



Example of directory structure for Packages

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Contents

1 Article purpose	3
2 Creating the structure	4
3 Focus on the Starter Package directory	5
4 Focus on the Developer Package directory	7
5 Focus on the Distribution Package directory	10
6 Appendix A: directory structure after build (Developer Package)	12
7 Appendix B: directory structure after build (Distribution Package)	15



1 Article purpose

This article aims at proposing a way to organize, on the host PC, the software packages of the different Packages (Starter, Developer and Distribution) for a given release of the STM32MPU Embedded Software distribution.

The main objective of the proposed organization is to keep together the software packages corresponding to a given release because there are links between them. For example:

- Flashing the image from the Starter Package on the board is mandatory before modifying the source code from the Developer Package. Both the image and the source code must belong to the same software release.
- The SDK (Developer Package) and the image (Starter Package) have both been generated from the Distribution Package. A software release thus guarantees that there is no misalignment between the different software packages.

An example of organization for tools is proposed [here](#).

Information

The objective of this article is to describe one organization among all the possible organizations. Feel free to organize the delivered Packages in any other way that would better match your way of working.

Information

In practice, this article uses the release **STM32MP15-Ecosystem-v1.0.0** for the STM32MPU Embedded Software distribution as an example to illustrate the proposed organization. If you are using a different release, the names of the directories and files might differ.

The directories are shown in green, while the files are in black.



2 Creating the structure

- Create your <working directory> and assign a unique name to it (for example by including the release name):

```
PC $> mkdir STM32MP15-Ecosystem-v1.0.0
PC $> cd STM32MP15-Ecosystem-v1.0.0
```

- Create the first-level directories that will host the software packages delivered through the STM32MPU Embedded Software distribution release note:

```
PC $> mkdir Starter-Package
PC $> mkdir Developer-Package
PC $> mkdir Distribution-Package
```

- The resulting directory structure looks as follows:

```
STM32MP15-Ecosystem-v1.0.0  STM32MPU Embedded Software release
├── Developer-Package       Developer Package installation directory
├── Distribution-Package    Distribution Package installation directory
└── Starter-Package        Starter Package installation directory
```

Once all software packages have been installed according to the instructions given in the STM32MPU Embedded Software distribution release note, the resulting directory structure looks as follows:

```
STM32MP15-Ecosystem-v1.0.0  STM32MPU Embedded Software release
├── Developer-Package       Developer Package installation
│   └── directory
│       ├── SDK             SDK for OpenSTLinux distribution
│       ├── STM32Cube_FW_MP1_V1.0.0  STM32CubeMP1 Package
│       └── stm32mp1-openstlinux-4.19-thud-mp1-19-02-20  Linux kernel, U-Boot, TF-A and OP-
│   TEE OS source code (OpenSTLinux distribution)
├── Distribution-Package    Distribution Package installation
│   └── directory
│       ├── stm32mp1-openstlinux-4.19-thud-mp1-19-02-20  OpenSTLinux distribution (full
│   source code and OpenEmbedded-based build framework)
├── Starter-Package        Starter Package installation
│   └── directory
│       └── stm32mp1-openstlinux-4.19-thud-mp1-19-02-20  Software image (binaries)
```



3 Focus on the Starter Package directory

The *Starter-Package* directory contains the software image for the STM32MPU Embedded Software distribution.

The trusted boot chain is the default solution delivered by STMicroelectronics. It includes the superset of features (for example, all Flash memory devices are supported). The basic boot chain is also upstreamed by STMicroelectronics, with a limited number of features (for example microSD card memory boot only). Refer to the [Boot chains overview](#) article for details.

