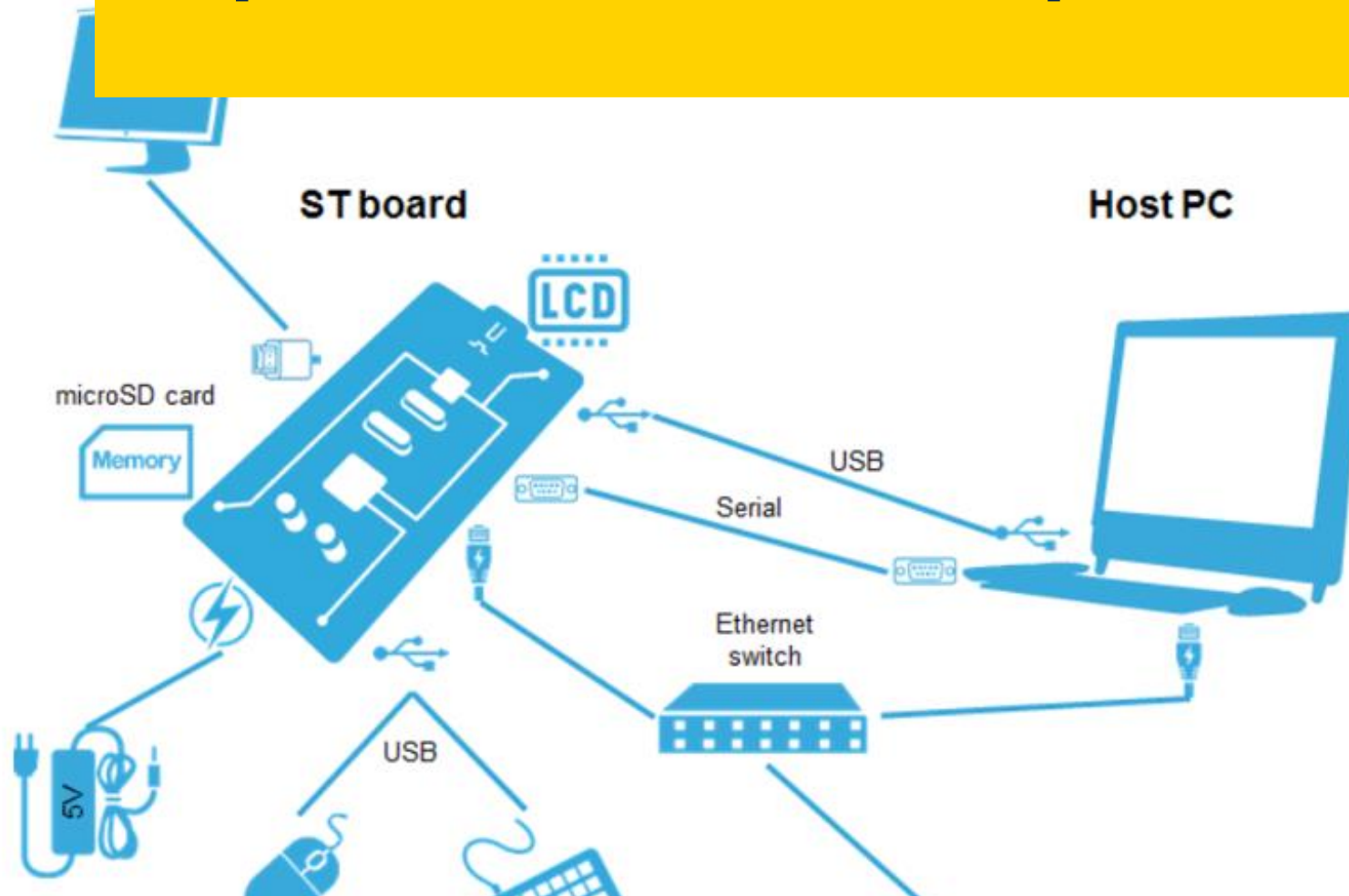


# OpenSTLinux Developer Package



# WIKI PAGE for OpenSTLinux Developer Package

Refer to:

[https://wiki.st.com/stm32mpu/wiki/STM32MPU\\_Developer\\_Package](https://wiki.st.com/stm32mpu/wiki/STM32MPU_Developer_Package)

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

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## 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](#)



# OpenSTLinux Developer Package - **DOWNLOAD**

Refer to:

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

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ST logo  [Products](#) [Tools & software](#) [Applications](#) [Solutions](#) [ST Developer Zone](#)

Breadcrumb: [Embedded software](#) > [MCU and MPU embedded software](#) > [STM32 Embedded Software](#) > [STM32 MPU OpenSTLinux Distribution](#) > [STM32MP2Dev](#)

**STM32MP2Dev** ACTIVE

## STM32MP2 OpenSTLinux Developer Package

[Get Software](#) [Download databrief](#)

Navigation tabs: [Overview](#) [Documentation](#) [Tools & Software](#)

# OpenSTLinux Developer Package - **DOWNLOAD**

Refer to:

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

## Get Software

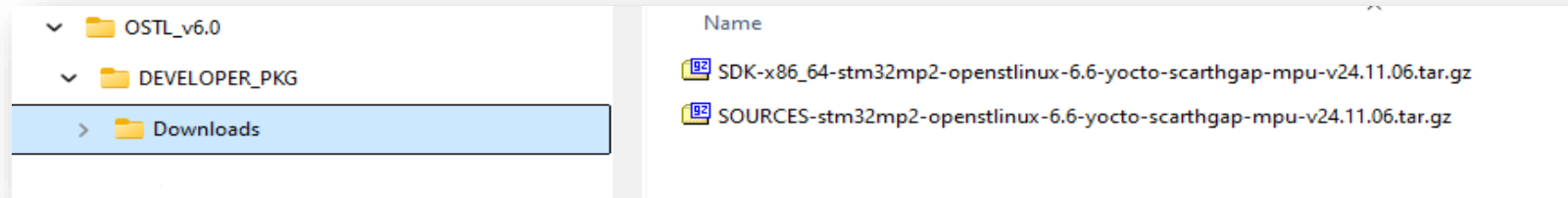
Part Number	Download	All versions
+ MP2-DEV-Arm	Get latest	Select version ▼
+ MP2-DEV-SRC	Get latest	Select version ▼
+ MP2-DEV-x86	Get latest	Select version ▼
+ MP2-DEV-x86-RUST	Get latest	Select version ▼

# SDK ENVIRONMENT SETUP

# OpenSTLinux Developer Package - **SETUP**

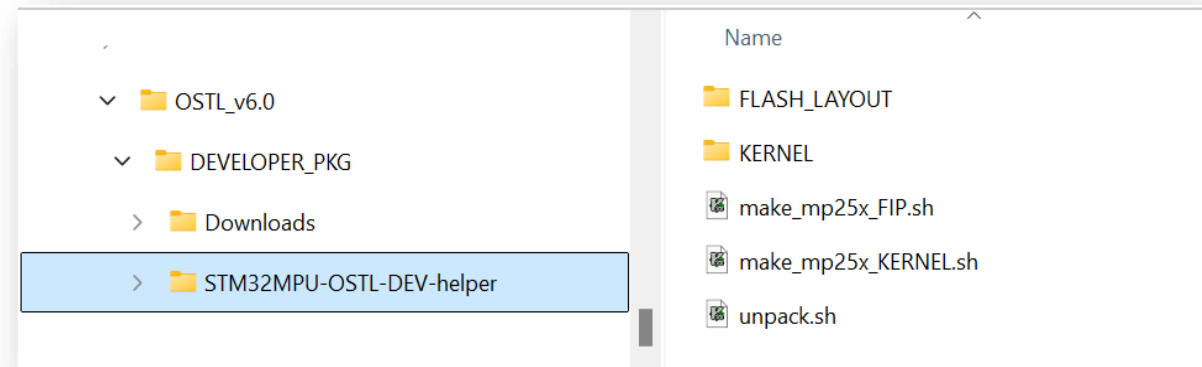
## Materials:

