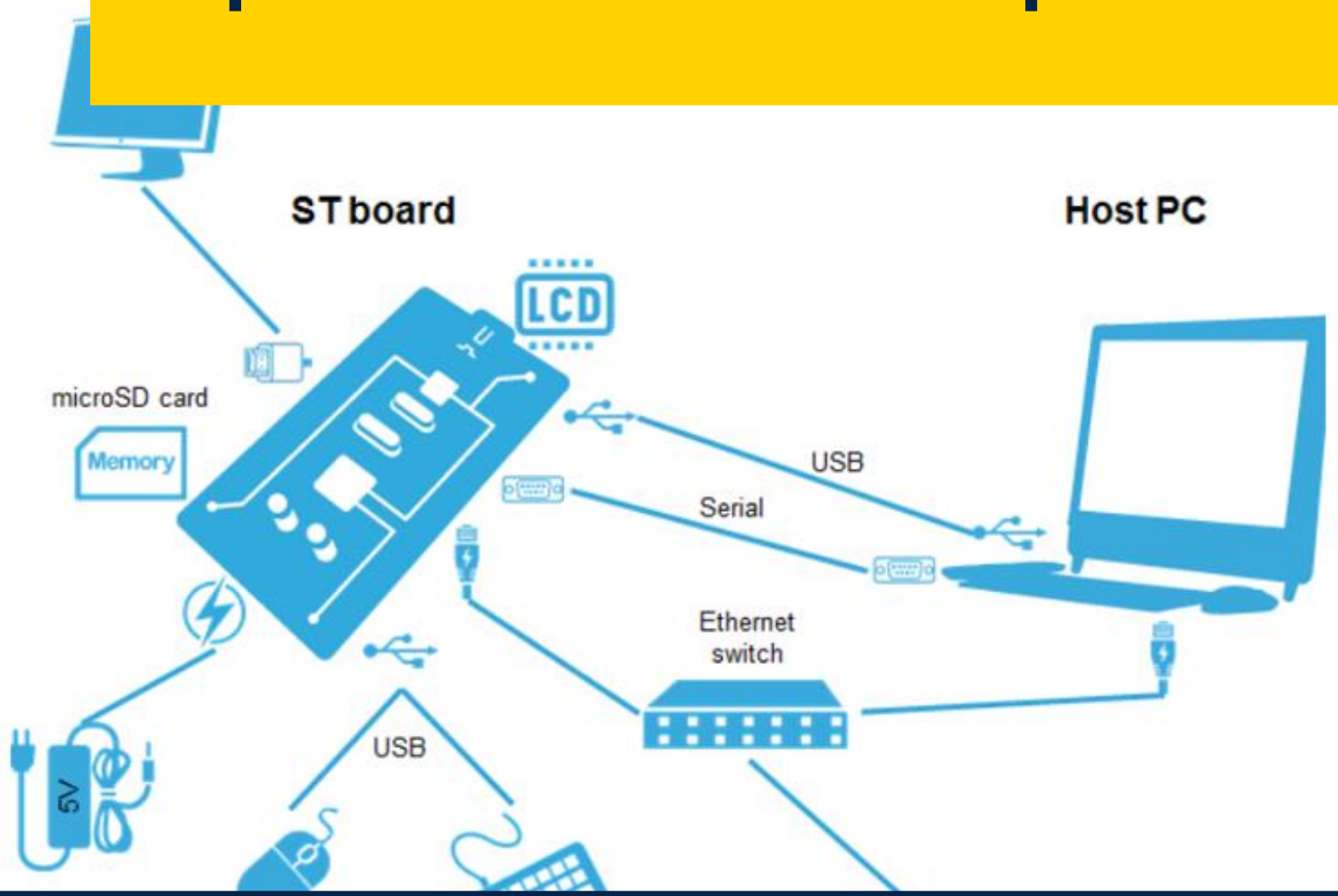
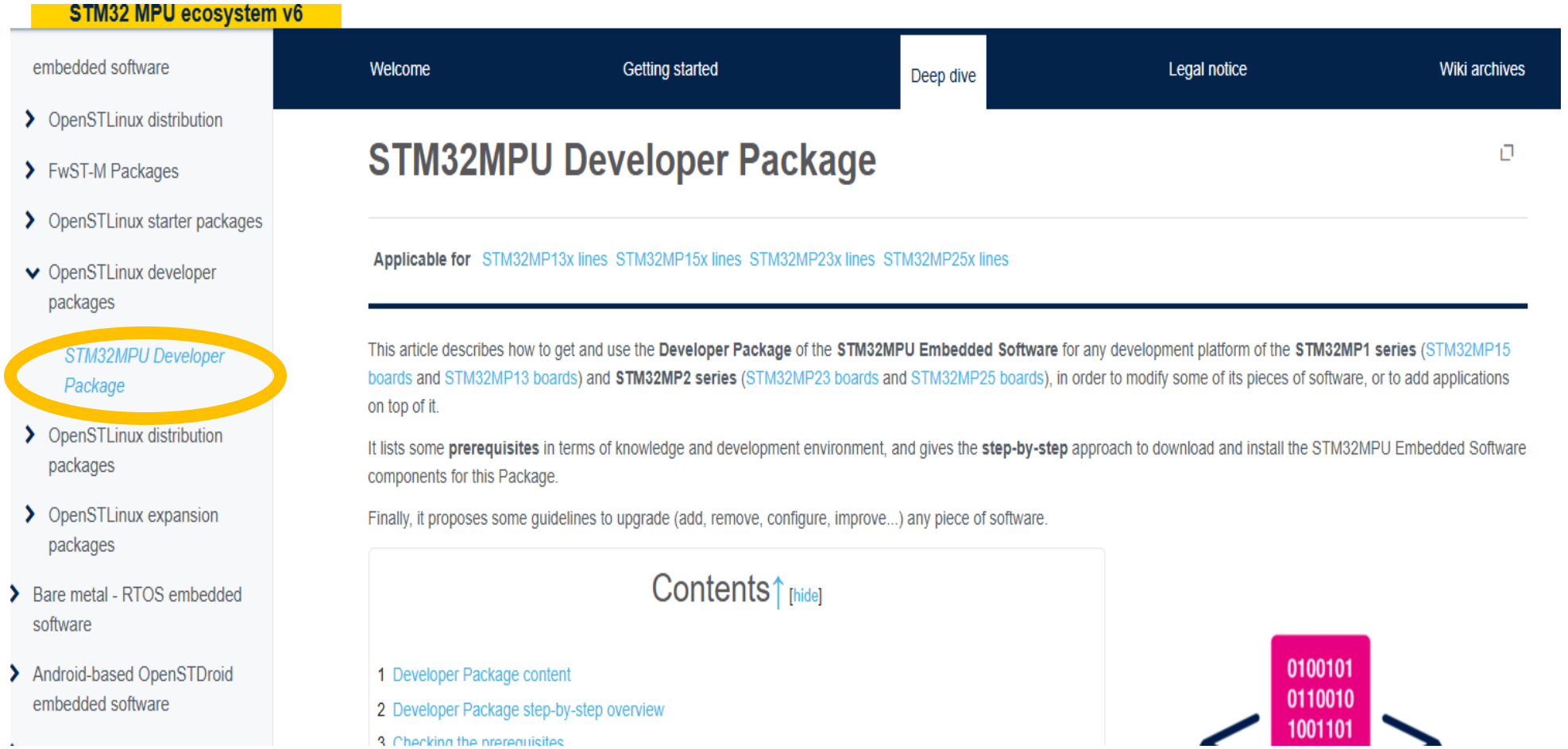
OpenSTLinux Developer Package



WIKI PAGE for OpenSTLinux Developer Package

Refer to:

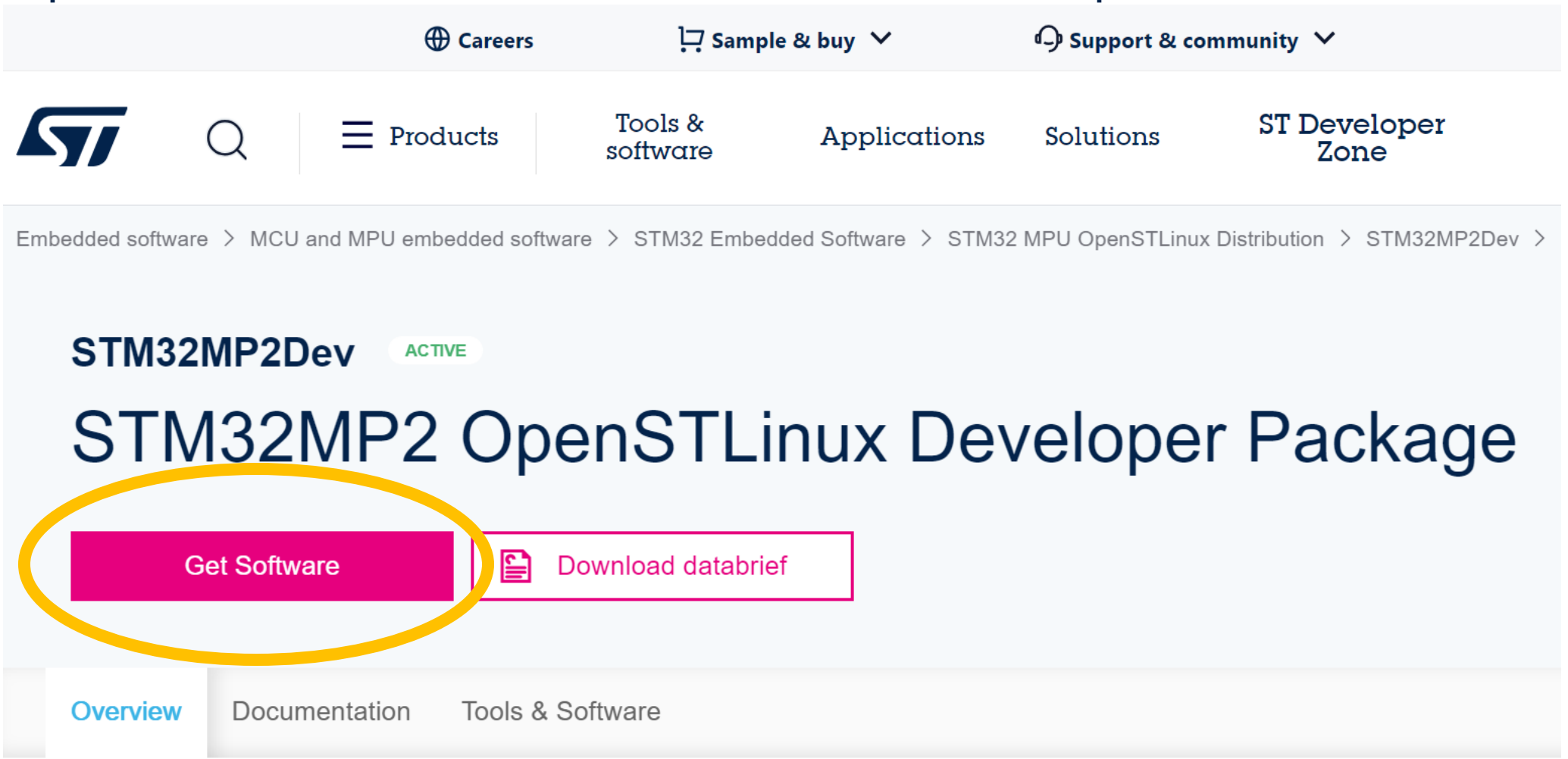
https://wiki.st.com/stm32mpu/wiki/STM32MPU_Developer_Package



OpenSTLinux Developer Package - **DOWNLOAD**

Refer to:

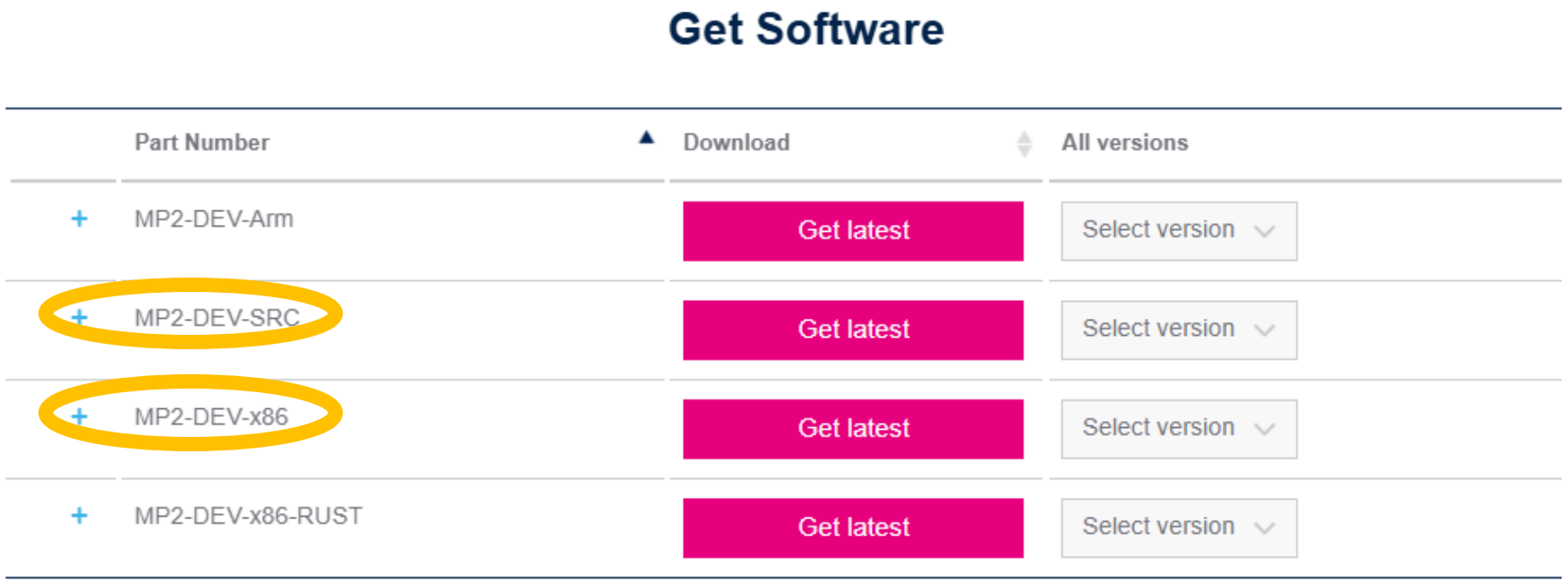
https://www.st.com/en/embedded-software/stm32mp2dev.html



OpenSTLinux Developer Package - **DOWNLOAD**

Refer to:

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



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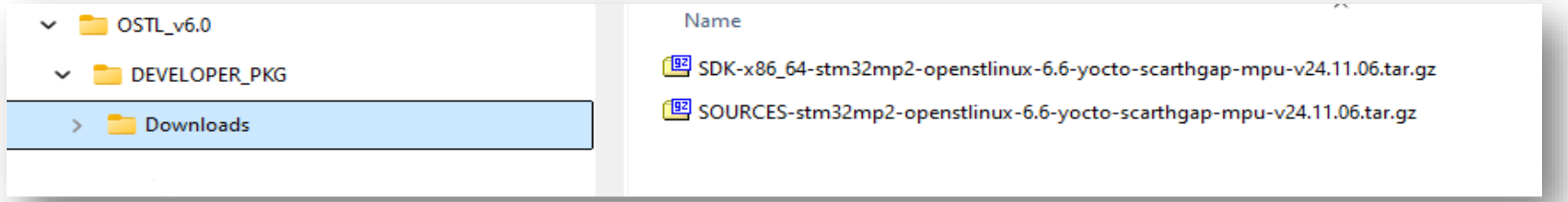
SDK ENVIRONMENT SETUP

OpenSTLinux Developer Package - **SETUP**

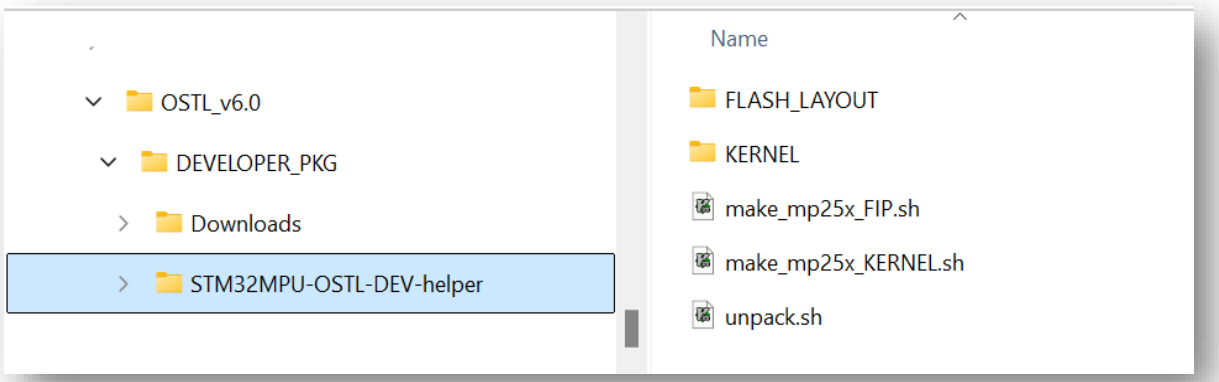
Materials:

1. Toolchain and SOURCES:



2. STM32MPU-OSTL-DEV-helper:

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



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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

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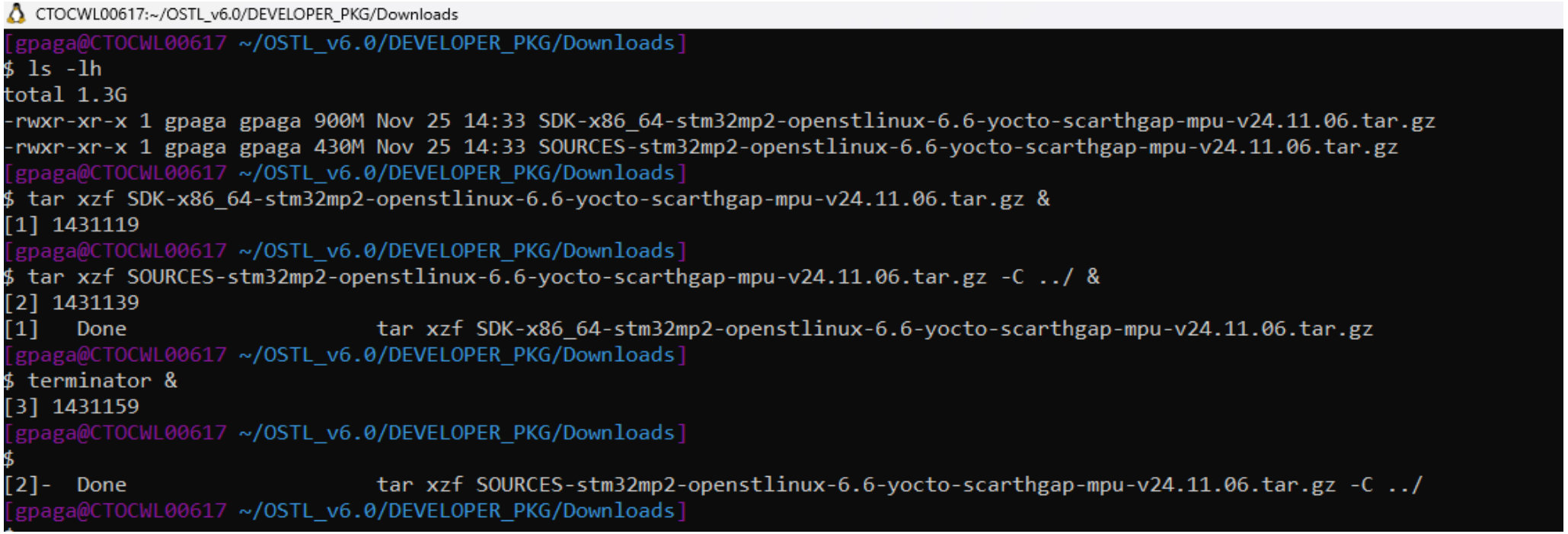
OpenSTLinux Developer Package - **SETUP**

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 &



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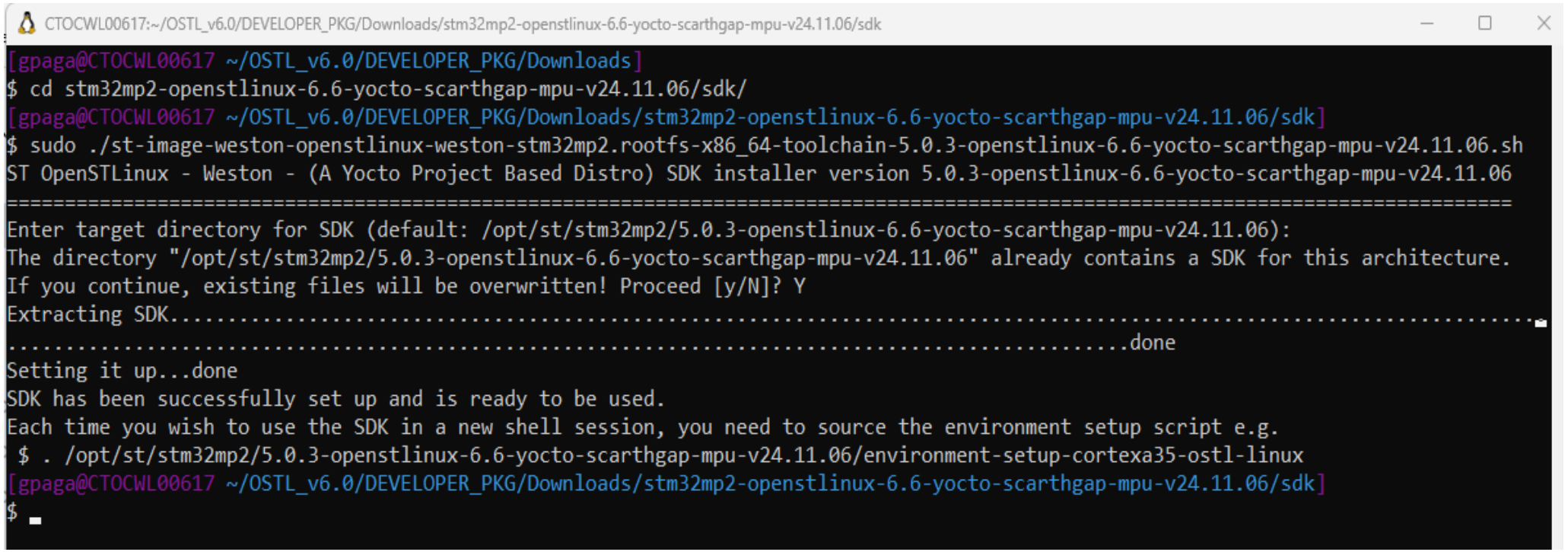
OpenSTLinux Developer Package - **SETUP**

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



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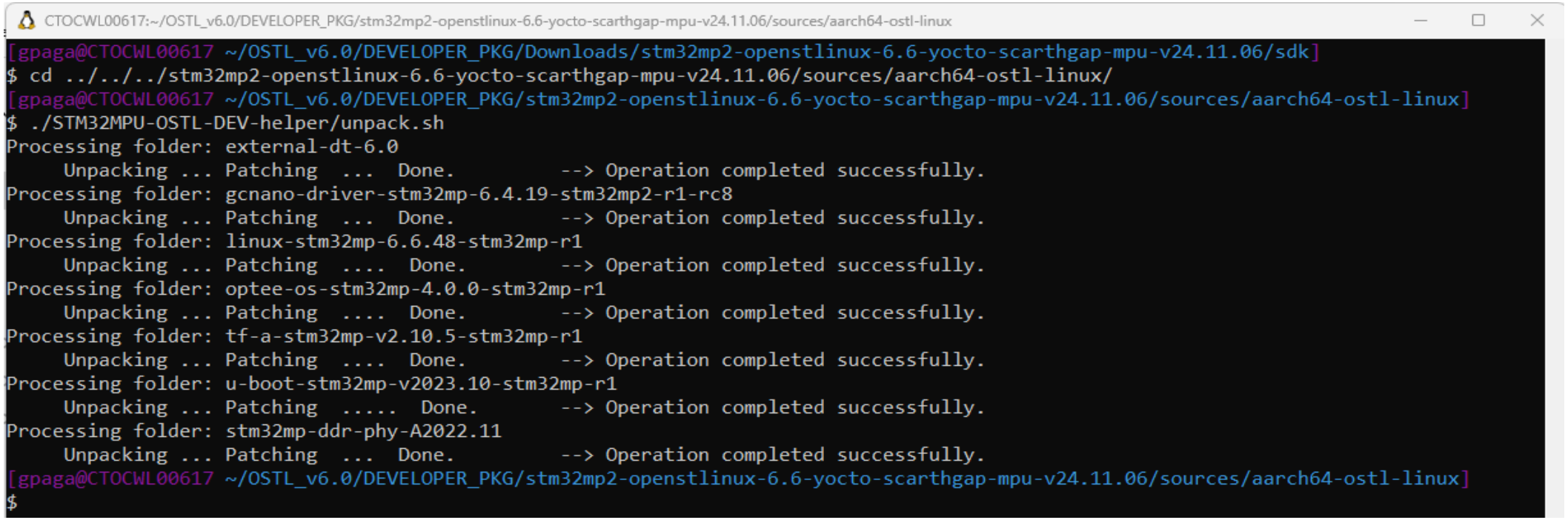
OpenSTLinux Developer Package - **SETUP**