Flash memory partitions (e.g. roofs, bootfs...) are explained in the [STM32MP15 Flash mapping](#) article.

```

Starter-Package
├── stm32mp1-openstlinux-4.19-thud-mp1-19-02-20
│   └── images
│       └── stm32mp1
│           ├── flashlayout_st-image-weston                               Flash layout
│           └── files (description of the partitions) for the supported Flash devices and boards
│               ├── FlashLayout_emmc_stm32mp157c-ev1-optee.tsv           Flash layout
│               └── file for eMMC and trusted boot chain, with OP-TEE OS → STM32MP157C-EV1
│                   ├── FlashLayout_emmc_stm32mp157c-ev1-trusted.tsv     Flash layout
│                   └── file for eMMC and trusted boot chain → STM32MP157C-EV1
│                       ├── FlashLayout_nand-4-256_stm32mp157c-ev1-optee.tsv   Flash layout
│                       └── file for NAND Flash and trusted boot chain, with OP-TEE OS → STM32MP157C-EV1
│                           ├── FlashLayout_nand-4-256_stm32mp157c-ev1-trusted.tsv   Flash layout
│                           └── file for NAND Flash and trusted boot chain → STM32MP157C-EV1
│                               ├── FlashLayout_nor-emmc_stm32mp157c-ev1-optee.tsv   Flash layout
│                               └── file for NOR Flash (and eMMC) and trusted boot chain, with OP-TEE OS → STM32MP157C-EV1
│                                   ├── FlashLayout_nor-emmc_stm32mp157c-ev1-trusted.tsv   Flash layout
│                                   └── file for NOR Flash (and eMMC) and trusted boot chain → STM32MP157C-EV1
│                                       ├── FlashLayout_nor-nand-4-256_stm32mp157c-ev1-optee.tsv   Flash layout
│                                       └── file for NOR Flash (and NAND Flash) and trusted boot chain, with OP-TEE OS → STM32MP157C-EV1
│                                           ├── FlashLayout_nor-nand-4-256_stm32mp157c-ev1-trusted.tsv   Flash layout
│                                           └── file for NOR Flash (and NAND Flash) and trusted boot chain → STM32MP157C-EV1
│                                               ├── FlashLayout_nor-sdcard_stm32mp157c-ev1-optee.tsv   Flash layout
│                                               └── file for NOR Flash (and microSD card) and trusted boot chain, with OP-TEE OS →
│                                                   STM32MP157C-EV1
│                                                       ├── FlashLayout_nor-sdcard_stm32mp157c-ev1-trusted.tsv   Flash layout
│                                                       └── file for NOR Flash (and microSD card) and trusted boot chain → STM32MP157C-EV1
│                                                           ├── FlashLayout_sdcard_stm32mp157a-dk1-basic.tsv           Flash layout
│                                                           └── file for microSD card and basic boot chain → STM32MP157A-DK1
│                                                               ├── FlashLayout_sdcard_stm32mp157a-dk1-optee.tsv       Flash layout
│                                                               └── file for microSD card and trusted boot chain, with OP-TEE OS → STM32MP157A-DK1
│                                                                   ├── FlashLayout_sdcard_stm32mp157a-dk1-trusted.tsv     Flash layout
│                                                                   └── file for microSD card and trusted boot chain (recommended setup) → STM32MP157A-DK1
│                                                                       ├── FlashLayout_sdcard_stm32mp157c-dk2-basic.tsv       Flash layout
│                                                                       └── file for microSD card and basic boot chain → STM32MP157C-DK2
│                                                                           ├── FlashLayout_sdcard_stm32mp157c-dk2-optee.tsv   Flash layout
│                                                                           └── file for microSD card and trusted boot chain, with OP-TEE OS → STM32MP157C-DK2
│                                                                               ├── FlashLayout_sdcard_stm32mp157c-dk2-trusted.tsv   Flash layout
│                                                                               └── file for microSD card and trusted boot chain (recommended setup) → STM32MP157C-DK2
│                                                                                   ├── FlashLayout_sdcard_stm32mp157c-ev1-basic.tsv   Flash layout
│                                                                                   └── file for microSD card and basic boot chain → STM32MP157C-EV1
│                                                                                       ├── FlashLayout_sdcard_stm32mp157c-ev1-optee.tsv   Flash layout
│                                                                                       └── file for microSD card and trusted boot chain, with OP-TEE OS → STM32MP157C-EV1
│                                                                                           ├── FlashLayout_sdcard_stm32mp157c-ev1-trusted.tsv   Flash layout
│                                                                                           └── file for microSD card and trusted boot chain (recommended setup) → STM32MP157C-EV1
│                                                                                               └── scripts
│                                                                                                   └── create_sdcard_from_flashlayout.sh