### 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]
```

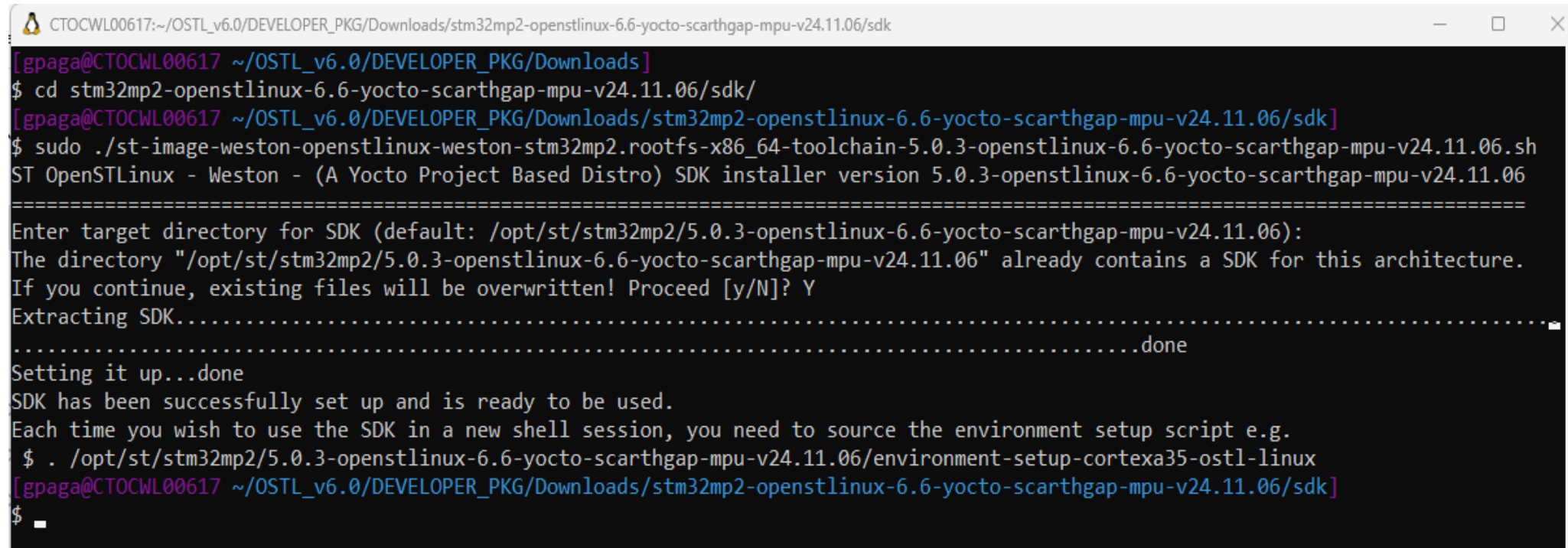


# OpenSTLinux Developer Package - **SETUP**

## 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
```

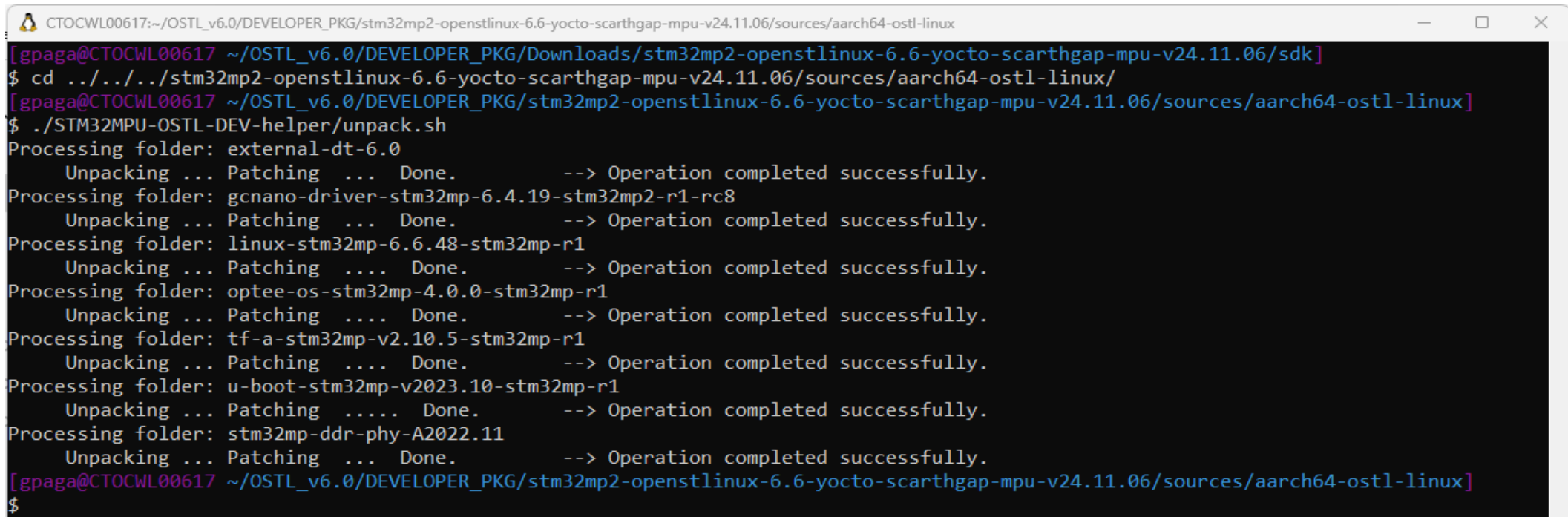


```
CTOCWL00617:~/OSTL_v6.0/DEVELOPER_PKG/Downloads/stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sdk
[gpaga@CTOCWL00617 ~/OSTL_v6.0/DEVELOPER_PKG/Downloads]
$ cd stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sdk/
[gpaga@CTOCWL00617 ~/OSTL_v6.0/DEVELOPER_PKG/Downloads/stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sdk]
$ 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
```



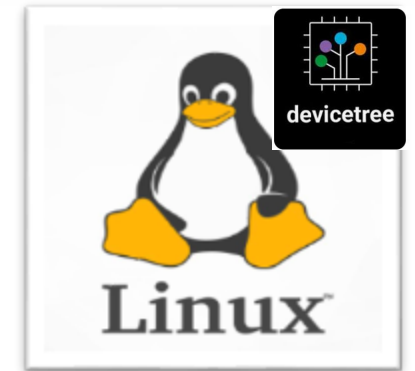
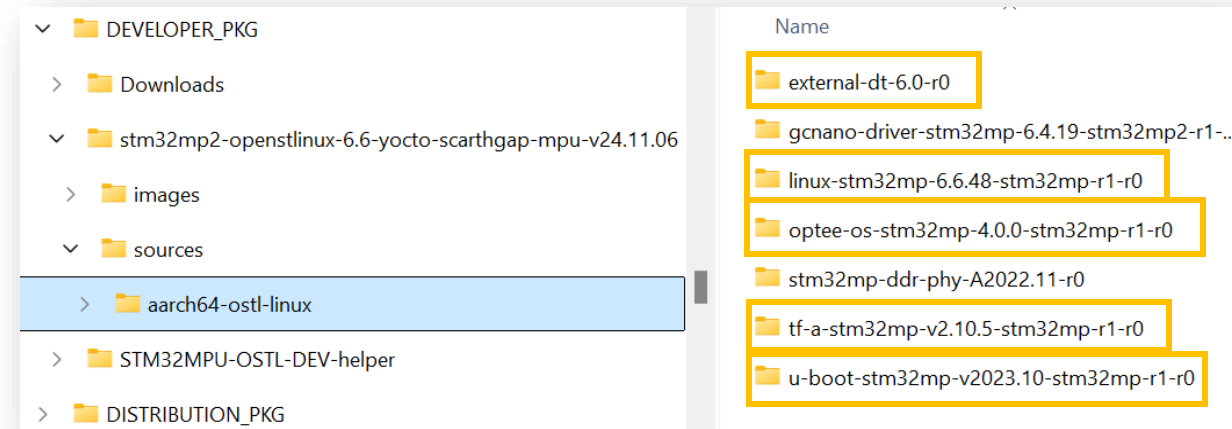
```
CTOCWL00617:~/OSTL_v6.0/DEVELOPER_PKG/stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sources/aarch64-ostl-linux  
[gpaga@CTOCWL00617 ~/OSTL_v6.0/DEVELOPER_PKG/Downloads/stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sdk]  
$ cd ../../../../stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sources/aarch64-ostl-linux/  
[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-stm32mp2-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-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/..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
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/fip/fip\_usb.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-6.6-yocto-scarthga]$ ls -lh BUILD_OUTPUT/fip/* BUILD_OUTPUT/tfa/* BUILD_OUTPUT/kernel/*
-rw-r--r-- 1 gpaga gpaga 2.6M Dec  1 00:20 BUILD_OUTPUT/fip/fip.bin
-rw-r--r-- 1 gpaga gpaga 34K Dec  1 00:20 BUILD_OUTPUT/fip/fip-ddr.bin
-rw-r--r-- 1 gpaga gpaga 2.6M Dec  1 00:20 BUILD_OUTPUT/fip/fip_usb.bin
-rw-r--r-- 1 gpaga gpaga 5.8M Dec  1 00:00 BUILD_OUTPUT/kernel/Image.gz
-rw-r--r-- 1 gpaga gpaga 113K Dec  1 00:00 BUILD_OUTPUT/kernel/stm32mp257f-dk.dtb
-rw-r--r-- 1 gpaga gpaga 120 Dec  1 00:20 BUILD_OUTPUT/tfa/metadata.bin
-rw-r--r-- 1 gpaga gpaga 195K Dec  1 00:20 BUILD_OUTPUT/tfa/tfa_emmc.stm32
-rw-r--r-- 1 gpaga gpaga 191K Dec  1 00:20 BUILD_OUTPUT/tfa/tfa_usb.stm32

BUILD_OUTPUT/kernel/lib:
total 4.0K
drwxr-xr-x 3 gpaga gpaga 4.0K Nov 30 22:51 modules
[gpaga@CTOCWL00617 ~/OSTL_v6.0/DEVELOPER_PKG/stm32mp2-openstlinux-6.6-yocto-scarthga]
```

FLASH  
HELPERS

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

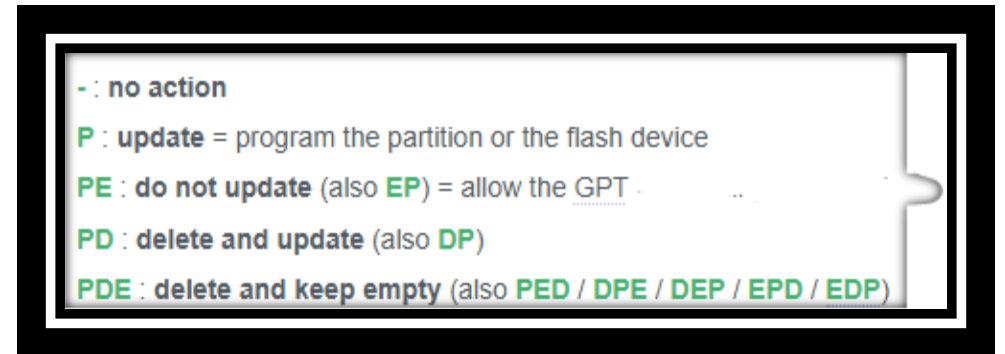


# OpenSTLinux Developer Package – FLUSH OPT1

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

Rif.