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



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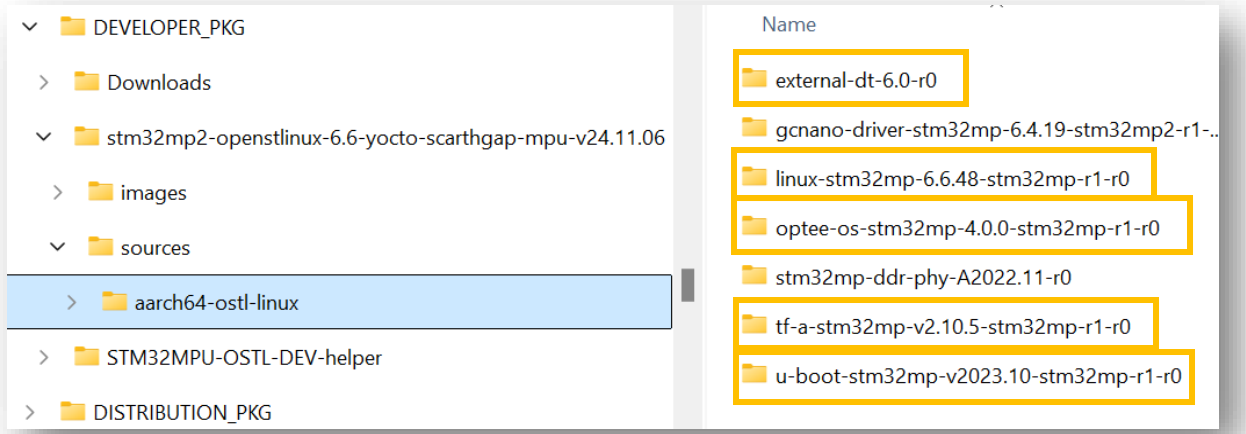
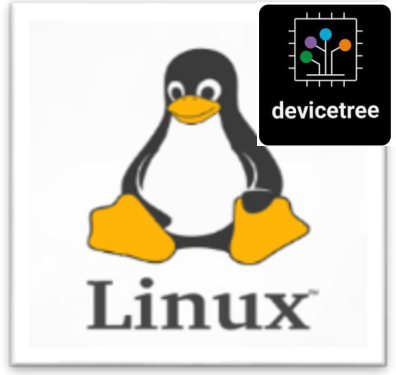
SDK BUILD

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



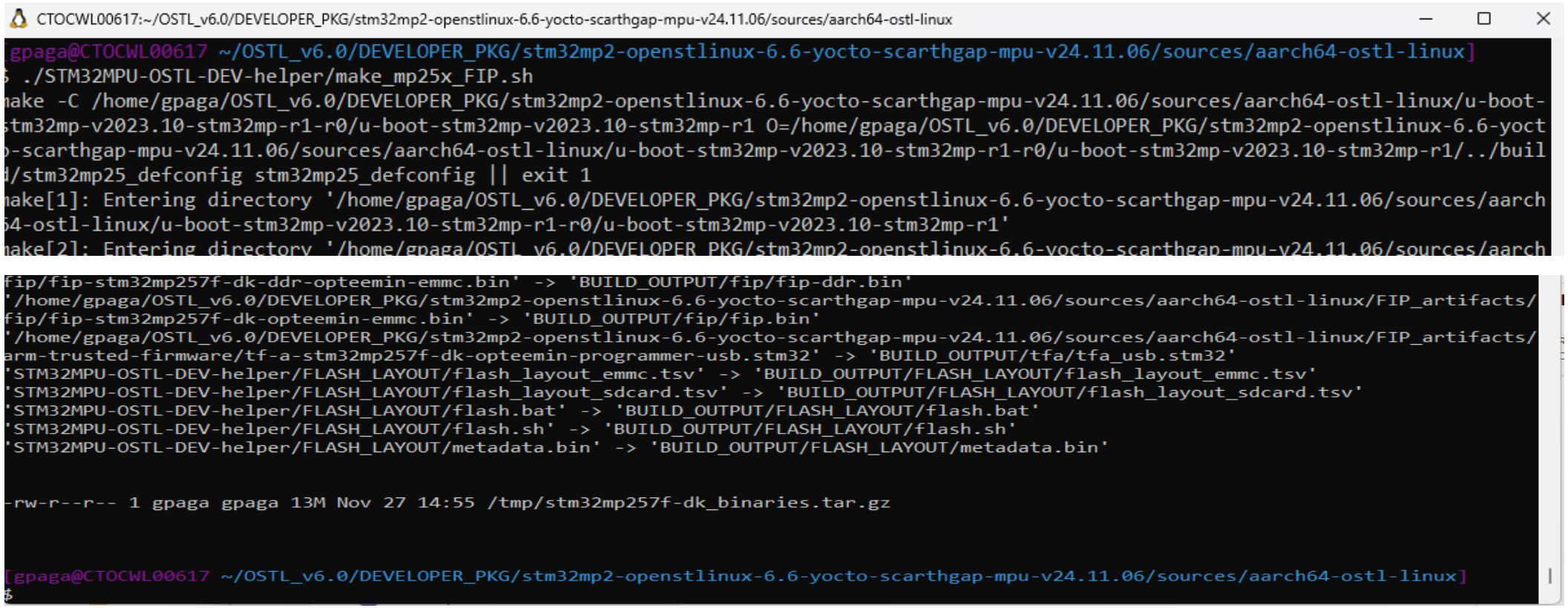


FIP = Firmware Image Package

OpenSTLinux Developer Package - **BUILD**

FIP build:

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



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/aarch
64-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/aarch6
4-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/[redacted]/OSTL_v6.0/DEVELOPER_PKG/stm32mp2-openstlinux-6.6-yocto-scarthgap-mpu-v24.11.06/sources/aarch6
4-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]
$
```

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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

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BOARD UPDATE

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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' -> '/mnt/c/Users/
'BUILD_OUTPUT/flash.sh' -> '/mnt/c/Users/
'BUILD_OUTPUT/FLASH_LAYOUT/flash_layout_emmc.tsv' -> '/mnt/c/Users/
'BUILD_OUTPUT/FLASH_LAYOUT/flash_layout_sdcard.tsv' -> '/mnt/c/Users/
'BUILD_OUTPUT/FLASH_LAYOUT/metadata.bin' -> '/mnt/c/Users/
'BUILD_OUTPUT/kernel/Image.gz' -> '/mnt/c/Users/
'BUILD_OUTPUT/kernel/stm32mp257f-dk.dtb' -> '/mnt/c/Users/
'BUILD_OUTPUT/fip/fip-ddr.bin' -> '/mnt/c/Users/
'BUILD_OUTPUT/fip/fip.bin' -> '/mnt/c/Users/
'BUILD_OUTPUT/tfa/metadata.bin' -> '/mnt/c/Users/
'BUILD_OUTPUT/tfa/tfa_emmc.stm32' -> '/mnt/c/Users/
'BUILD_OUTPUT/tfa/tfa_sdcard.stm32' -> '/mnt/c/Users/
'BUILD_OUTPUT/tfa/tfa_usb.stm32' -> '/mnt/c/Users/
gpaga@CTOCWL00617 ~/OSTL_v6.0/DEVELOPER_PKG/stm32mp2-openstlinux-6.6-yocto-scart
```

Rif.
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)

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

C:\Users\ .\BUILD_OUTPUT>"C:\Program Files\STMicroelectronics\STM32Cu
Programmer\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   : STMicroelectronics
Product ID  : DFU in HS Mode @Device ID /0x505, @Revision ID /0x2000
SN          : 002F002C4136500800373653
DFU protocol: 1.1