```



Example of directory structure for Packages

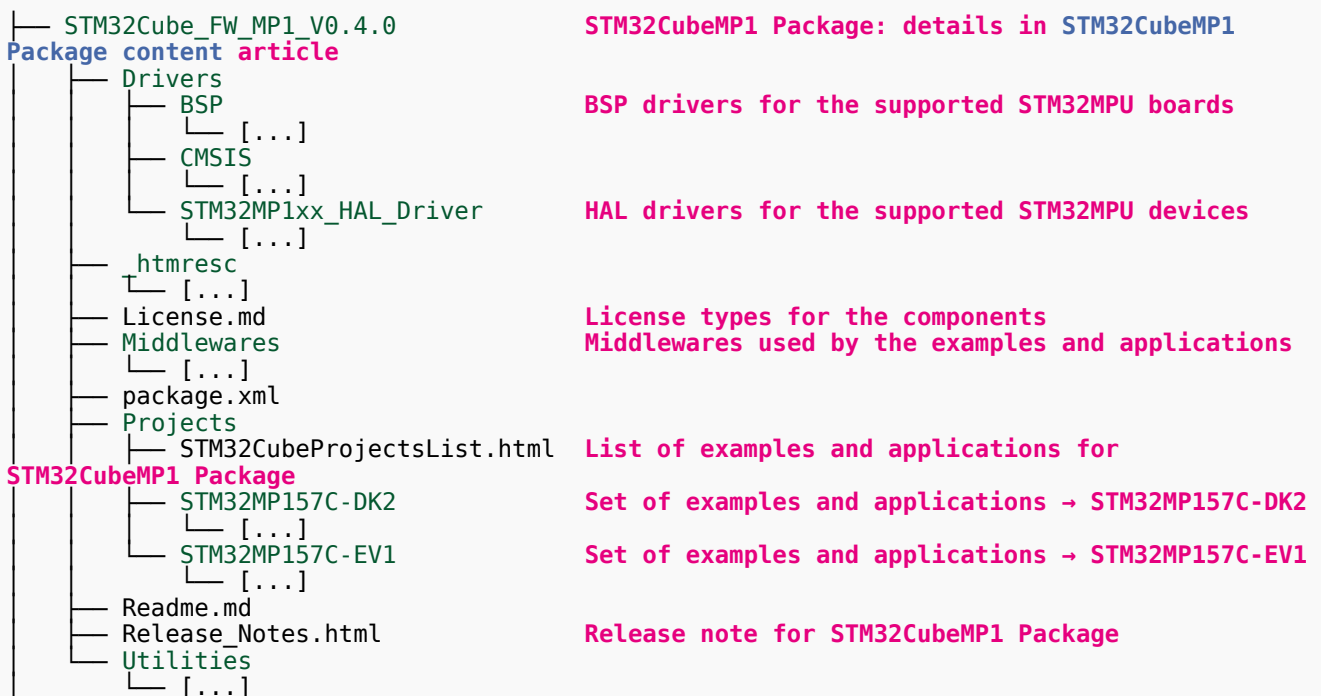
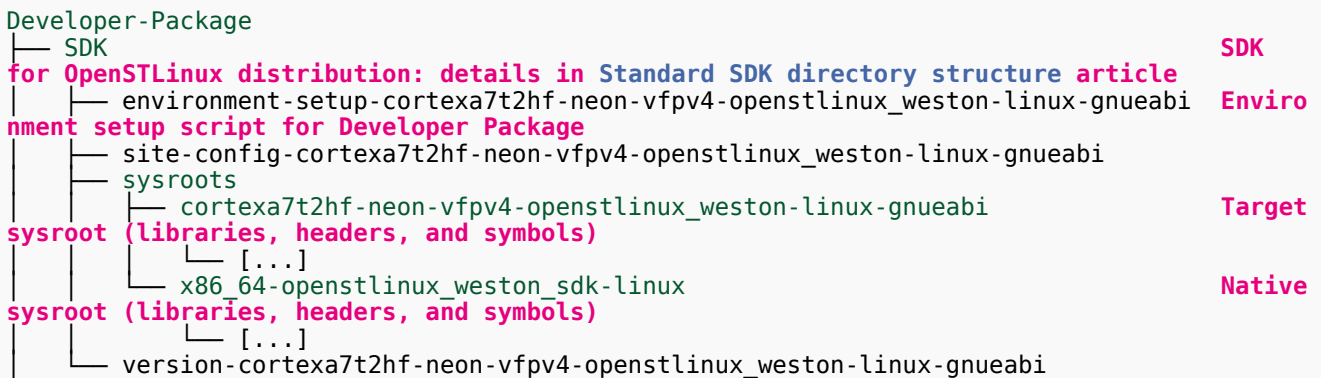
<i>tfs</i> partition	st-image-bootfs-openstlinux-weston-stm32mp1.ext4	Binary for <i>boo</i>
	st-image-bootfs-openstlinux-weston-stm32mp1.manifest	
<i>rfs</i> partition	st-image-userfs-openstlinux-weston-stm32mp1.ext4	Binary for <i>use</i>
	st-image-userfs-openstlinux-weston-stm32mp1.manifest	
<i>dorfs</i> partition	st-image-vendorfs-openstlinux-weston-stm32mp1.ext4	Binary for <i>ven</i>
<i>tfs</i> partition	st-image-weston-openstlinux-weston-stm32mp1.ext4	Binary for <i>roo</i>
	st-image-weston-openstlinux-weston-stm32mp1.license	
	st-image-weston-openstlinux-weston-stm32mp1-license_content.html	
	st-image-weston-openstlinux-weston-stm32mp1.manifest	
	st-image-weston-openstlinux-weston-stm32mp1_nand_4_256_multivolume.ubi	
OP-TEE OS runtime services (trusted boot chain) → STM32MP157A-DK1	tee-[header/pageable/pager]_v2-stm32mp157a-dk1-optee.stm32	Binaries for
OP-TEE OS runtime services (trusted boot chain) → STM32MP157C-DK2	tee-[header/pageable/pager]_v2-stm32mp157c-dk2-optee.stm32	Binaries for
OP-TEE OS runtime services (trusted boot chain) → STM32MP157C-EV1	tee-[header/pageable/pager]_v2-stm32mp157c-ev1-optee.stm32	Binaries for
for <i>FSBL</i> partition (trusted boot chain), with OP-TEE OS → STM32MP157A-DK1	tf-a-stm32mp157a-dk1-optee.stm32	TF-A binary
for <i>FSBL</i> partition (trusted boot chain) → STM32MP157A-DK1	tf-a-stm32mp157a-dk1-trusted.stm32	TF-A binary
for <i>FSBL</i> partition (trusted boot chain) → STM32MP157A-DK1	tf-a-stm32mp157c-dk2-optee.stm32	TF-A binary
for <i>FSBL</i> partition (trusted boot chain), with OP-TEE OS → STM32MP157C-DK2	tf-a-stm32mp157c-dk2-trusted.stm32	TF-A binary