[https://wiki.st.com/stm32mpu/wiki/STM32CubeProgrammer\\_flashlayout](https://wiki.st.com/stm32mpu/wiki/STM32CubeProgrammer_flashlayout)



```
Command Prompt
C:\Users\... \BUILD_OUTPUT>flash.bat

C:\Users\... \BUILD_OUTPUT>"C:\Program Files\STMicroelectronics\STM32CubeProgrammer\bin\STM32_Programmer_CLI.exe" -c port=USB1 -w FLASH_LAYOUT\flash.tsv

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

USB speed : High Speed (480MBit/s)
Manuf. ID : STMMicroelectronics
Product ID : Dfu in HS Mode @Device ID /0x505, @Revision ID /0x2000
SN : 002F002C4136500800373653
Dfu protocol: 1.1

Download in Progress:
[Progress Bar] 100%

File download complete
Time elapsed during download operation: 00:00:00.900

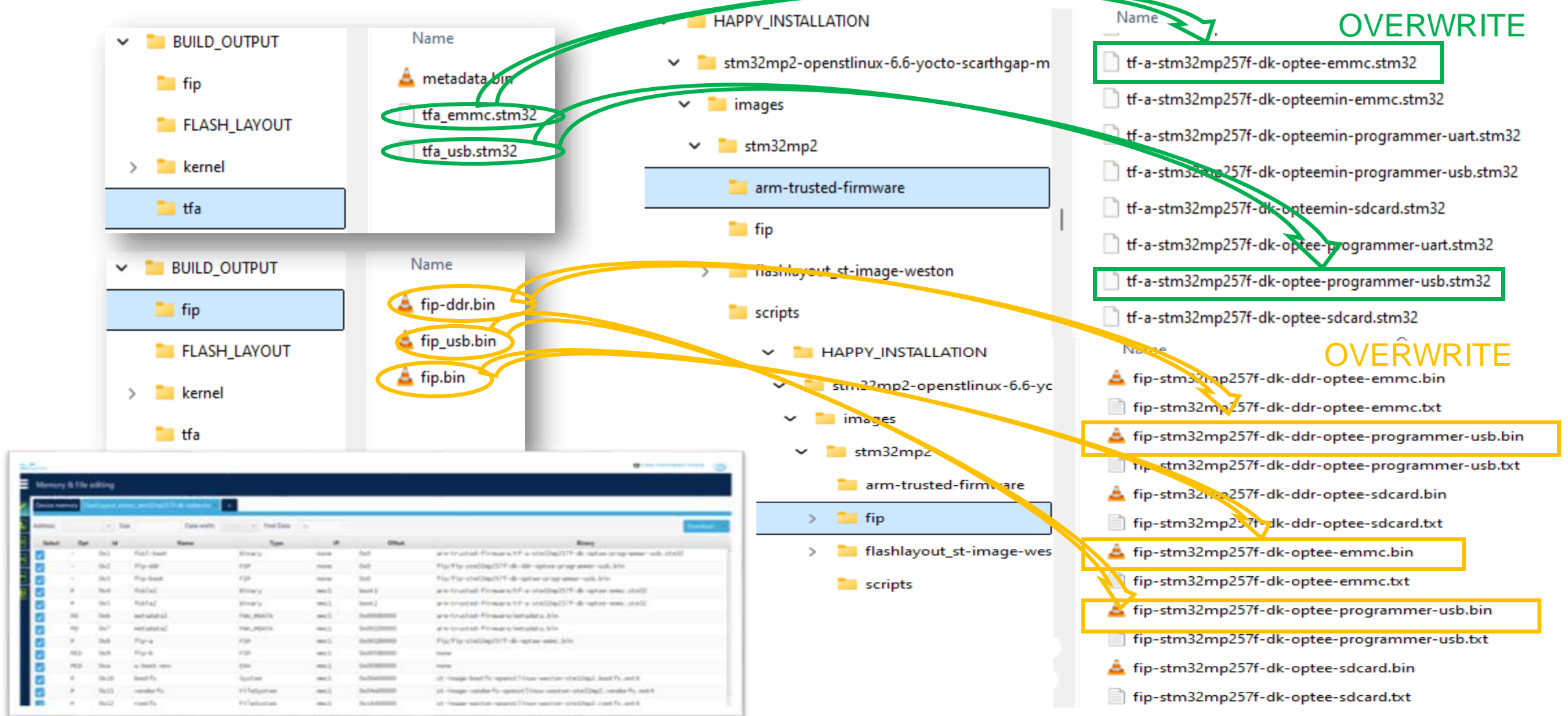
RUNNING Program ...
PartID: :0x08
Start operation done successfully at partition 0x08
Flashing service completed successfully

C:\Users\... \BUILD_OUTPUT>rem "C:\Program Files\STMicroelectronics\STM32CubeProgrammer\bin\STM32_Programmer_CLI.exe" -c port=USB1 -w FLASH_LAYOUT\flash.tsv
```

flash\_layout\_emmc.tsv ~\BUILD\_OUTPUT\FLASH\_LAYOUT) - GVIM

#Opt	Id	Name	Type	IP	Offset	Binary
-	0x01	fsbl-boot	Binary		0x0	tfa/tfa_usb.stm32
-	0x02	fip-ddr	FIP		0x0	fip/fip-ddr.bin
-	0x03	fip-boot	FIP		0x0	fip/fip.bin
P	0x04	fsbla1	Binary		mmc1 boot1	tfa/tfa_emmc.stm32
P	0x05	fsbla2	Binary		mmc1 boot2	tfa/tfa_emmc.stm32
PE	0x06	metadata1	FWU_METADATA		mmc1 0x00080000	tfa/metadata.bin
PE	0x07	metadata2	FWU_METADATA		mmc1 0x00100000	tfa/metadata.bin
P	0x08	fip-a	FIP		mmc1 0x00180000	fip/fip.bin
PED	0x09	fip-b	FIP		mmc1 0x00580000	fip/fip.bin
PED	0x0A	u-boot-env	ENV		mmc1 0x00980000	none
PE	0x10	bootfs	System		mmc1 0x00A00000	none
PE	0x11	vendorfs	FileSystem		mmc1 0x04A00000	none
PE	0x12	rootfs	FileSystem		mmc1 0x14400000	none
PE	0x13	userfs	FileSystem		mmc1 0xD4400000	none

# OpenSTLinux Developer Package - FLUSH OPT2



# 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](https://wiki.st.com/stm32mpu/wiki/STM32MPU_Distribution_Package)