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\ \BUILD_OUTPUT>rem "C:\Program Files\STMicroelectronics\S
```

flash_layout_emmc.tsv ~\BUILD_OUTPUT\FLASH_LAYOUT) - GVIM

File Edit Tools Syntax Buffers Window Help

#Opt	Id	Name	Type	IP	Offset	Binary
-	0x01	fsbl-boot	Binary	none	0x0	tfa/tfa_usb.stm32
-	0x02	fip-ddr	FIP	none	0x0	fip/fip-ddr.bin
-	0x03	fip-boot	FIP	none	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_MDATA	mmc1	0x00080000	tfa/metadata.bin
PE	0x07	metadata2	FWU_MDATA	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

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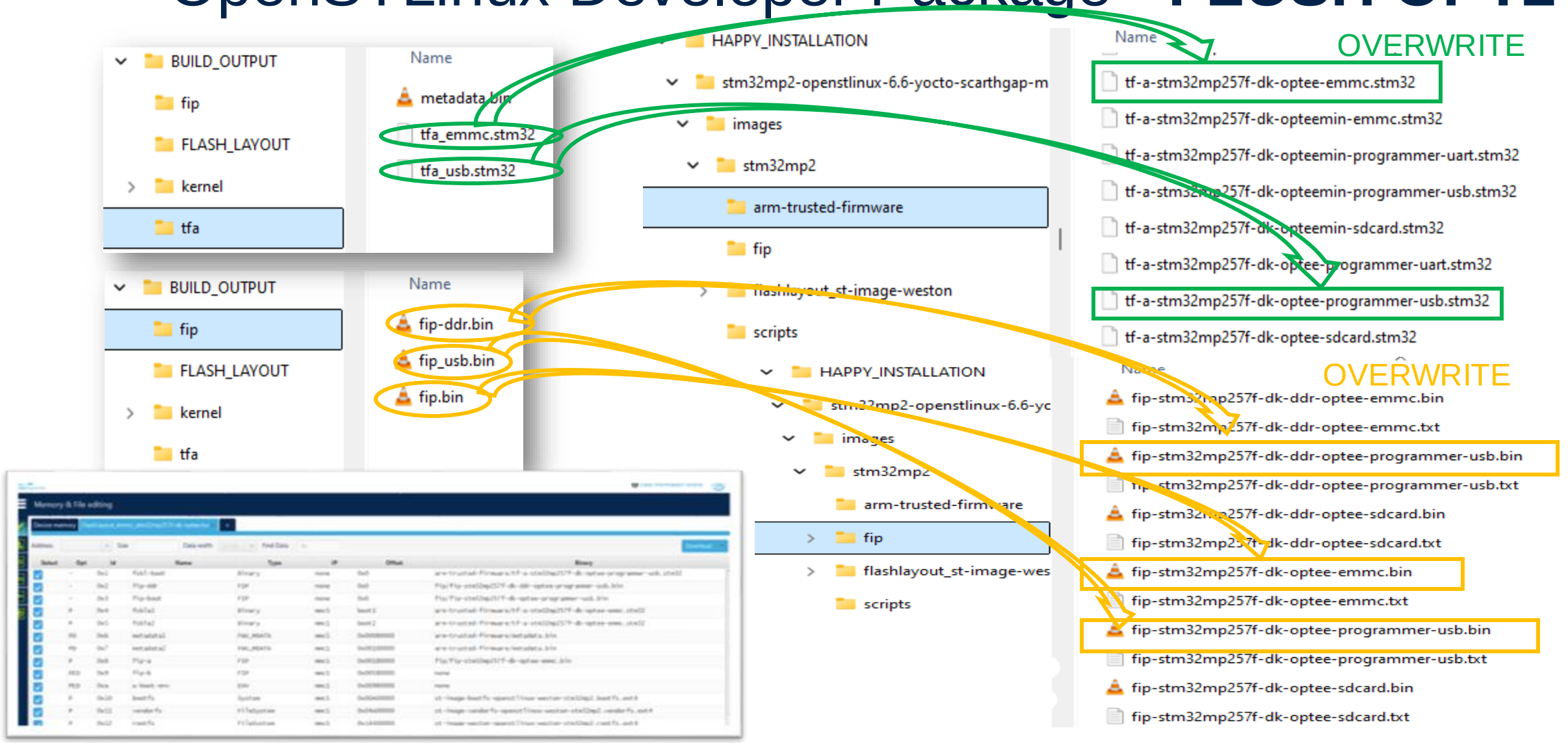
OpenSTLinux Developer Package - **FLUSH OPT2**



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STM32MP2x power and flexibility 2/2

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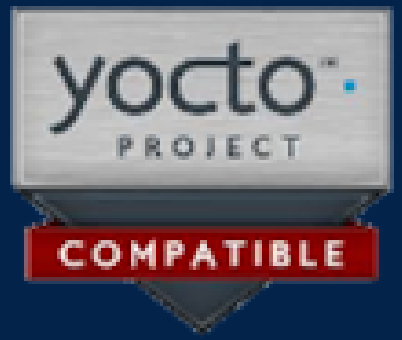
OpenSTLinux Distribution Package



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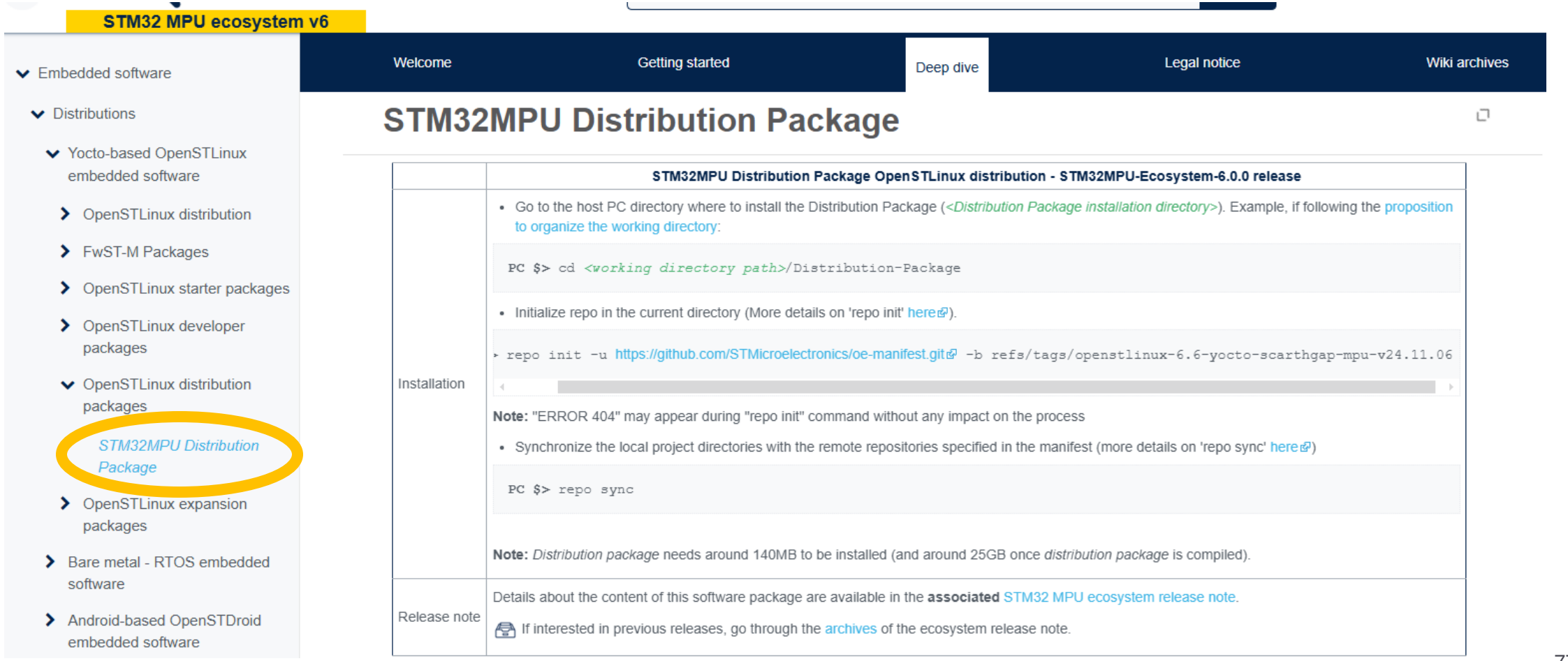
WIKI PAGE for OpenSTLinux Distribution Package

Refer to:

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



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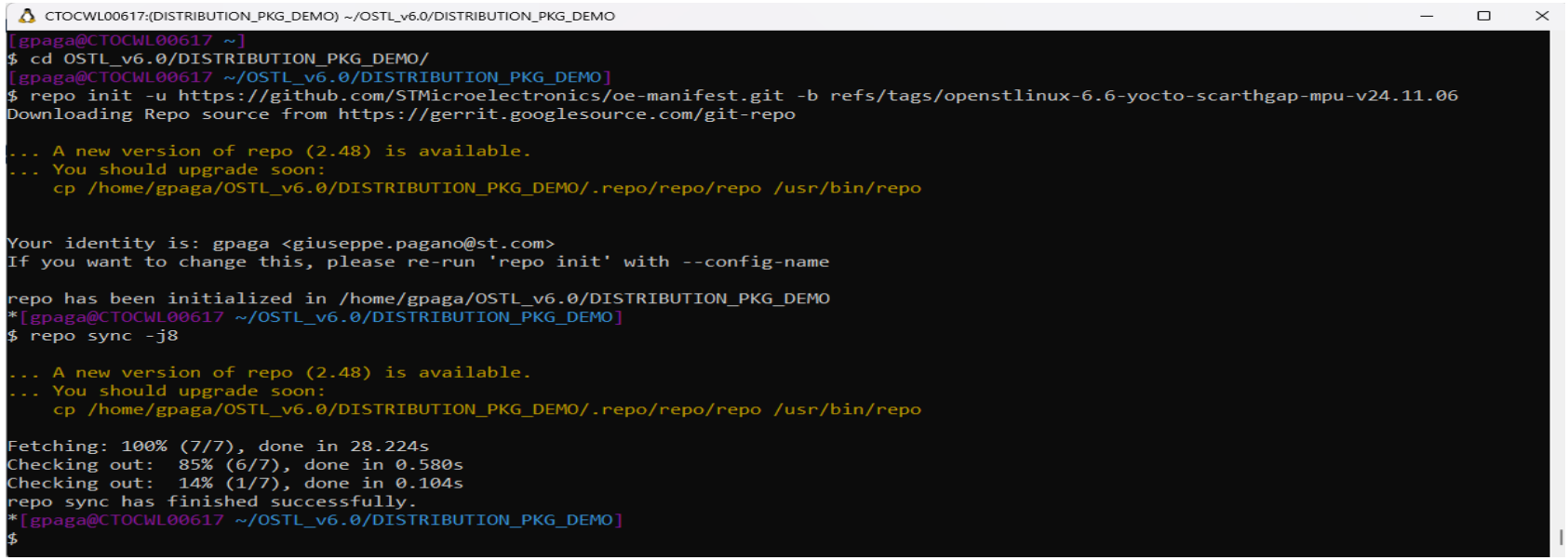
OpenSTLinux Distribution Package - **SETUP**

- 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



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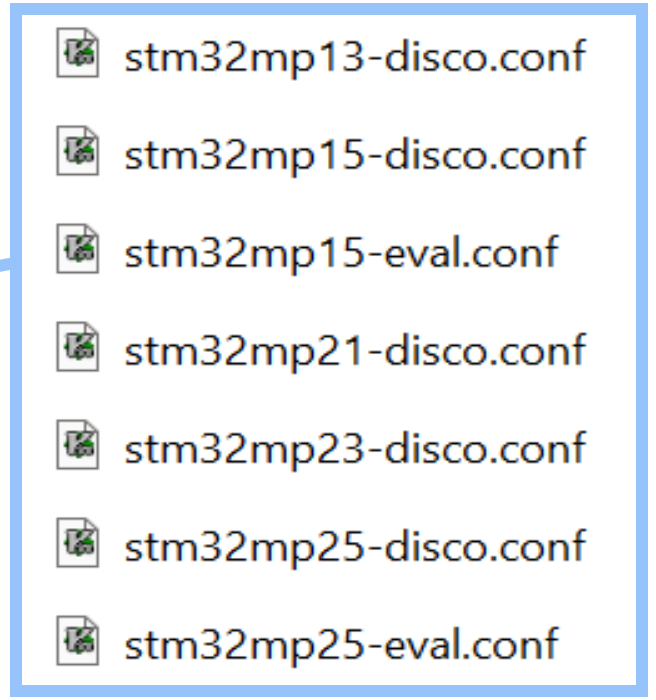
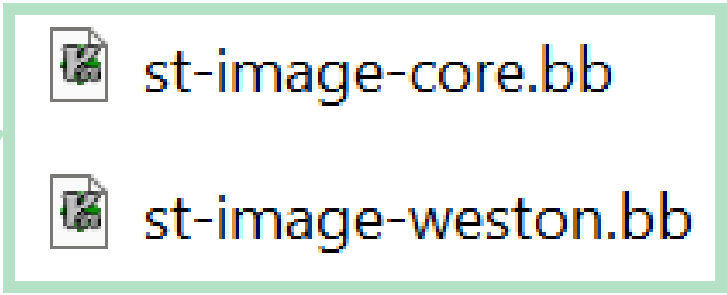
OpenSTLinux Distribution Package – **OpenSTLinux**

Brief Yocto ABC:

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





OpenSTLinux Distribution Package – **OpenSTLinux**

Rif: 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):

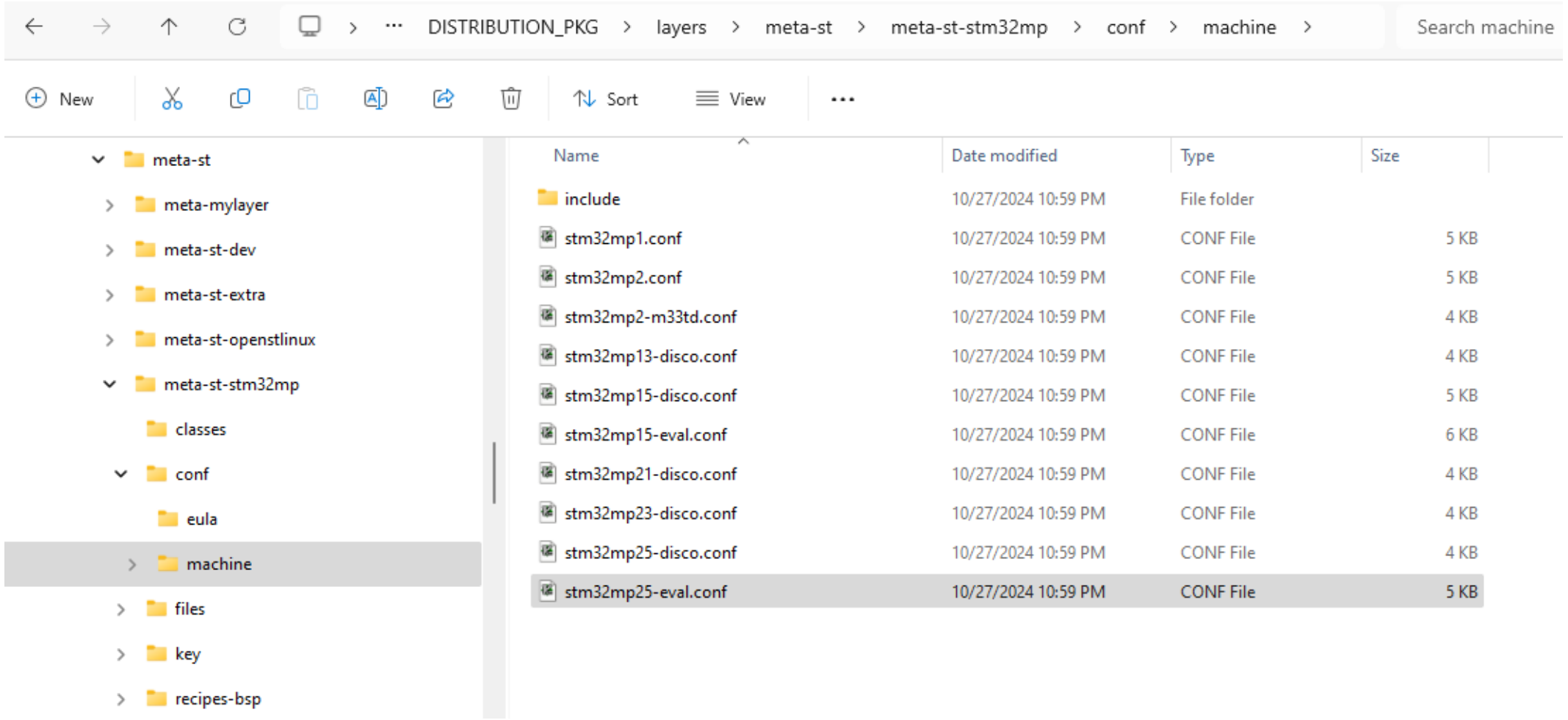
```
PC $> DISTRO=openstlinux-weston MACHINE=<machine> source layers/meta-st/scripts/envsetup.sh
```

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



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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
# =========================================================================
BOOTSCHEME_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_SDCARD  += "stm32mp257f-ev1"
STM32MP_DT_FILES_NOR     += "stm32mp257f-ev1"

EXTERNAL_DEVICETREE_SDCARD = "stm32mp257f-ev1-ca35tdcid-ostl"
EXTERNAL_DEVICETREE_SDCARD =+ "stm32mp257f-ev1-ca35tdcid-ostl-m33-examples"

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

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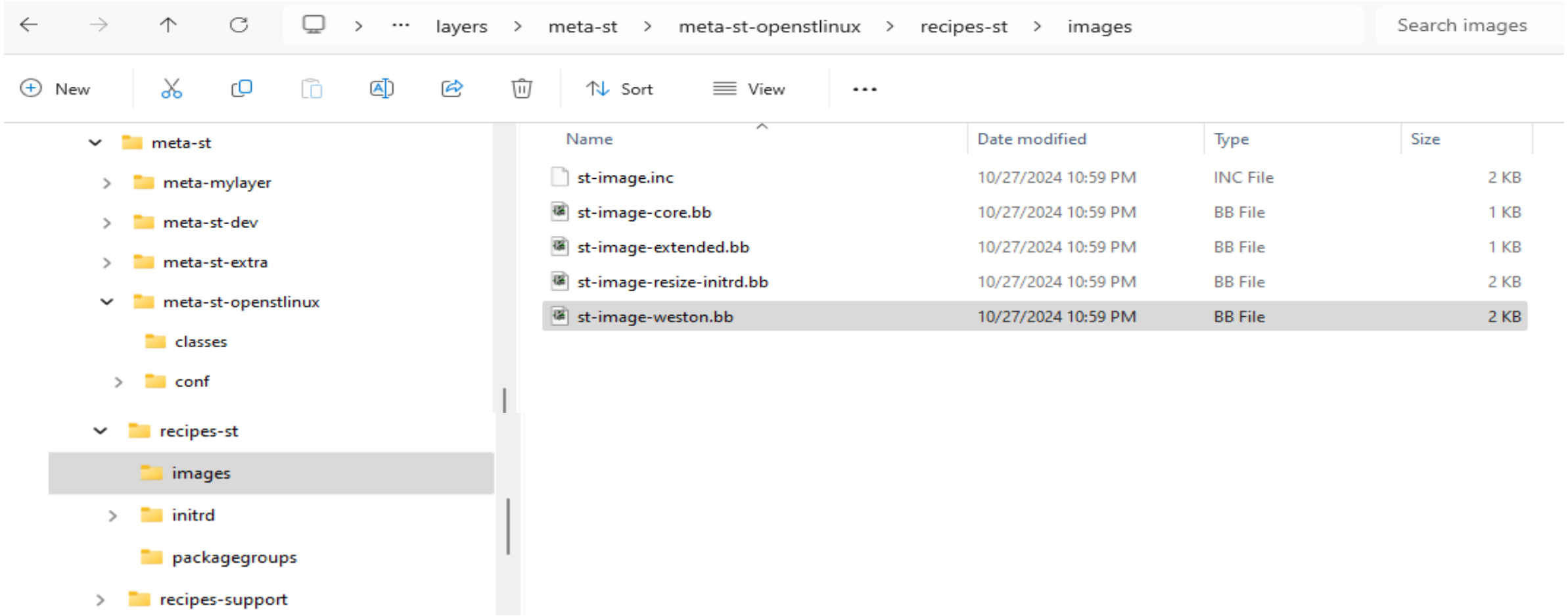
OpenSTLinux Distribution Package – **IMAGE defs**

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



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 += "\
     splash                \
     package-management    \
     ssh-server-dropbear   \
     hwcodecs              \
     tools-profile         \
     eclipse-debug         \
     "

#
# INSTALL addons
#
CORE_IMAGE_EXTRA_INSTALL += " \
     resize-helper \
     st-hostname \
     \
     packagegroup-framework-core-base     \
     packagegroup-framework-tools-base    \
     \
     packagegroup-framework-core          \
     packagegroup-framework-tools         \
     \
     packagegroup-framework-core-extra    \
     \
     ${@bb.utils.contains('COMBINED_FEATURES', 'optee', 'packagegroup-optee-core', '', d)} \
     ${@bb.utils.contains('COMBINED_FEATURES', 'optee', 'packagegroup-optee-test', '', d)} \
     "
```