for <i>FSBL</i> partition (trusted boot chain) → STM32MP157C-DK2	tf-a-stm32mp157c-ev1-optee.stm32	TF-A binary
for <i>FSBL</i> partition (trusted boot chain), with OP-TEE OS → STM32MP157C-EV1	tf-a-stm32mp157c-ev1-trusted.stm32	TF-A binary
for <i>FSBL</i> partition (trusted boot chain) → STM32MP157C-EV1	u-boot-spl.stm32-stm32mp157a-dk1-basic	U-Boot binary
for <i>FSBL</i> partition (basic boot chain) → STM32MP157A-DK1	u-boot-spl.stm32-stm32mp157c-dk2-basic	U-Boot binary
for <i>FSBL</i> partition (basic boot chain) → STM32MP157C-DK2	u-boot-spl.stm32-stm32mp157c-ev1-basic	U-Boot binary
for <i>FSBL</i> partition (basic boot chain) → STM32MP157C-EV1	u-boot-stm32mp157a-dk1-basic.img	U-Boot binary
for <i>SSBL</i> partition (basic boot chain) → STM32MP157A-DK1	u-boot-stm32mp157a-dk1-optee.stm32	U-Boot binary
for <i>SSBL</i> partition (trusted boot chain), with OP-TEE OS → STM32MP157A-DK1	u-boot-stm32mp157a-dk1-trusted.stm32	U-Boot binary
for <i>SSBL</i> partition (trusted boot chain) → STM32MP157A-DK1	u-boot-stm32mp157c-dk2-basic.img	U-Boot binary
for <i>SSBL</i> partition (basic boot chain) → STM32MP157C-DK2	u-boot-stm32mp157c-dk2-optee.stm32	U-Boot binary
for <i>SSBL</i> partition (trusted boot chain), with OP-TEE OS → STM32MP157C-DK2	u-boot-stm32mp157c-dk2-trusted.stm32	U-Boot binary
for <i>SSBL</i> partition (trusted boot chain) → STM32MP157C-DK2	u-boot-stm32mp157c-ev1-basic.img	U-Boot binary
for <i>SSBL</i> partition (basic boot chain) → STM32MP157C-EV1	u-boot-stm32mp157c-ev1-optee.stm32	U-Boot binary
for <i>SSBL</i> partition (trusted boot chain), with OP-TEE OS → STM32MP157C-EV1	u-boot-stm32mp157c-ev1-trusted.stm32	U-Boot binary
for <i>SSBL</i> partition (trusted boot chain) → STM32MP157C-EV1		