**STM32 MPU ecosystem v6**

▼ Embedded software

▼ Distributions

▼ Yocto-based OpenSTLinux embedded software

➤ OpenSTLinux distribution

➤ FwST-M Packages

➤ OpenSTLinux starter packages

➤ OpenSTLinux developer packages

▼ OpenSTLinux distribution packages

STM32MPU Distribution Package

➤ OpenSTLinux expansion packages

➤ Bare metal - RTOS embedded software

➤ Android-based OpenSTDroid embedded software

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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"><li>Go to the host PC directory where to install the Distribution Package (&lt;Distribution Package installation directory&gt;). Example, if following the <a href="#">proposition to organize the working directory</a>:</li></ul> <pre>PC \$&gt; cd &lt;working directory path&gt;/Distribution-Package</pre> <ul style="list-style-type: none"><li>Initialize repo in the current directory (More details on 'repo init' <a href="#">here</a>).</li></ul> <pre>&gt; repo init -u https://github.com/STMicroelectronics/oe-manifest.git -b refs/tags/openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06</pre> <p><b>Note:</b> "ERROR 404" may appear during "repo init" command without any impact on the process</p> <ul style="list-style-type: none"><li>Synchronize the local project directories with the remote repositories specified in the manifest (more details on 'repo sync' <a href="#">here</a>)</li></ul> <pre>PC \$&gt; repo sync</pre> <p><b>Note:</b> 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 <b>associated</b> <a href="#">STM32 MPU ecosystem release note</a>.</p> <p> If interested in previous releases, go through the <a href="#">archives</a> 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 sync -j8

```
CTOCWL00617:(DISTRIBUTION_PKG_DEMO) ~/OSTL_v6.0/DISTRIBUTION_PKG_DEMO
[gpaga@CTOCWL00617 ~]
$ cd OSTL_v6.0/DISTRIBUTION_PKG_DEMO/
[gpaga@CTOCWL00617 ~/OSTL_v6.0/DISTRIBUTION_PKG_DEMO]
$ repo init -u https://github.com/STMicroelectronics/oe-manifest.git -b refs/tags/openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06
Downloading Repo source from https://gerrit.googlesource.com/git-repo

... A new version of repo (2.48) is available.
... You should upgrade soon:
    cp /home/gpaga/OSTL_v6.0/DISTRIBUTION_PKG_DEMO/.repo/repo/repo /usr/bin/repo

Your identity is: gpaga <giuseppe.pagano@st.com>
If you want to change this, please re-run 'repo init' with --config-name

repo has been initialized in /home/gpaga/OSTL_v6.0/DISTRIBUTION_PKG_DEMO
*[gpaga@CTOCWL00617 ~/OSTL_v6.0/DISTRIBUTION_PKG_DEMO]
$ repo sync -j8

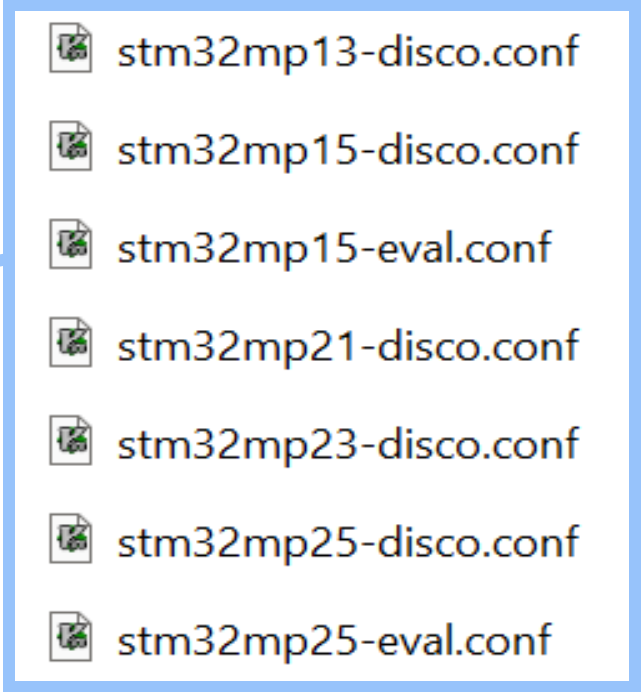
... A new version of repo (2.48) is available.
... You should upgrade soon:
    cp /home/gpaga/OSTL_v6.0/DISTRIBUTION_PKG_DEMO/.repo/repo/repo /usr/bin/repo








Fetching: 100% (7/7), done in 28.224s
Checking out: 85% (6/7), done in 0.580s
Checking out: 14% (1/7), done in 0.104s
repo sync has finished successfully.
*[gpaga@CTOCWL00617 ~/OSTL_v6.0/DISTRIBUTION_PKG_DEMO]
$
```

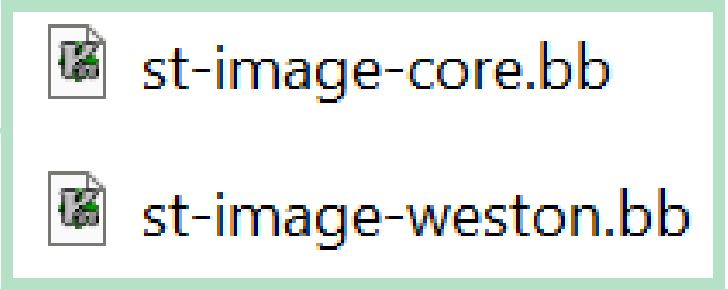
# OpenSTLinux Distribution Package – OpenSTLinux



## 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

Rif: [https://wiki.st.com/stm32mpu/wiki/STM32MPU\\_Distribution\\_Package](https://wiki.st.com/stm32mpu/wiki/STM32MPU_Distribution_Package)

## 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
```

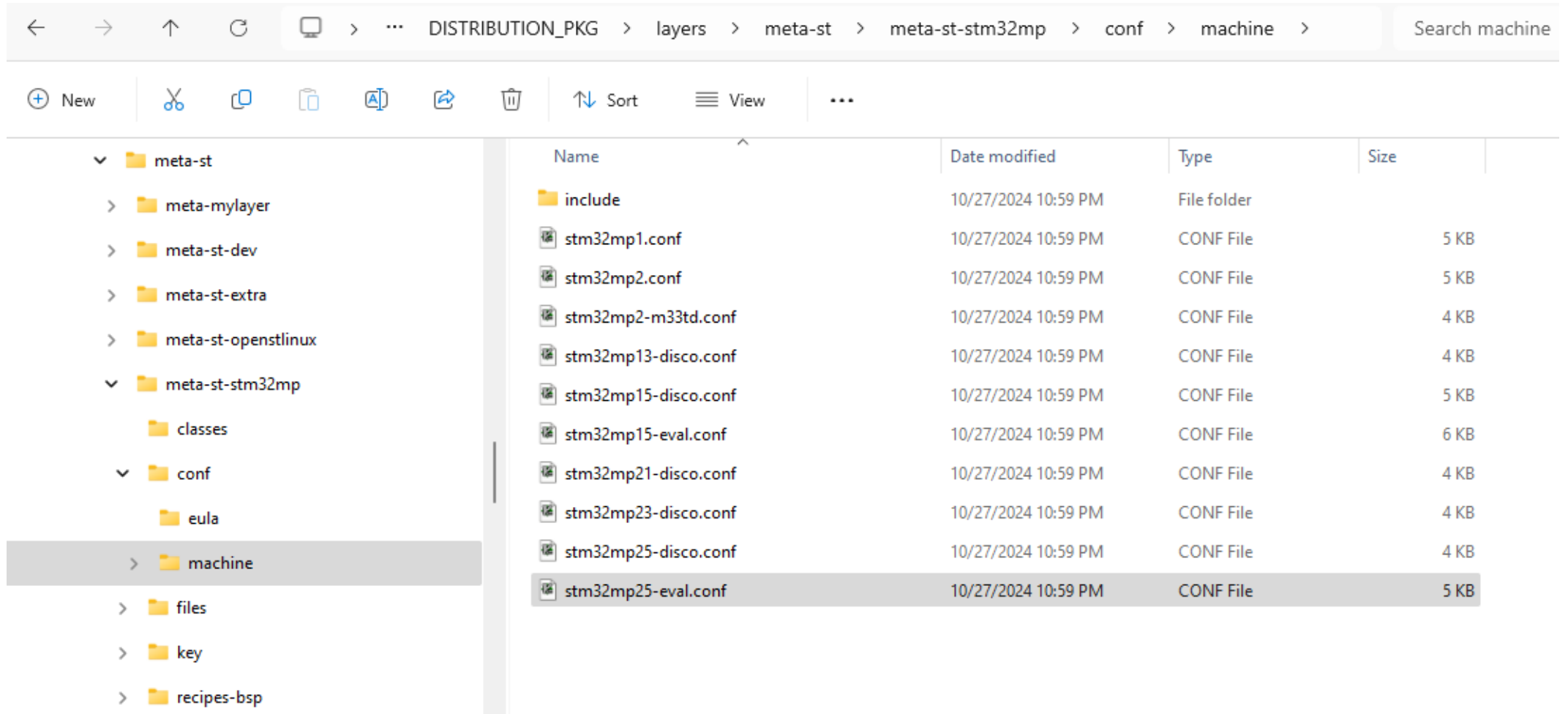
The *bitbake* <image> command is used to build the image. <image> specifies the targeted image, *st-image-weston* here (Weston image support).