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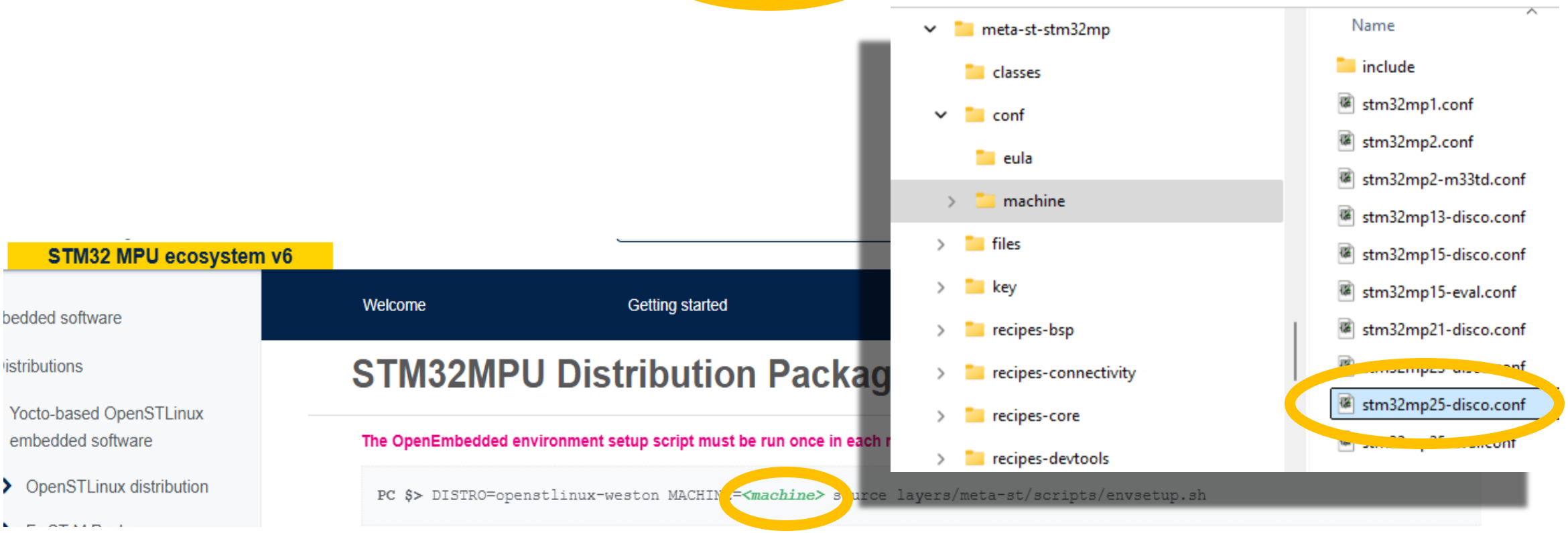
OpenSTLinux Distribution Package – **ENV SETUP**

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

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



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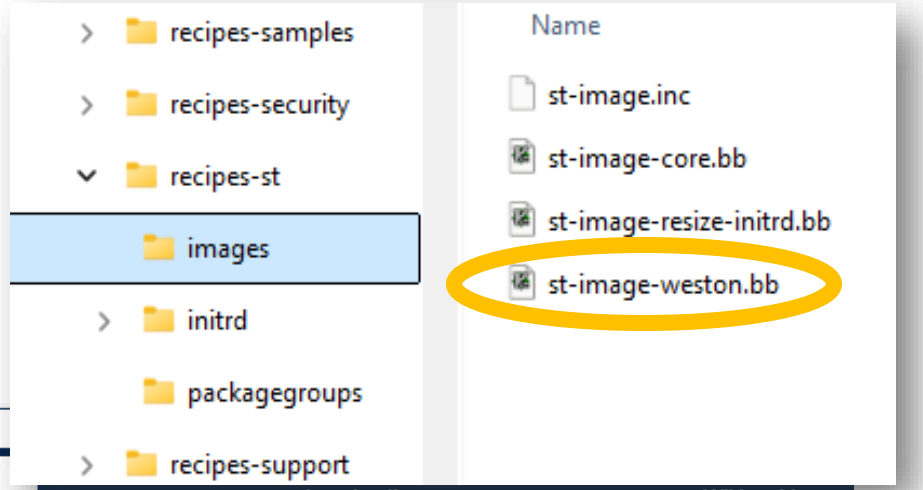
OpenSTLinux Distribution Package – **BUILD image**

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

bitbake st-image-weston



STM32 MPU ecosystem v6

bedded software

Distributions

Yocto-based OpenSTLinux embedded software

OpenSTLinux distribution

FwST-M Packages

OpenSTLinux starter packages

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

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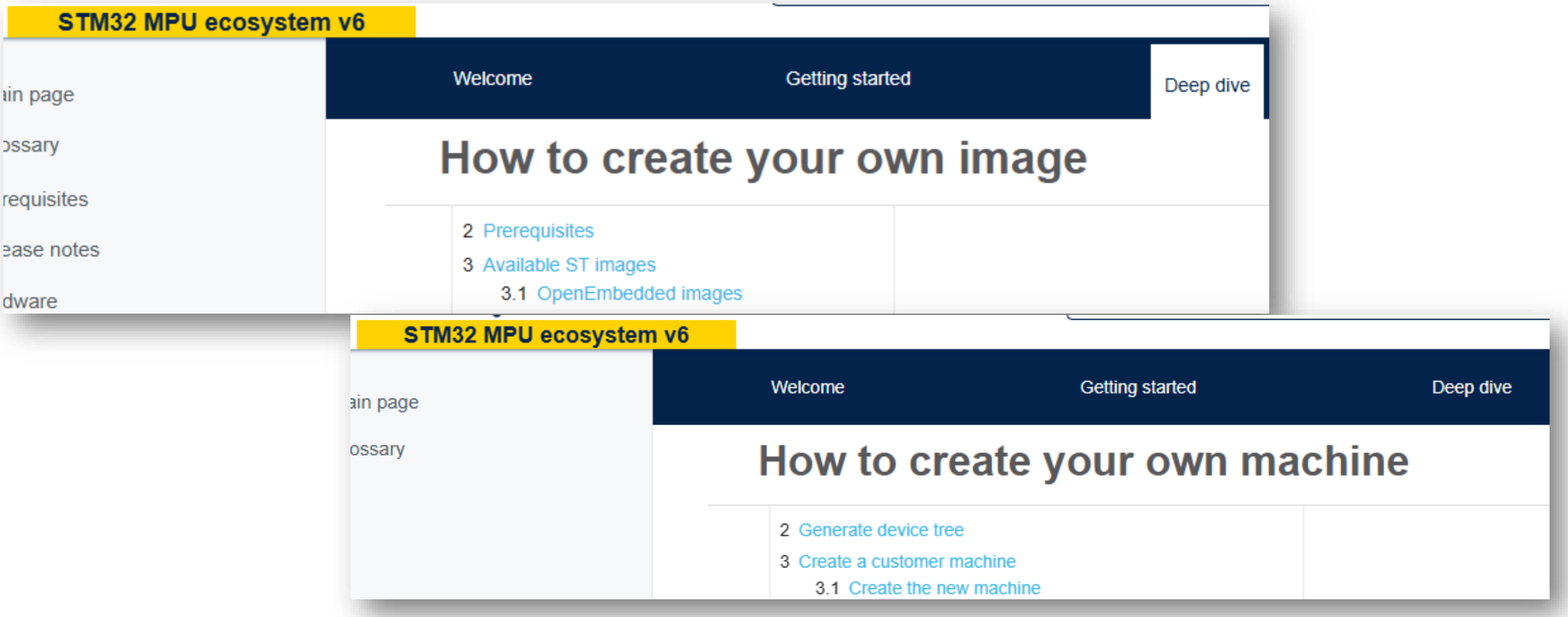
CUSTOMIZATION of OpenSTLinux Distribution Package