4 Focus on the Developer Package directory

The *Developer-Package* directory contains:

- The source code for the following OpenSTLinux software packages (development for Arm[®] Cortex[®]-A processor):
 - Linux[®] kernel
 - U-Boot
 - TF-A
 - OP-TEE OS
- The debug symbol files for Linux kernel, U-Boot, TF-A and OP-TEE OS
- The SDK (for cross-development on an host PC)
- The STM32Cube MPU Package (developed for Arm[®] Cortex[®]-M processor)





<pre> └─ stm32mp1-openstlinux-4.19-thud-mp1-19-02-20 distribution └─ images └─ stm32mp1 directory └─ tf-a-bl2-optee.elf TEE OS → trusted boot firmware stage └─ tf-a-bl2-trusted.elf boot firmware stage └─ tf-a-bl32-trusted.elf software stage └─ u-boot-stm32mp157a-dk1-optee.elf TEE OS → STM32MP157A-DK1 └─ u-boot-stm32mp157a-dk1-trusted.elf STM32MP157A-DK1 └─ u-boot-stm32mp157c-dk2-optee.elf TEE OS → STM32MP157C-DK2 └─ u-boot-stm32mp157c-dk2-trusted.elf STM32MP157C-DK2 └─ u-boot-stm32mp157c-ev1-optee.elf TEE OS → STM32MP157C-EV1 └─ u-boot-stm32mp157c-ev1-trusted.elf STM32MP157C-EV1 └─ vmlinux </pre>	<p>Source code for OpenSTLinux</p> <p>Debug symbol files installation</p> <p>Debug symbol file for TF-A, with OP-</p> <p>Debug symbol file for TF-A → trusted</p> <p>Debug symbol file for TF-A → runtime</p> <p>Debug symbol file for U-Boot, with OP-</p> <p>Debug symbol file for U-Boot →</p> <p>Debug symbol file for U-Boot, with OP-</p> <p>Debug symbol file for U-Boot →</p> <p>Debug symbol file for U-Boot, with OP-</p> <p>Debug symbol file for U-Boot →</p> <p>Debug symbol file for Linux kernel</p>
---	---

<pre> └─ sources └─ arm-openstlinux_weston-linux-gnueabi └─ linux-stm32mp-4.19-r0 └─ [*].patch e for Linux kernel build └─ fragment-[*].config └─ linux-4.19.9 └─ linux-4.19.9.tar.xz └─ README.HOW_T0.txt └─ series </pre>	<p>Linux kernel installation directory</p> <p>ST patches for Linux kernel</p> <p>ST configuration fragments for Linux kernel</p> <p>Linux kernel source code directory</p> <p>Helper file for Linux kernel management: referenc</p>
---	---

<pre> └─ optee-os-stm32mp-3.3.0-r0 └─ [*].patch └─ 3.3.0.tar.gz └─ Makefile.sdk └─ optee_os-3.3.0 └─ README.HOW_T0.txt └─ series </pre>	<p>OP-TEE OS installation directory</p> <p>ST patches for OP-TEE OS</p> <p>Makefile for the OP-TEE OS compilation</p> <p>OP-TEE OS source code directory</p> <p>Helper file for OP-TEE OS management: reference</p>
---	---