```
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"

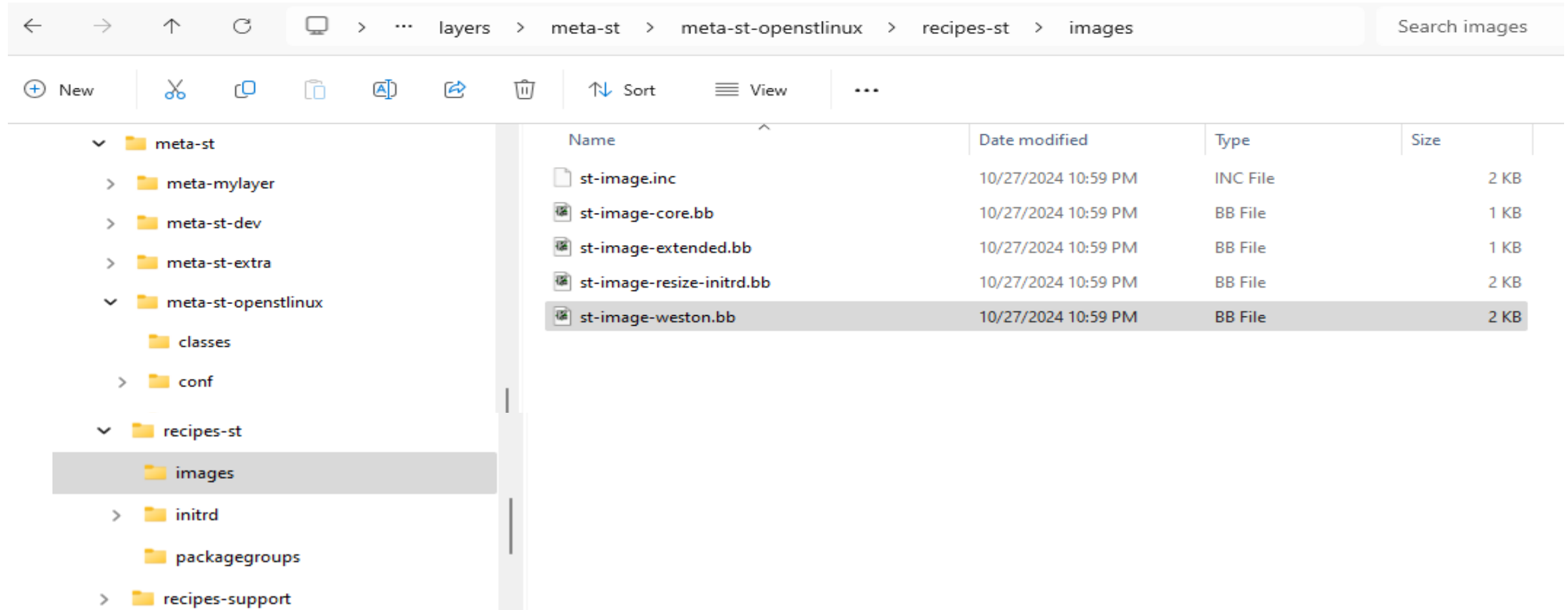
# Define list of devicetree per supported storage
STM32MP_DT_FILES_EMMC += "stm32mp257f-ev1"
STM32MP_DT_FILES_SD CARD += "stm32mp257f-ev1"
STM32MP_DT_FILES_NOR += "stm32mp257f-ev1"

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](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 the text "STM32 MPU ecosystem v6". Below the header, there is a 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 meta-st-stm32mp layer, with the "machine" folder selected. The "machine" folder contains a list of configuration files, including "stm32mp1.conf", "stm32mp2.conf", "stm32mp2-m33td.conf", "stm32mp13-disco.conf", "stm32mp15-disco.conf", "stm32mp15-eval.conf", "stm32mp21-disco.conf", "stm32mp25-disco.conf", and "stm32mp25-eval.conf". The "stm32mp25-disco.conf" file is highlighted with a yellow circle.

# OpenSTLinux Distribution Package – **BUILD image**

Rif: [https://wiki.st.com/stm32mpu/wiki/STM32MPU\\_Distribution\\_Package](https://wiki.st.com/stm32mpu/wiki/STM32MPU_Distribution_Package)

**bitbake st-image-weston**

The screenshot displays the STM32MPU ecosystem v6 website. The main heading is "STM32MPU Distribution Package". Below it, a text block explains that the `bitbake <image>` command is used to build the image, with `st-image-weston` as an example. A terminal snippet shows the command `PC $> bitbake st-image-weston`. A file explorer overlay on the right shows the directory structure, with `st-image-weston.bb` highlighted. The left sidebar contains navigation links for "Embedded software", "Distributions", and "OpenSTLinux distribution".

**STM32 MPU ecosystem v6**

Welcome Getting started Deep dive Legal notice Wiki archives

## STM32MPU Distribution Package

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

File Explorer:

- recipes-samples
- recipes-security
- recipes-st
- images**
- initrd
- packagegroups
- recipes-support

Name:

- st-image.inc
- st-image-core.bb
- st-image-resize-initrd.bb
- st-image-weston.bb**

Left Sidebar:

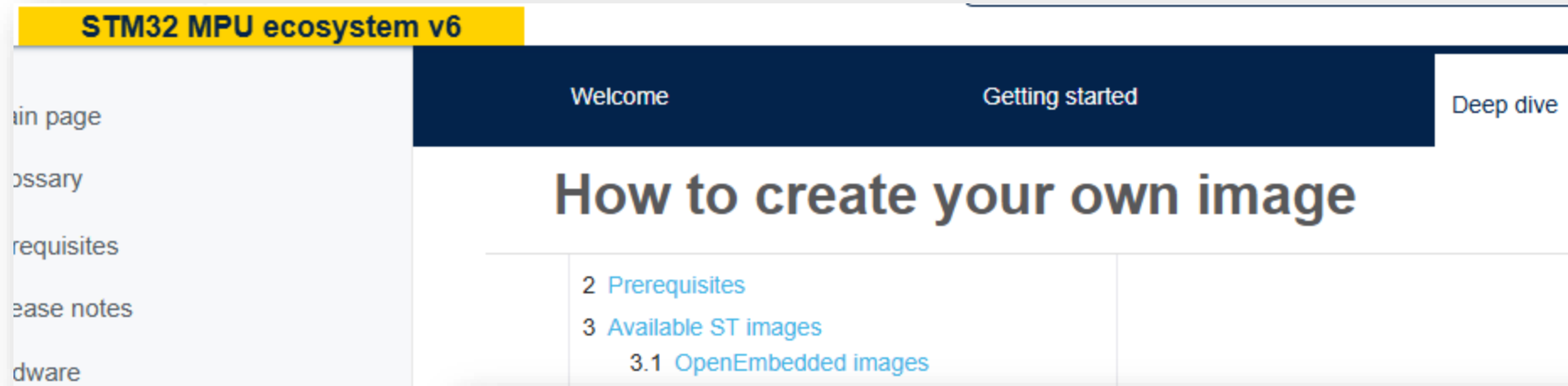
- Embedded software
- Distributions
  - Yocto-based OpenSTLinux embedded software
    - OpenSTLinux distribution
    - FwST-M Packages
    - OpenSTLinux starter packages

# CUSTOMIZATION of OpenSTLinux Distribution Package



# OpenSTLinux Distribution Package – CUSTOMIZATION

[https://wiki.st.com/stm32mpu/wiki/How\\_to\\_create\\_your\\_own\\_image](https://wiki.st.com/stm32mpu/wiki/How_to_create_your_own_image)

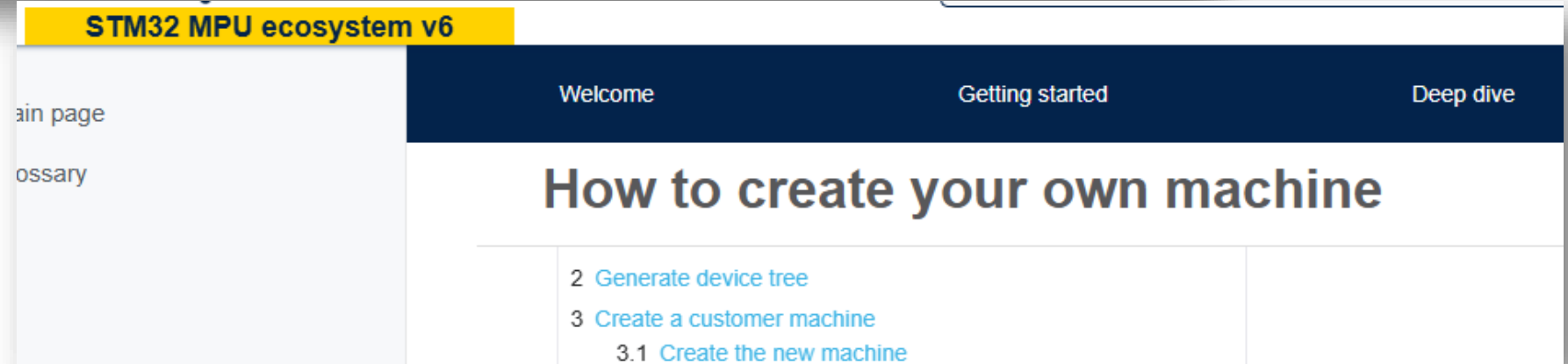


STM32 MPU ecosystem v6

main page | Welcome | Getting started | Deep dive

## How to create your own image

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



STM32 MPU ecosystem v6

main page | Welcome | Getting started | Deep dive

## How to create your own machine

- 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](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/myimage.bb
```