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_machine

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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
```

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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]
$
```

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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-overlayed      list overlayed 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]
$
```

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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]
$
```

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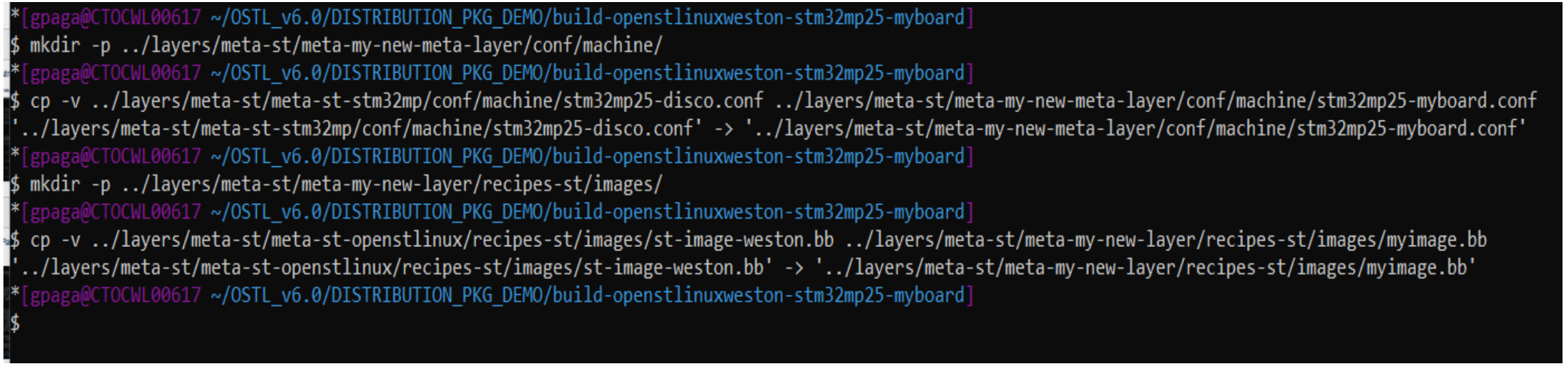
OSTL Distribution Package – **POPULATE NEW LAYER**

```
$ 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
```



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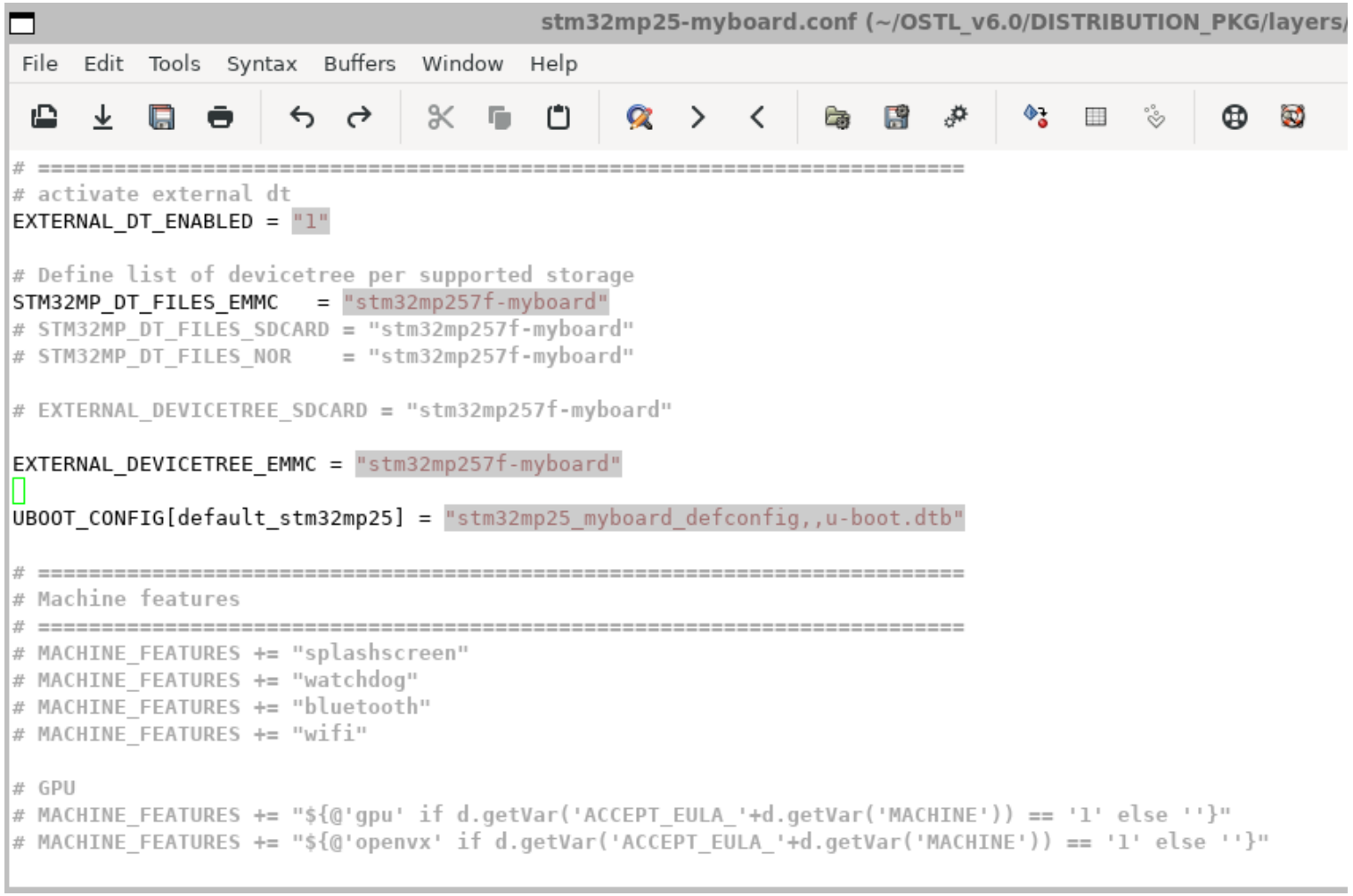
OSTL Distribution Package – **ADD NEW LAYER**

$ 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



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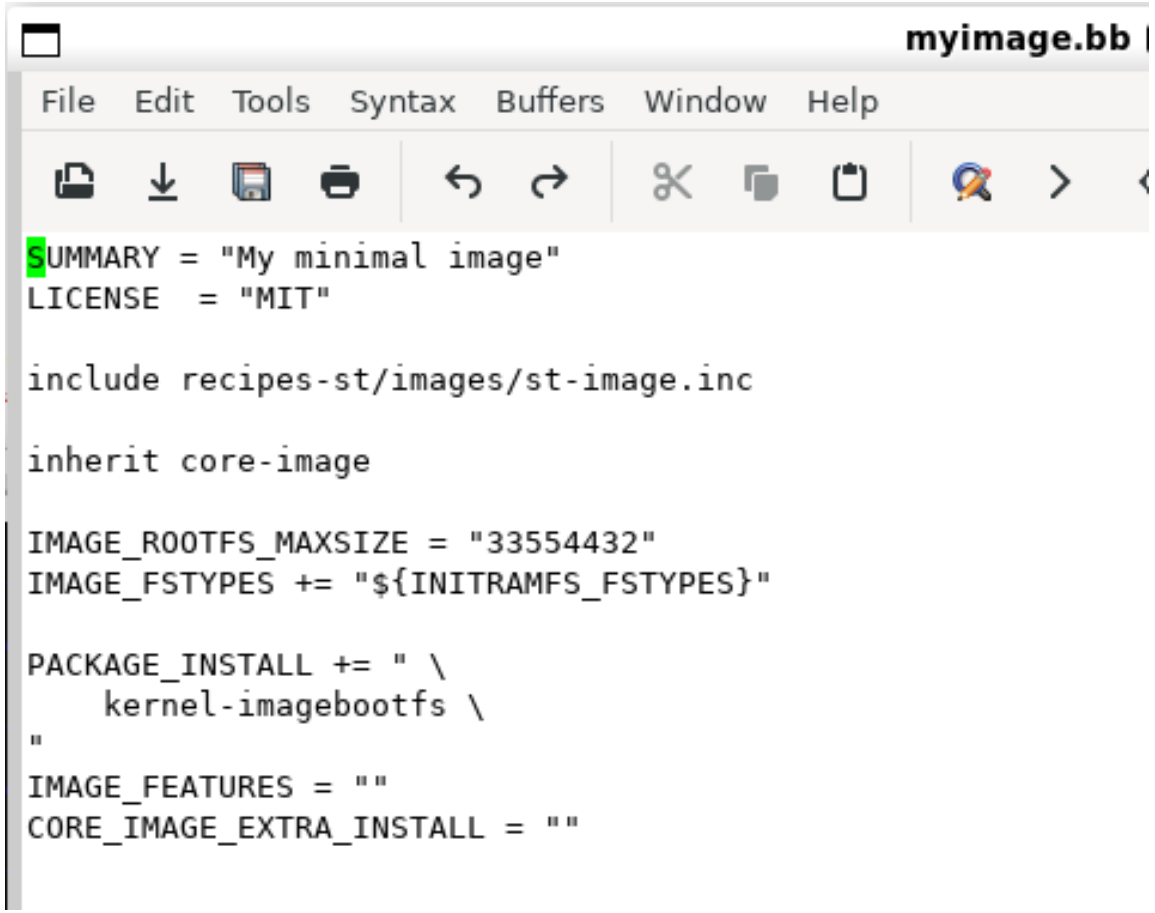
OSTL Distribution Package – **myimage.bb** image file

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



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
Loading cache: 100% |                                                                                | ETA:  --:--:--
NOTE: /home/gpaga/OSTL_v6.0/DISTRIBUTION_PKG/layers/meta-st/meta-st-openstlinux/recipes-st/images/st-image-
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]
```

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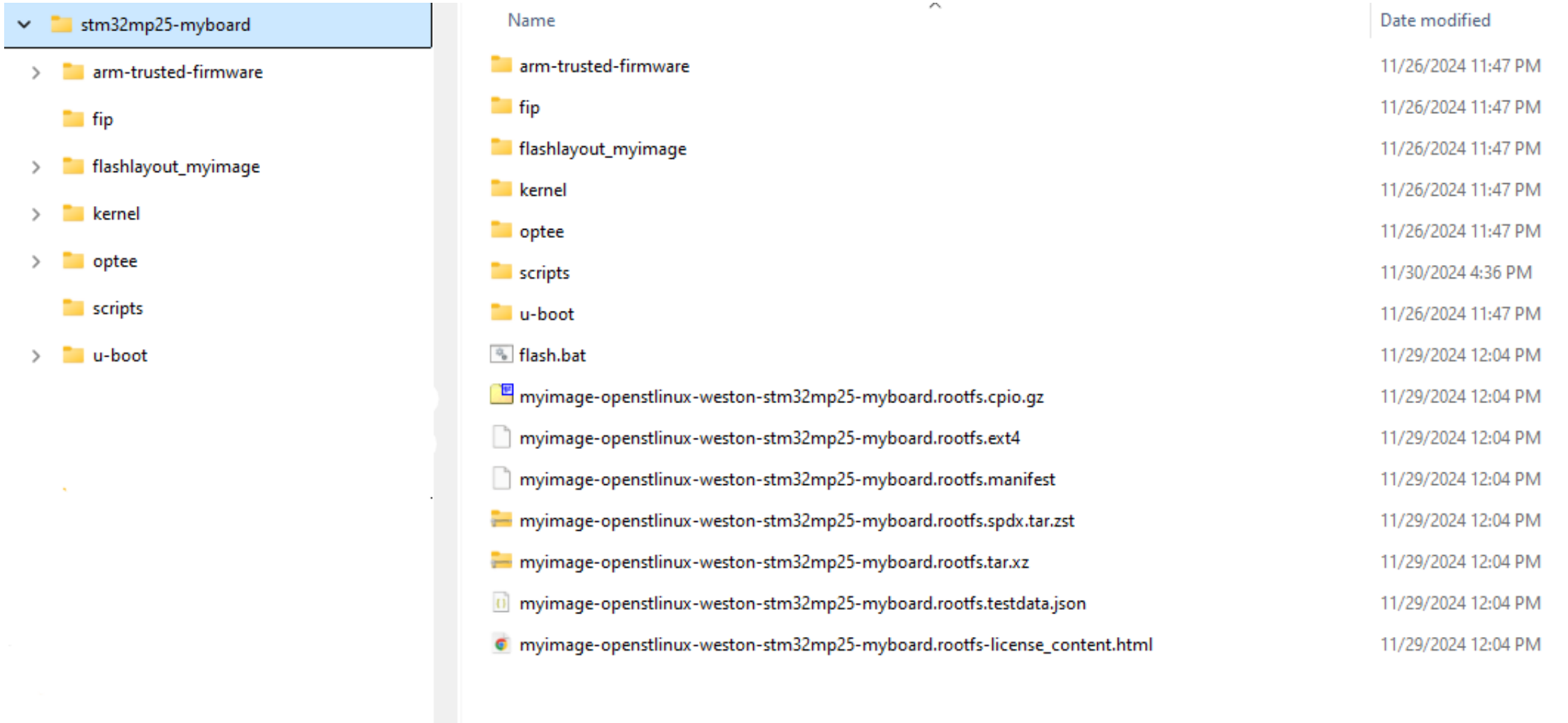
OpenSTLinux Distribution Package – **MY IMAGE**



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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\STMicroelectronic
s\STM32Cube\STM32CubeProgrammer\bin\STM32_Programmer_CLI.exe" -c port=USB1 -w flashl
ayout_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
```