<pre> └─ tf-a-stm32mp-2.0-r0 └─ [*].patch └─ arm-trusted-firmware-2.0 └─ Makefile.sdk └─ README.HOW_T0.txt └─ series └─ v2.0.tar.gz </pre>	<p>TF-A installation directory</p> <p>ST patches for TF-A</p> <p>TF-A source code directory</p> <p>Makefile for the TF-A compilation</p> <p>Helper file for TF-A management: reference</p>
--	--



```

└─ u-boot-stm32mp-2018.11-r0
  ├── [*].patch
  ├── Makefile.sdk
  ├── README.HOW_TO.txt
  └─ series
    ├── u-boot-2018.11
    └─ v2018.11.tar.gz

```

for U-Boot build

U-Boot installation directory
ST patches for U-Boot
Makefile for the U-Boot compilation
Helper file for U-Boot management: reference

U-Boot source code directory

Appendix A shows the structure of the Linux kernel, U-Boot, TF-A and OP-TEE OS installation directories after these software packages have been built.



5 Focus on the Distribution Package directory

The *Distribution-Package* directory contains all the OpenEmbedded layers required to get the source code of any STM32MPU Embedded Software component, as well as a build framework based on OpenEmbedded.

```

Distribution-Package
├── openstlinux-4.19-thud-mp1-19-02-20  OpenSTLinux distribution
│   └── layers
│       ├── meta-openembedded  Collection of layers for the OpenEmbedded-Core universe (Op
│       │                       enEmbedded standard)
│       │   └── [...]
│       └── meta-qt5           QT5 layer for OpenEmbedded (standard)
│           └── [...]
  
```

```

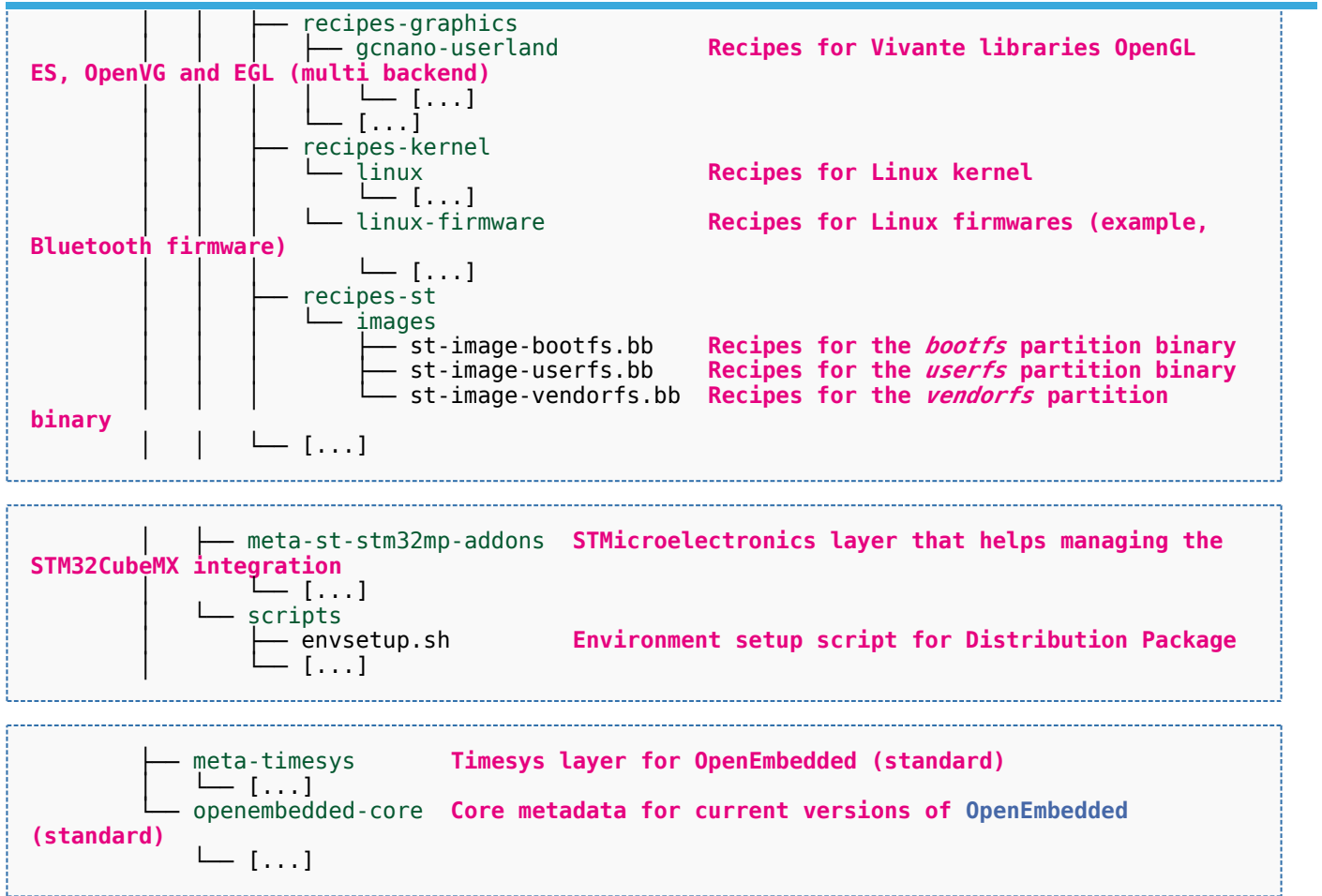
├── meta-st
│   ├── meta-st-openstlinux  STMicroelectronics layer that
│   │                       contains the settings of the frameworks and images for the OpenSTLinux distribution
│   │
│   ├── recipes-samples
│   │   └── images
│   │       ├── st-example-image-qt.bb  ST example of image based on QT
│   │       ├── st-example-image-x11.bb  ST example of image based on X11
│   │       └── st-example-image-xfce.bb  ST example of image based on XFCE
│   │
│   ├── st-image-userfs.bbappend  Additional packages (application
│   │                               launcher, demo...) for ST Weston image
│   │   └── [...]
│   ├── recipes-st
│   │   ├── images
│   │   └── st-image-core.bb  Core image for OpenSTLinux
│   │
│   ├── st-image.inc
│   ├── st-image-weston.bb  Weston image with basic Wayland
│   │                       support for OpenSTLinux distribution: recommended setup
│   ├── packagegroups
│   │   └── [...]
│   └── [...]
  