```
*[gpaga@CTOCWL00617 ~/OSTL_v6.0/DISTRIBUTION_PKG_DEMO/build-openstlinuxweston-stm32mp25-myboard]  
$ mkdir -p ../layers/meta-st/meta-my-new-meta-layer/conf/machine/  
*[gpaga@CTOCWL00617 ~/OSTL_v6.0/DISTRIBUTION_PKG_DEMO/build-openstlinuxweston-stm32mp25-myboard]  
$ cp -v ../layers/meta-st/meta-st-stm32mp/conf/machine/stm32mp25-disco.conf ../layers/meta-st/meta-my-new-meta-layer/conf/machine/stm32mp25-myboard.conf  
'../layers/meta-st/meta-st-stm32mp/conf/machine/stm32mp25-disco.conf' -> '../layers/meta-st/meta-my-new-meta-layer/conf/machine/stm32mp25-myboard.conf'  
*[gpaga@CTOCWL00617 ~/OSTL_v6.0/DISTRIBUTION_PKG_DEMO/build-openstlinuxweston-stm32mp25-myboard]  
$ mkdir -p ../layers/meta-st/meta-my-new-layer/recipes-st/images/  
*[gpaga@CTOCWL00617 ~/OSTL_v6.0/DISTRIBUTION_PKG_DEMO/build-openstlinuxweston-stm32mp25-myboard]  
$ cp -v ../layers/meta-st/meta-st-openstlinux/recipes-st/images/st-image-weston.bb ../layers/meta-st/meta-my-new-layer/recipes-st/images/myimage.bb  
'../layers/meta-st/meta-st-openstlinux/recipes-st/images/st-image-weston.bb' -> '../layers/meta-st/meta-my-new-layer/recipes-st/images/myimage.bb'  
*[gpaga@CTOCWL00617 ~/OSTL_v6.0/DISTRIBUTION_PKG_DEMO/build-openstlinuxweston-stm32mp25-myboard]  
$
```

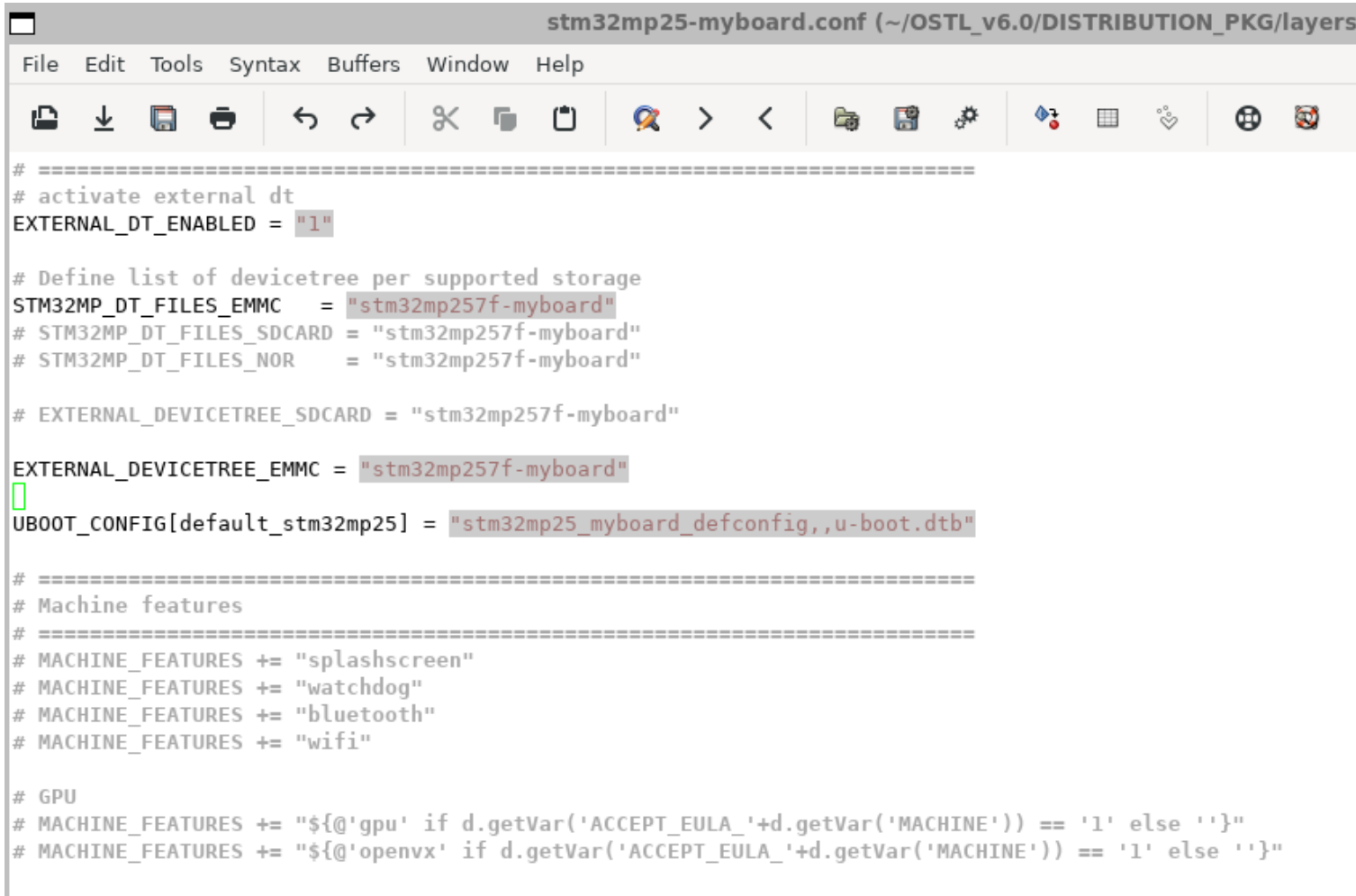
# OSTL Distribution Package – ADD NEW LAYER

**\$ 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 – **myboard.conf** machine file

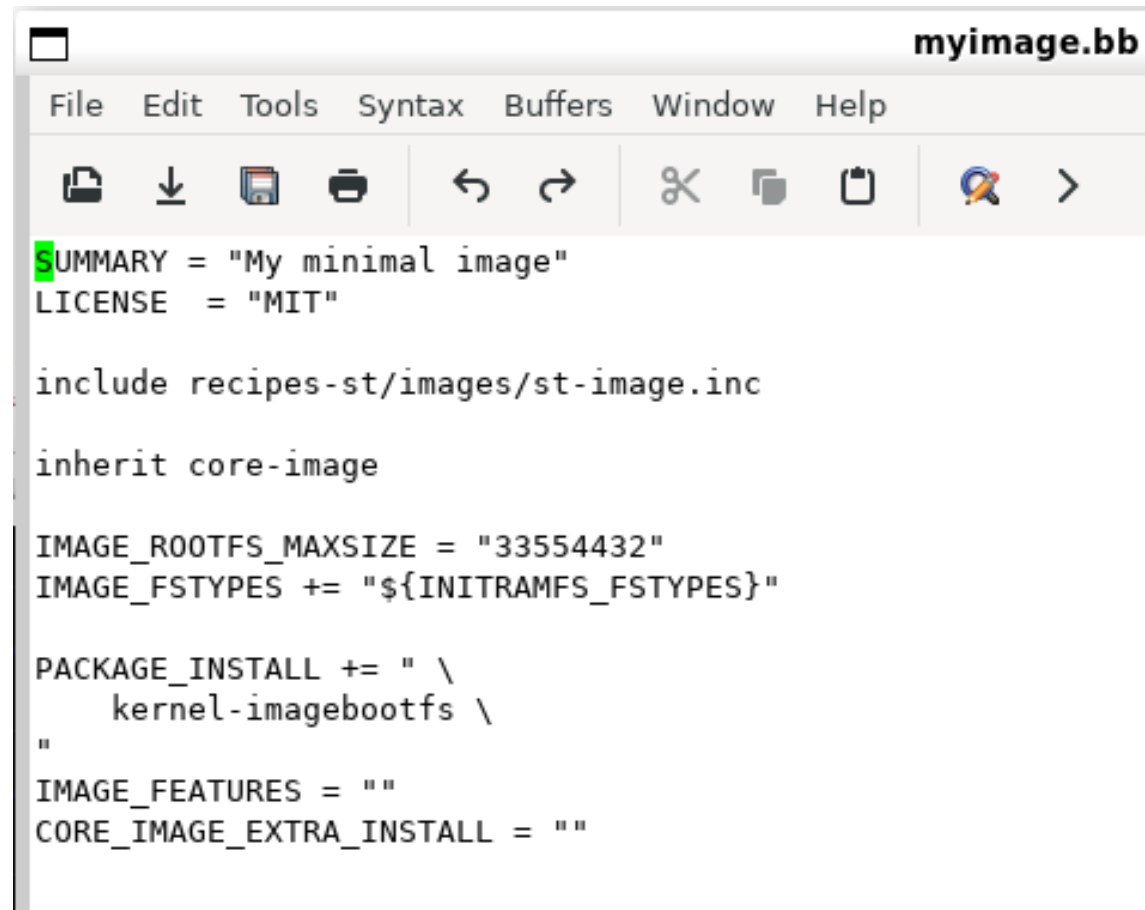
```
$ gvim ../layers/meta-st/meta-mylayer/conf/machine/stm32mp25-myboard.conf
```



```
stm32mp25-myboard.conf (~/.OSTL_v6.0/DISTRIBUTION_PKG/layers/...)  
File Edit Tools Syntax Buffers Window Help  
# =====  
# activate external dt  
EXTERNAL_DT_ENABLED = "1"  
  
# Define list of devicetree per supported storage  
STM32MP_DT_FILES_EMMC = "stm32mp257f-myboard"  
# STM32MP_DT_FILES_SDCARD = "stm32mp257f-myboard"  
# STM32MP_DT_FILES_NOR = "stm32mp257f-myboard"  
  