COM60 - Tera Term VT

File Edit Setup Control Wind

```
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 ...
```

Rif.
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

File Edit Tools Syntax Buffers Window Help

#Opt	Id	Name	Type	IP	Offset	Binary
-	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
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_MDATA	mmc1	0x00080000	arm-trusted-firmware/metadata.bin
PD	0x07	metadata2	FWU_MDATA	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

FLASH HELPERS

MYIMAGE

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OpenSTLinux installation check

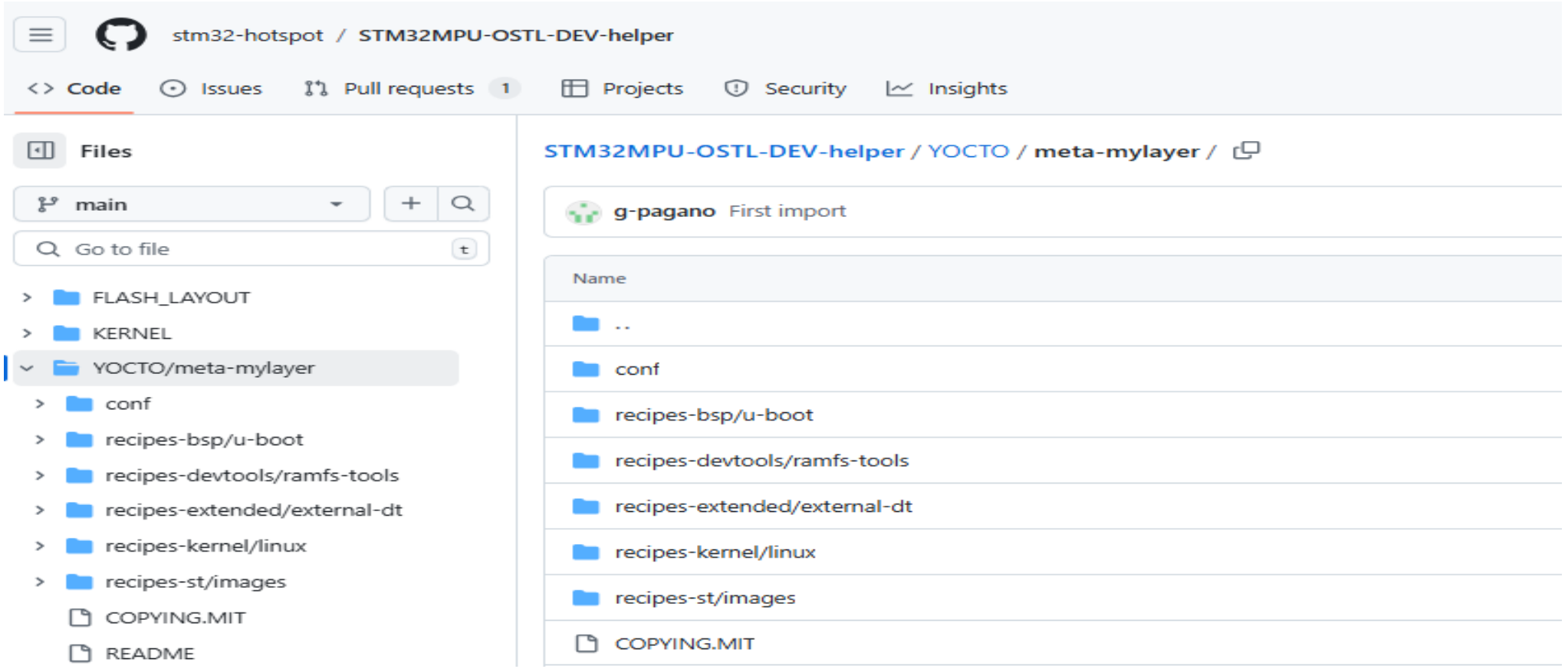
Use serial console to run some simple commands:

- 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



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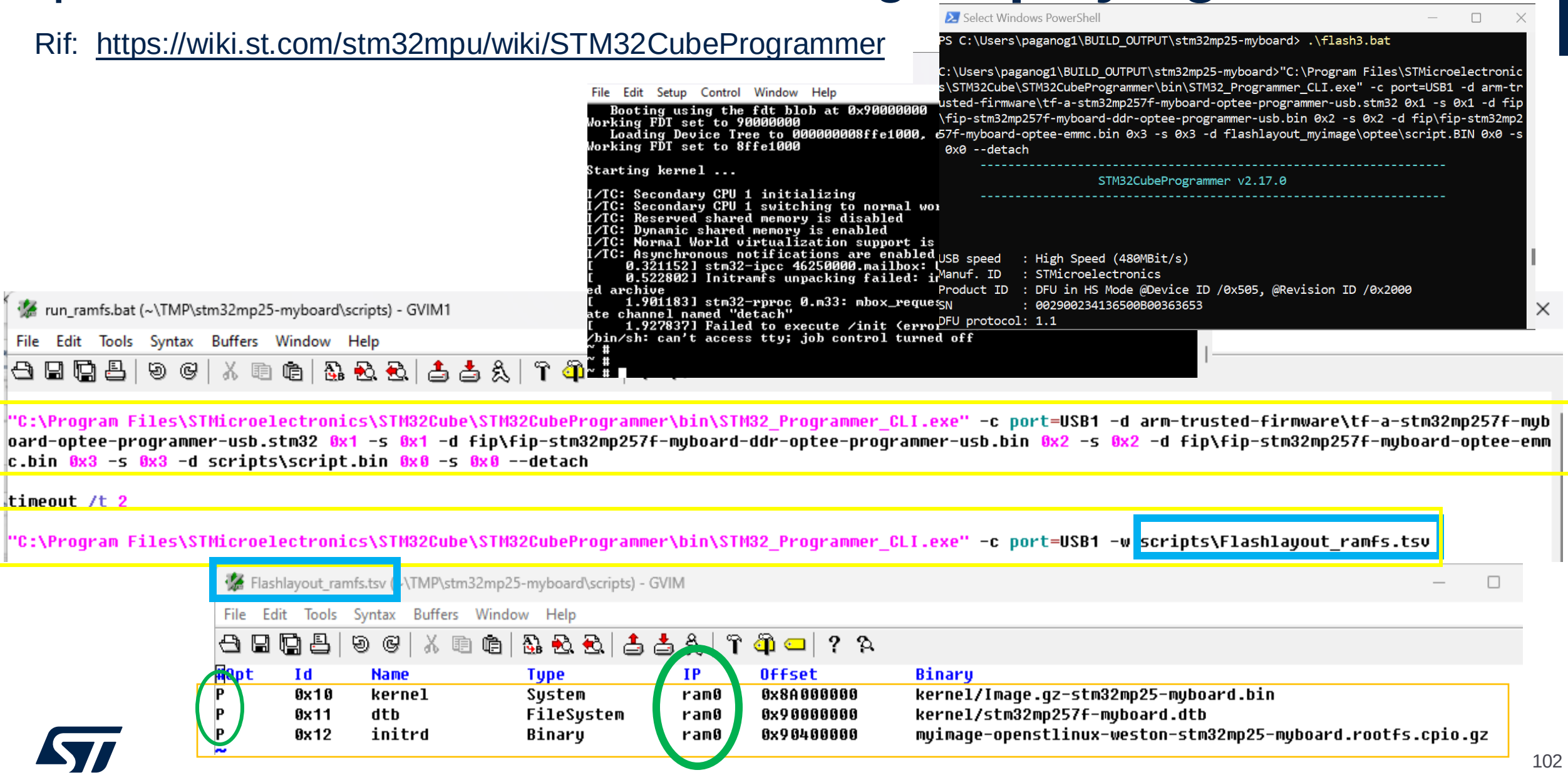
OpenSTLinux Distribution Package – **playing with ramfs**

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



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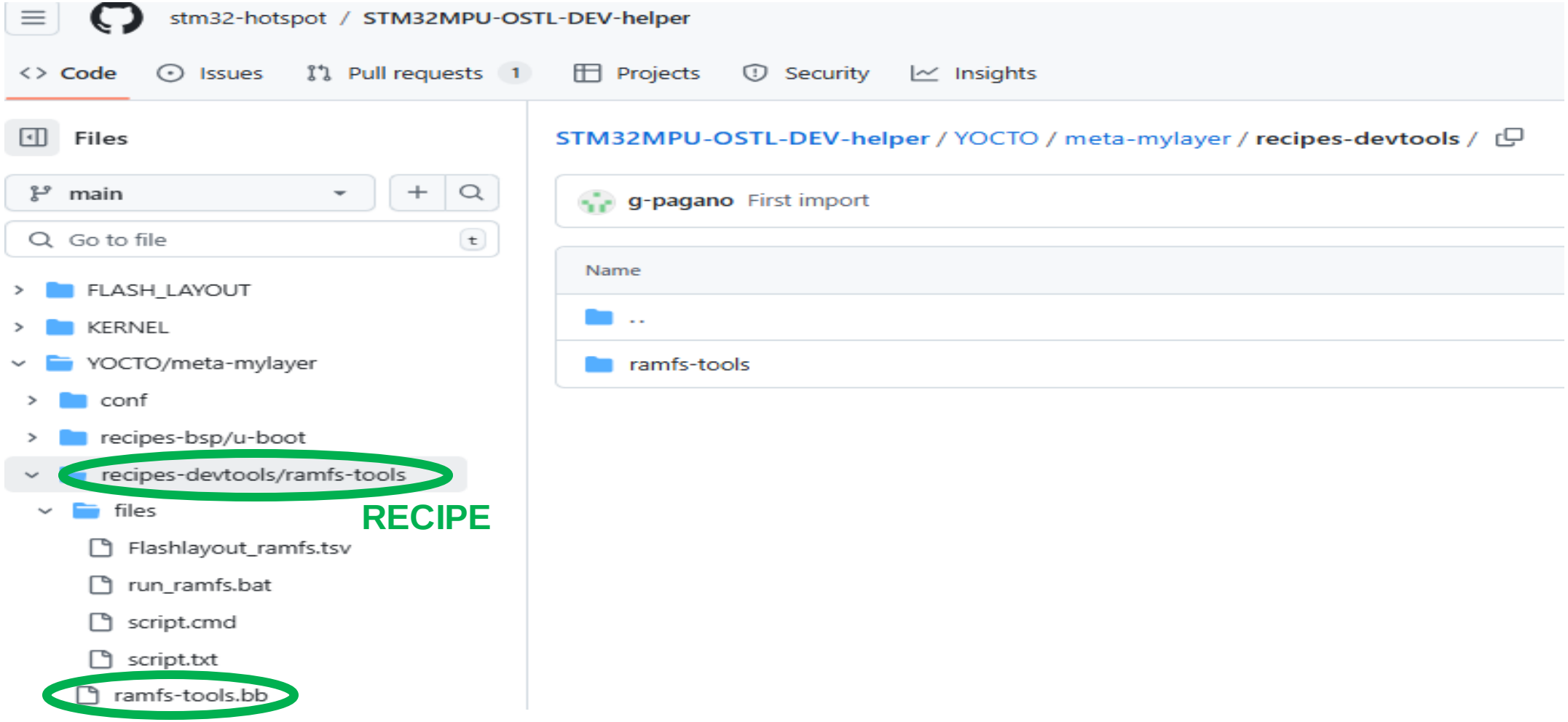
OpenSTLinux recipe example "ramfs-tools.bb"