```

```

├── meta-st-stm32mp  STMicroelectronics layer that contains
│   │               the description of the BSP for the STM32 MPU devices
│   │
│   ├── recipes-bsp
│   │   ├── alsa
│   │   │   └── [...]
│   │   └── drivers  Recipes for Vivante GCNANO GPU kernel
│   │
│   ├── [...]
│   ├── trusted-firmware-a  Recipes for TF-A
│   │   └── [...]
│   ├── u-boot  Recipes for U-Boot
│   │   └── [...]
│   ├── recipes-extended
│   │   └── m4projects  Recipes for STM32Cube MPU Package
│   │       └── [...]
│   └── [...]
  
```



Example of directory structure for Packages

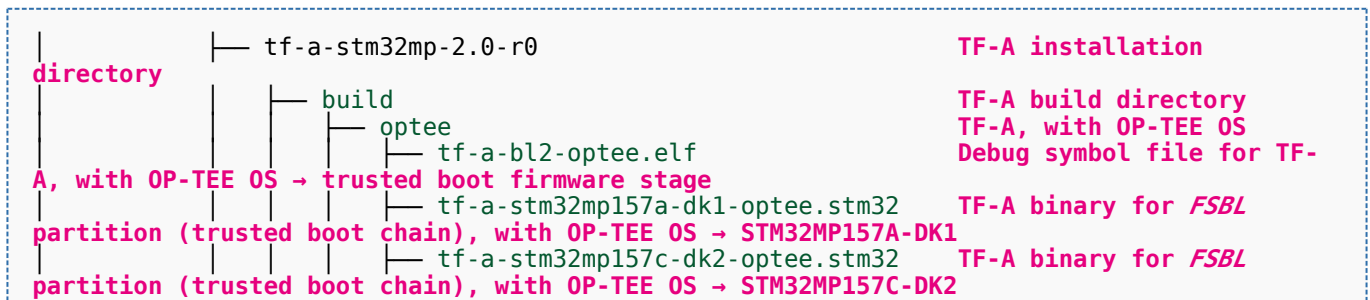
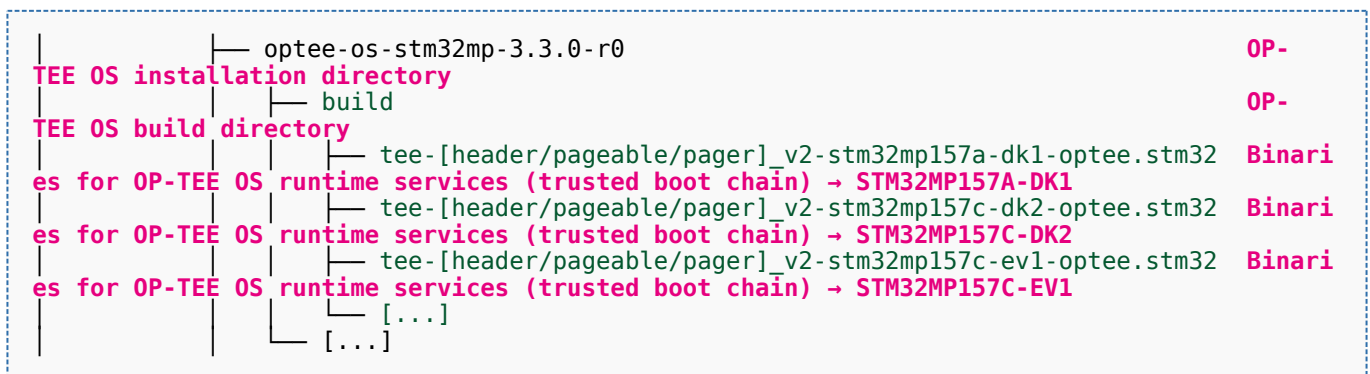
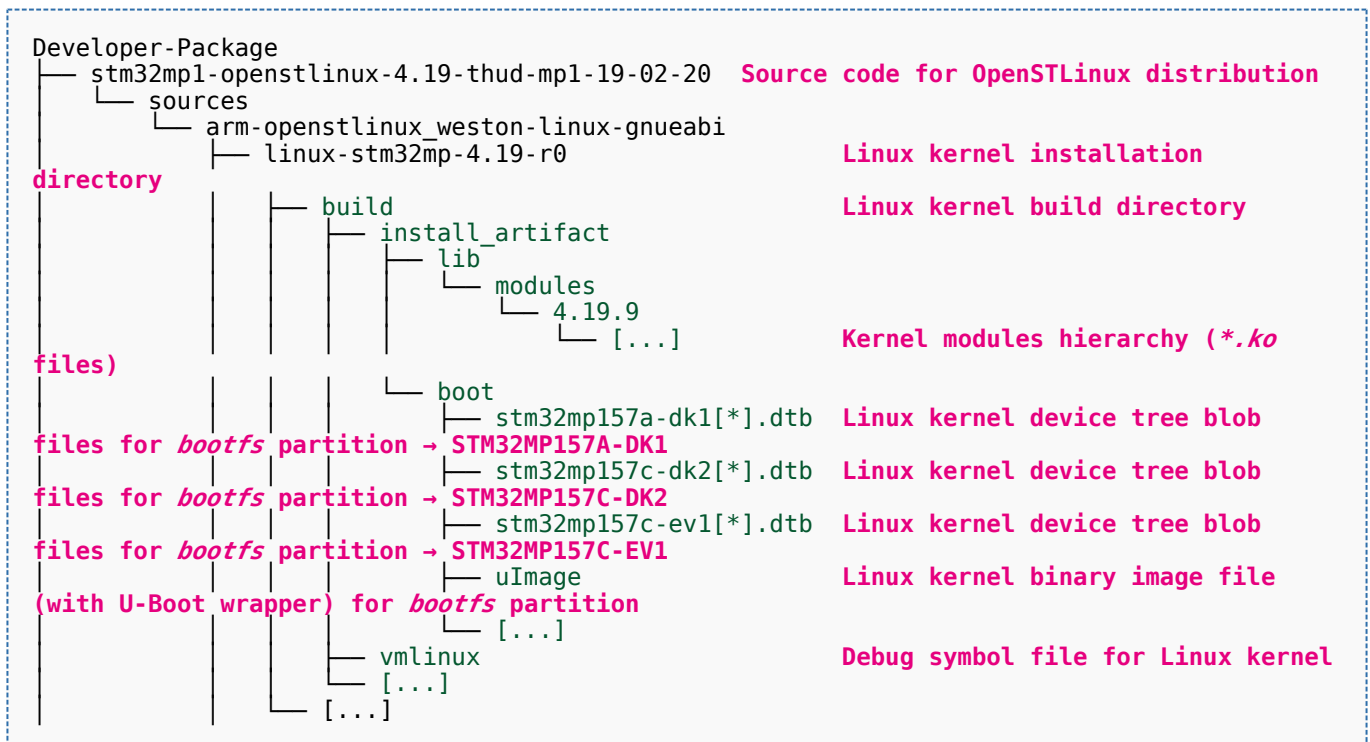


Appendix B shows the structure of the build directory.



6 Appendix A: directory structure after build (Developer Package)

Provided you have followed the recommendations of the *README.HOW_TO.txt* helper files to build the Linux kernel, the U-Boot and the TF-A, then the following new directories and files contain the build outputs.





Example of directory structure for Packages

partition (trusted boot chain), with OP-TEE OS → STM32MP157C-EV1	tf-a-stm32mp157c-ev1-optee.stm32	TF-A binary for <i>FSBL</i>
	[...]	
	trusted	TF-A, without OP-TEE OS
A → trusted boot firmware stage	tf-a-bl2-trusted.elf	Debug symbol file for TF-
A → trusted boot firmware stage	tf-a-bl32-trusted.elf	Debug symbol file for TF-
partition (trusted boot chain) → STM32MP157A-DK1	tf-a-stm32mp157a-dk1-trusted.stm32	TF-A binary for <i>FSBL</i>
partition (trusted boot chain) → STM32MP157C-DK2	tf-a-stm32mp157c-dk2-trusted.stm32	TF-A binary for <i>FSBL</i>
partition (trusted boot chain) → STM32MP157C-EV1	tf-a-stm32mp157c-ev1-trusted.stm32	TF-A binary for <i>FSBL</i>
	[...]	
	[...]	