# EXTERNAL_DEVICETREE_SDCARD = "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"  
  
# GPU  
# MACHINE_FEATURES += "${@'gpu' if d.getVar('ACCEPT_EULA_'+d.getVar('MACHINE')) == '1' else ''}"  
# MACHINE_FEATURES += "${@'openvx' if d.getVar('ACCEPT_EULA_'+d.getVar('MACHINE')) == '1' else ''}"
```

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

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

A screenshot of a gvim editor window titled 'myimage.bb'. The window has a menu bar with 'File', 'Edit', 'Tools', 'Syntax', 'Buffers', 'Window', and 'Help'. Below the menu bar is a toolbar with icons for file operations (open, save, print, etc.) and editing (undo, redo, cut, copy, paste, etc.). The main text area contains the following content:

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

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

inherit core-image

IMAGE_ROOTFS_MAXSIZE = "33554432"
IMAGE_FSTYPES += "${INITRAMFS_FSTYPES}"

PACKAGE_INSTALL += " \
    kernel-imagebootfs \
"

IMAGE_FEATURES = ""
CORE_IMAGE_EXTRA_INSTALL = ""
```



# 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]
```

# OpenSTLinux Distribution Package – MY IMAGE

stm32mp25-myboard		Name	Date modified
> arm-trusted-firmware		arm-trusted-firmware	11/26/2024 11:47 PM
fip		fip	11/26/2024 11:47 PM
> flashlayout_myimage		flashlayout_myimage	11/26/2024 11:47 PM
> kernel		kernel	11/26/2024 11:47 PM
> optee		optee	11/26/2024 11:47 PM
scripts		scripts	11/30/2024 4:36 PM
> u-boot		u-boot	11/26/2024 11:47 PM
		flash.bat	11/29/2024 12:04 PM
		myimage-openstlinux-weston-stm32mp25-myboard.rootfs.cpio.gz	11/29/2024 12:04 PM
		myimage-openstlinux-weston-stm32mp25-myboard.rootfs.ext4	11/29/2024 12:04 PM
		myimage-openstlinux-weston-stm32mp25-myboard.rootfs.manifest	11/29/2024 12:04 PM
		myimage-openstlinux-weston-stm32mp25-myboard.rootfs.spdx.tar.zst	11/29/2024 12:04 PM
		myimage-openstlinux-weston-stm32mp25-myboard.rootfs.tar.xz	11/29/2024 12:04 PM
		myimage-openstlinux-weston-stm32mp25-myboard.rootfs.testdata.json	11/29/2024 12:04 PM
		myimage-openstlinux-weston-stm32mp25-myboard.rootfs-license_content.html	11/29/2024 12:04 PM

# OpenSTLinux Distribution Package – IMAGE FLUSH

```

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
    
```

Rif.

[https://wiki.st.com/stm32mpu/wiki/STM32CubeProgrammer\\_flashlayout](https://wiki.st.com/stm32mpu/wiki/STM32CubeProgrammer_flashlayout)

```

- : no action
P : update = program the partition or the flash device
PE : do not update (also EP) = allow the GPT
PD : delete and update (also DP)
PDE : delete and keep empty (also PED / DPE / DEP / EPD / EDP)
    
```

FlashLayout\_emmc\_stm32mp257f-myboard-optee.tsv (~\TMP\stm32mp25-myboard\flashlayout\_myimage\optee) - GVIM

	#Opt	Id	Name	Type	IP	Offset	Binary
FLASH HELPERS	-	0x01	fsbl-boot	Binary	none	0x0	arm-trusted-firmware/tf-a-stm32mp257f-myboard-optee-programmer-usb.stm32
	-	0x02	fip-ddr	FIP	none	0x0	fip/fip-stm32mp257f-myboard-ddr-optee-programmer-usb.bin
	-	0x03	fip-boot	FIP	none	0x0	fip/fip-stm32mp257f-myboard-optee-programmer-usb.bin
MYIMAGE	P	0x04	fsbla1	Binary	mmc1	boot1	arm-trusted-firmware/tf-a-stm32mp257f-myboard-optee-emmc.stm32
	P	0x05	fsbla2	Binary	mmc1	boot2	arm-trusted-firmware/tf-a-stm32mp257f-myboard-optee-emmc.stm32
	PD	0x06	metadata1	FWU_METADATA	mmc1	0x00080000	arm-trusted-firmware/metadata.bin
	PD	0x07	metadata2	FWU_METADATA	mmc1	0x00100000	arm-trusted-firmware/metadata.bin
	P	0x08	fip-a	FIP	mmc1	0x00180000	fip/fip-stm32mp257f-myboard-optee-emmc.bin
	PED	0x09	fip-b	FIP	mmc1	0x00580000	none
	PED	0x0A	u-boot-env	ENV	mmc1	0x00980000	none
	P	0x10	rootfs	FileSystem	mmc1	0x00A00000	myimage-openstlinux-weston-stm32mp25-myboard.rootfs.ext4

# 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

# OpenSTLinux metalayer example "meta-mylayer"

Rif:

<https://github.com/stm32-hotspot/STM32MPU-OSTL-DEV-helper/tree/main/YOCTO/meta-mylayer>

The screenshot displays the GitHub interface for the repository `stm32-hotspot / STM32MPU-OSTL-DEV-helper`. The `Code` tab is selected. On the left, the file explorer shows the directory structure, with `YOCTO/meta-mylayer` expanded. The main content area shows the files and directories within `YOCTO/meta-mylayer`, including `..`, `conf`, `recipes-bsp/u-boot`, `recipes-devtools/ramfs-tools`, `recipes-extended/external-dt`, `recipes-kernel/linux`, `recipes-st/images`, `COPYING.MIT`, and `README`. A commit by `g-pagano` is visible at the top of the file list.

Name
..
conf
recipes-bsp/u-boot
recipes-devtools/ramfs-tools
recipes-extended/external-dt
recipes-kernel/linux
recipes-st/images
COPYING.MIT

# OpenSTLinux Distribution Package – playing with ramfs

Rif: <https://wiki.st.com/stm32mpu/wiki/STM32CubeProgrammer>

run\_ramfs.bat (~\TMP\stm32mp25-myboard\scripts) - GVIM1

File Edit Tools Syntax Buffers Window Help

File Edit Tools Syntax Buffers Window Help

File Edit Setup Control Window Help

Booting using the fdt blob at 0x90000000  
Working FDT set to 90000000  
Loading Device Tree to 000000008ffe1000,  
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 enabled  
I/TC: Asynchronous notifications are enabled  
[ 0.321152] stm32-ipcc 46250000.mailbox: [ 0.522802] Initramfs unpacking failed: invalid archive  
[ 1.901183] stm32-rproc 0.m33: mbox\_request\_channel named "detach"  
[ 1.927837] Failed to execute /init (error: /bin/sh: can't access tty; job control turned off)

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

"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 scripts\script.bin 0x0 -s 0x0 --detach

timeout /t 2

"C:\Program Files\STMicroelectronics\STM32Cube\STM32CubeProgrammer\bin\STM32\_Programmer\_CLI.exe" -c port=USB1 -w scripts\Flashlayout\_ramfs.tsv

Flashlayout\_ramfs.tsv (~\TMP\stm32mp25-myboard\scripts) - GVIM

File Edit Tools Syntax Buffers Window Help

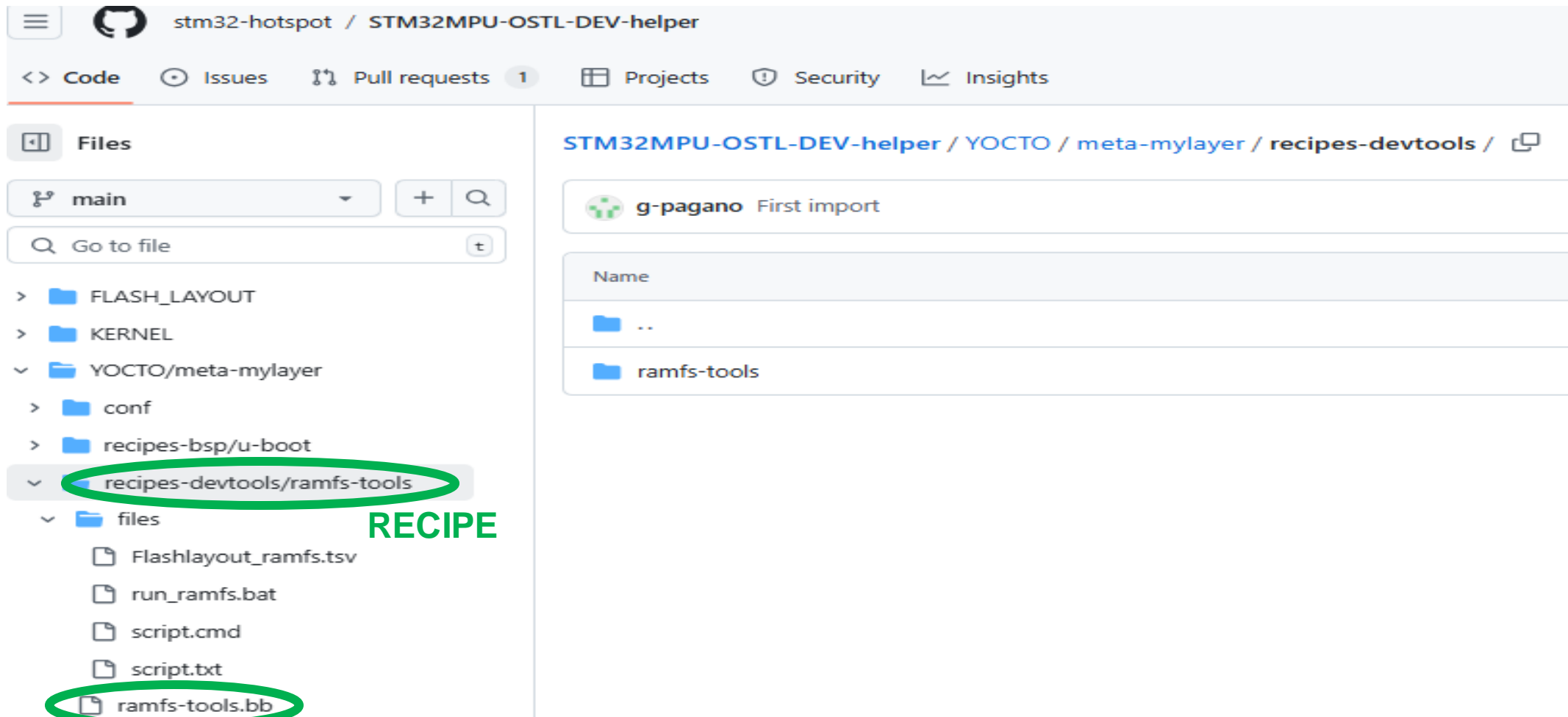
File Edit Tools Syntax Buffers Window Help

Port	Id	Name	Type	IP	Offset	Binary
P	0x10	kernel	System	ram0	0x8A000000	kernel/Image.gz-stm32mp25-myboard.bin
P	0x11	dtb	FileSystem	ram0	0x90000000	kernel/stm32mp257f-myboard.dtb
P	0x12	initrd	Binary	ram0	0x90400000	myimage-openstlinux-weston-stm32mp25-myboard.rootfs.cpio.gz

# OpenSTLinux recipe example "ramfs-tools.bb"

Rif:

<https://github.com/stm32-hotspot/STM32MPU-OSTL-DEV-helper/tree/main/YOCTO/meta-mylayer/recipes-devtools>



stm32-hotspot / STM32MPU-OSTL-DEV-helper

<> Code Issues Pull requests 1 Projects Security Insights

Files

main + 🔍

Go to file t

- > FLASH\_LAYOUT
- > KERNEL
- ▼ YOCTO/meta-mylayer
  - > conf
  - > recipes-bsp/u-boot
  - ▼ recipes-devtools/ramfs-tools **RECIPE**
    - ▼ files
      - Flashlayout\_ramfs.tsv
      - run\_ramfs.bat
      - script.cmd
      - script.txt
      - ramfs-tools.bb

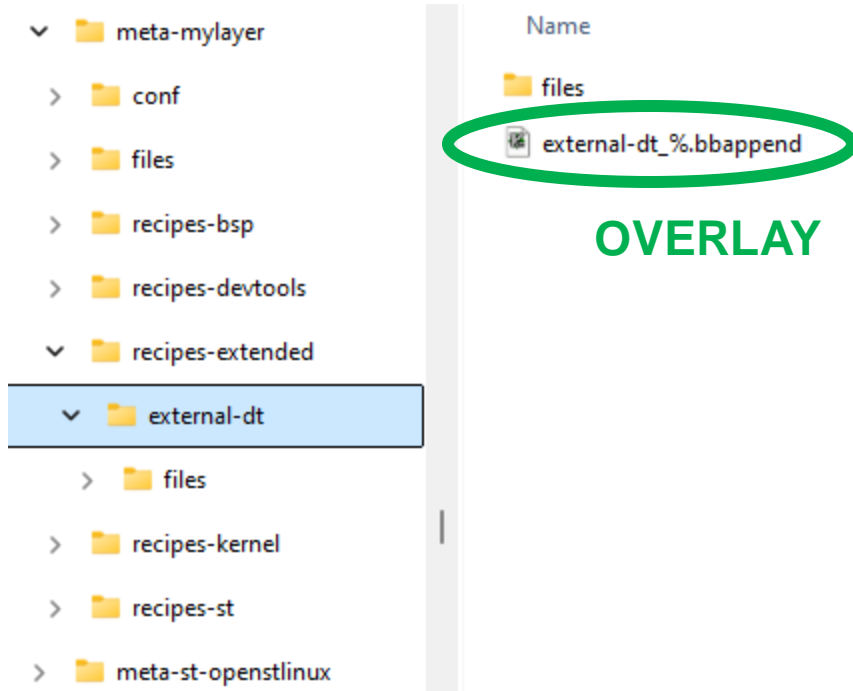
STM32MPU-OSTL-DEV-helper / YOCTO / meta-mylayer / recipes-devtools /

g-pagano First import

Name
..
ramfs-tools

# OSTL Distribution Package – ext devicetree files

\$ gvim ../layers/meta-st/meta-mylayer/recipes-extended/external-dt/external-dt\_%.bbappend