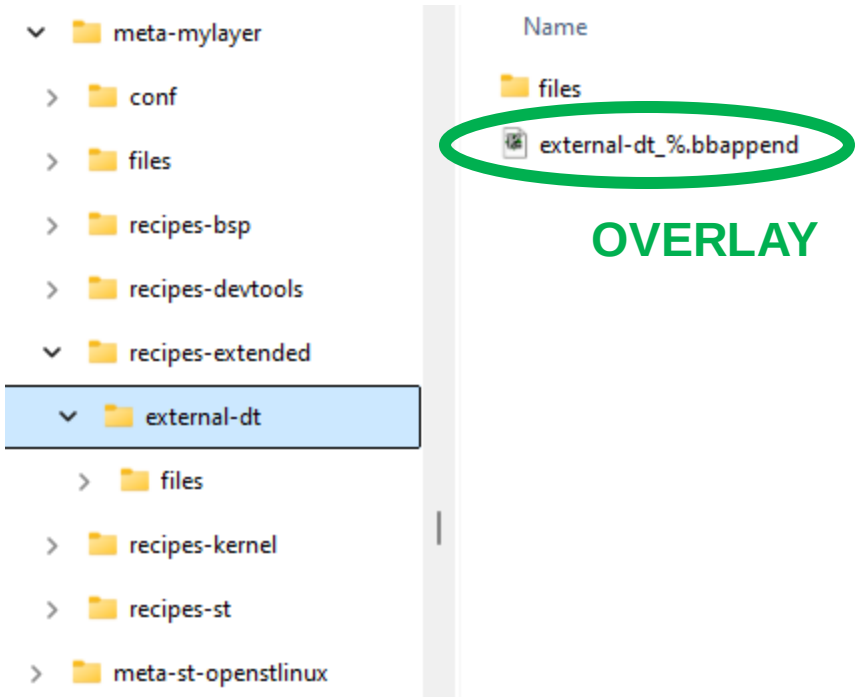
Rif:

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



OSTL Distribution Package – **ext devicetree** files

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



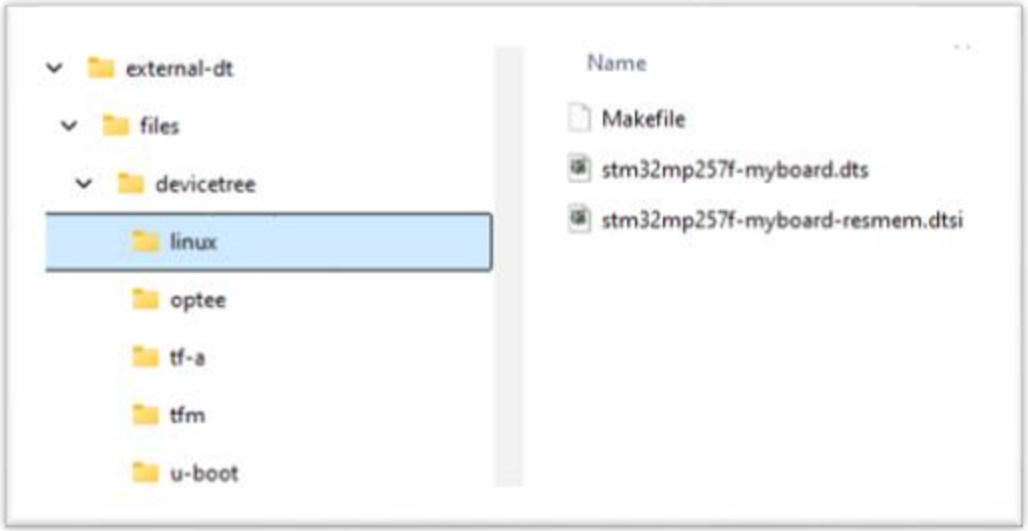
external-dt_%.bbappend (~/OSTL_v6.0/DISTRIBUTION_PKG/layers/meta-st

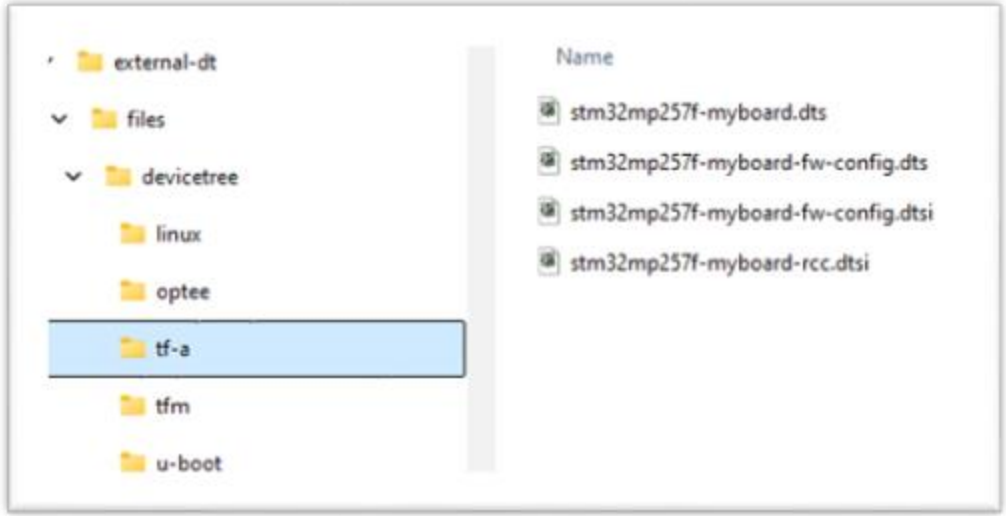
File Edit Tools Syntax Buffers Window Help

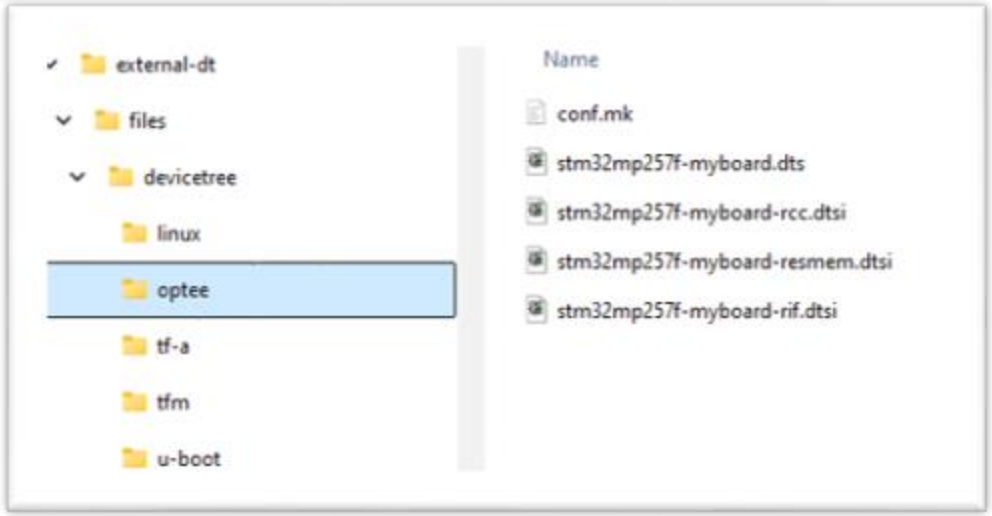
```
## SUMMARY = "Provides Device Tree files for STM32MP257 myboard"
## LICENSE = "GPL-2.0-only"
## LIC_FILES_CHKSUM = "file://${COMMON_LICENSE_DIR}/GPL-2.0-only;md5=801f80980d171dd6425610833a22dbe6"

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"
```

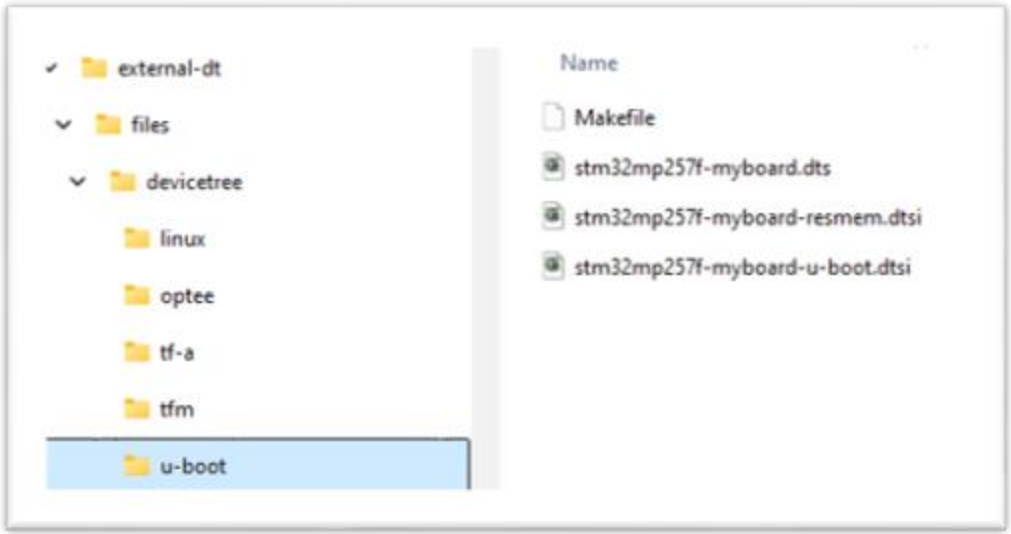
OSTL Distribution Package – **ext devicetree** files

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









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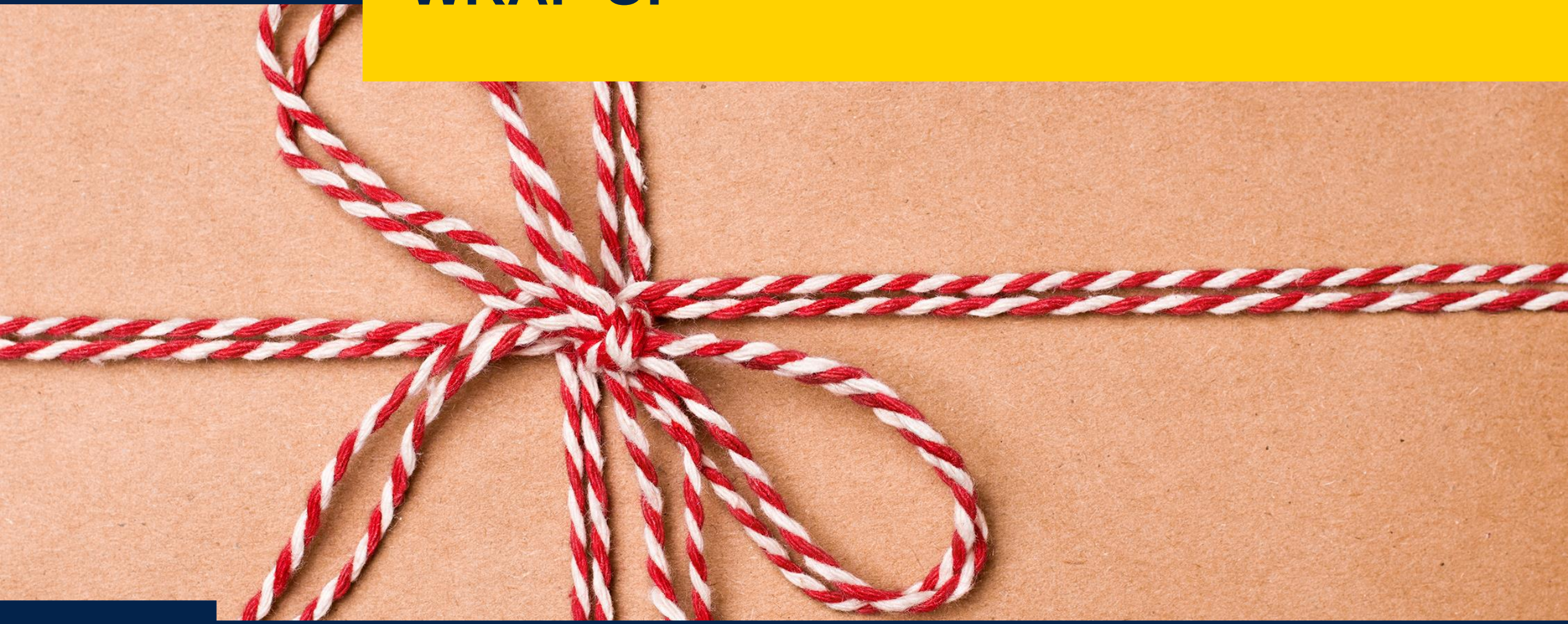
WRAP UP



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