```
external-dt_%.bbappend (~/.OSTL_v6.0/DISTRIBUTION_PKG/layers/meta-st)
File Edit Tools Syntax Buffers Window Help

## 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"

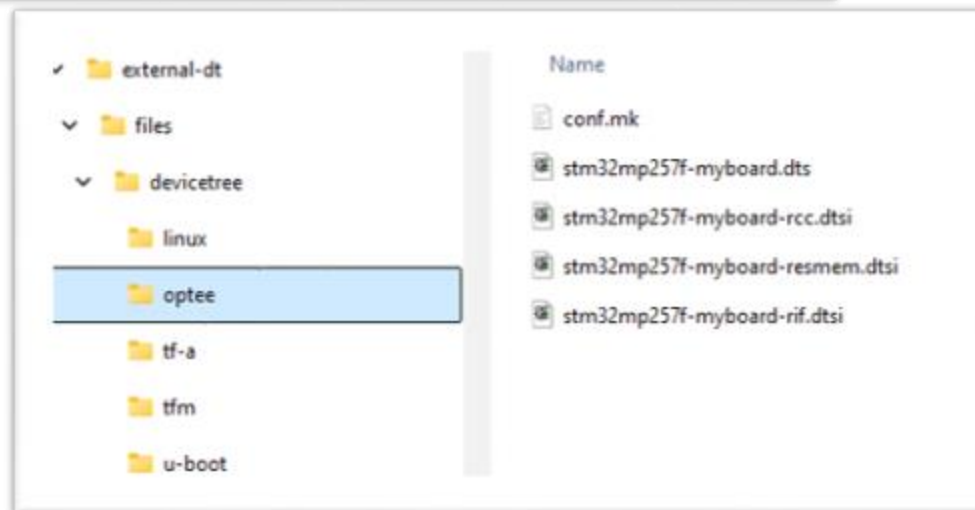
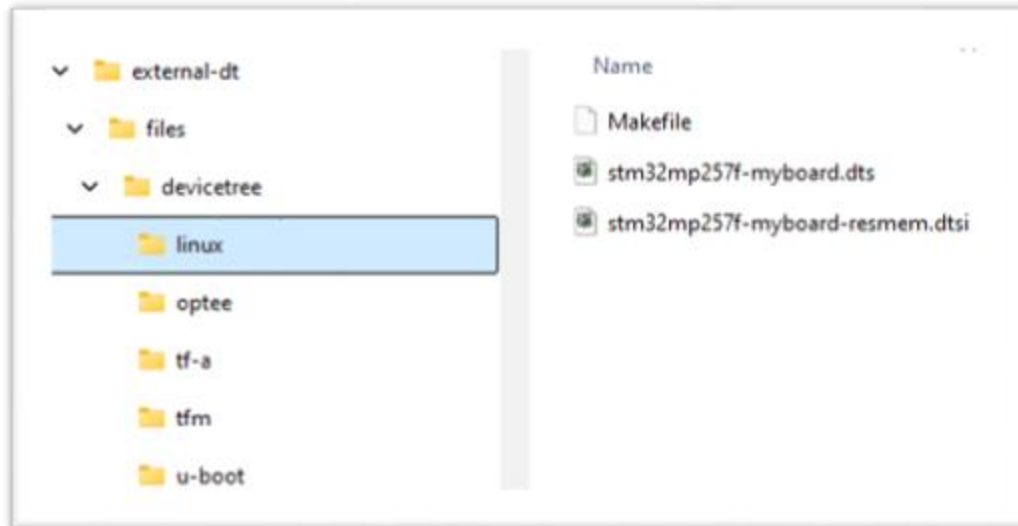
FILESEXTRAPATHS:prepend := "${THISDIR}/files:"
SRC_URI = " \
    file://devicetree/License.md \
    file://devicetree/README.md \
    file://devicetree/SECURITY.md \
    file://devicetree/linux/Makefile \
    file://devicetree/linux/stm32mp257f-myboard.dts \
    file://devicetree/linux/stm32mp257f-myboard-resmem.dtsi \
    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

Folder: *layers/meta-st/meta-mylayer/recipes-extended/external-dt/files*





# WRAP UP