directory	u-boot-stm32mp-2018.11-r0	U-Boot installation
for basic boot chain	build-basic	U-Boot build directory
partition (basic boot chain) → STM32MP157A-DK1	u-boot-spl.stm32-stm32mp157a-dk1-basic	U-Boot binary for <i>FSBL</i>
partition (basic boot chain) → STM32MP157C-DK2	u-boot-spl.stm32-stm32mp157c-dk2-basic	U-Boot binary for <i>FSBL</i>
partition (basic boot chain) → STM32MP157C-EV1	u-boot-spl.stm32-stm32mp157c-ev1-basic	U-Boot binary for <i>FSBL</i>
partition (basic boot chain) → STM32MP157A-DK1	u-boot-stm32mp157a-dk1-basic.img	U-Boot binary for <i>SSBL</i>
partition (basic boot chain) → STM32MP157C-DK2	u-boot-stm32mp157c-dk2-basic.img	U-Boot binary for <i>SSBL</i>
partition (basic boot chain) → STM32MP157C-EV1	u-boot-stm32mp157c-ev1-basic.img	U-Boot binary for <i>SSBL</i>
for trusted boot chain, with OP-TEE OS	build-optee	U-Boot build directory
Boot, with OP-TEE OS → STM32MP157A-DK1	u-boot-stm32mp157a-dk1-optee.elf	Debug symbol file for U-
partition (trusted boot chain), with OP-TEE OS → STM32MP157A-DK1	u-boot-stm32mp157a-dk1-optee.stm32	U-Boot binary for <i>SSBL</i>
Boot, with OP-TEE OS → STM32MP157C-DK2	u-boot-stm32mp157c-dk2-optee.elf	Debug symbol file for U-
partition (trusted boot chain), with OP-TEE OS → STM32MP157C-DK2	u-boot-stm32mp157c-dk2-optee.stm32	U-Boot binary for <i>SSBL</i>
Boot, with OP-TEE OS → STM32MP157C-EV1	u-boot-stm32mp157c-ev1-optee.elf	Debug symbol file for U-
partition (trusted boot chain), with OP-TEE OS → STM32MP157C-EV1	u-boot-stm32mp157c-ev1-optee.stm32	U-Boot binary for <i>SSBL</i>
	[...]	
for trusted boot chain	build-trusted	U-Boot build directory
Boot → STM32MP157A-DK1	u-boot-stm32mp157a-dk1-trusted.elf	Debug symbol file for U-
partition (trusted boot chain) → STM32MP157A-DK1	u-boot-stm32mp157a-dk1-trusted.stm32	U-Boot binary for <i>SSBL</i>
Boot → STM32MP157C-DK2	u-boot-stm32mp157c-dk2-trusted.elf	Debug symbol file for U-
partition (trusted boot chain) → STM32MP157C-DK2	u-boot-stm32mp157c-dk2-trusted.stm32	U-Boot binary for <i>SSBL</i>
Boot → STM32MP157C-EV1	u-boot-stm32mp157c-ev1-trusted.elf	Debug symbol file for U-
partition (trusted boot chain) → STM32MP157C-EV1	u-boot-stm32mp157c-ev1-trusted.stm32	U-Boot binary for <i>SSBL</i>
	[...]	
	[...]	



Example of directory structure for Packages



7 Appendix B: directory structure after build (Distribution Package)

Provided you have followed the build method explained in OpenSTLinux distribution, then the following new directories contain the build outputs.

As long as you did not modify the source code:

- the files in **STPurple** are the same as the ones available in the **Starter Package**: flash layout, binaries for *bootfs*, *rootfs*, *userfs* and *vendorfs* partitions
- the files in grey are the same as the ones available in the **Starter and Developer Packages**: binaries for *FSBL* and *SSBL* partitions, and for OP-TEE OS runtime services
- the files in **orange** are the same as the ones available in the **Developer Package**: Linux kernel image and device tree blobs, and debug symbol files

```
Distribution-Package/openstlinux-4.19-thud-mp1-19-02-20 /build-openstlinuxweston-stm32mp/t
mp-glibc/deploy
├── images
│   └── stm32mp1
│       ├── flashlayout_st-image-weston                               Flash layout
│       └── files (description of the partitions) for the supported flash devices
│           ├── FlashLayout_emmc_stm32mp157c-ev1-optee.tsv           Flash layout file
│           ├── for eMMC and trusted boot chain, with OP-TEE OS → STM32MP157C-EV1
│           ├── FlashLayout_emmc_stm32mp157c-ev1-trusted.tsv       Flash layout file
│           ├── for eMMC and trusted boot chain → STM32MP157C-EV1
│           ├── FlashLayout_nand-4-256_stm32mp157c-ev1-optee.tsv   Flash layout file
│           ├── for NAND Flash and trusted boot chain, with OP-TEE OS → STM32MP157C-EV1
│           ├── FlashLayout_nand-4-256_stm32mp157c-ev1-trusted.tsv Flash layout file
│           ├── for NAND Flash and trusted boot chain → STM32MP157C-EV1
│           ├── FlashLayout_nor-emmc_stm32mp157c-ev1-optee.tsv     Flash layout file
│           ├── for NOR Flash (and eMMC) and trusted boot chain, with OP-TEE OS → STM32MP157C-EV1
│           ├── FlashLayout_nor-emmc_stm32mp157c-ev1-trusted.tsv   Flash layout file
│           ├── for NOR Flash (and eMMC) and trusted boot chain → STM32MP157C-EV1
│           ├── FlashLayout_nor-nand-4-256_stm32mp157c-ev1-optee.tsv Flash layout file
│           ├── for NOR Flash (and NAND Flash) and trusted boot chain, with OP-TEE OS → STM32MP157C-EV1
│           ├── FlashLayout_nor-nand-4-256_stm32mp157c-ev1-trusted.tsv Flash layout file
│           ├── for NOR Flash (and NAND Flash) and trusted boot chain → STM32MP157C-EV1
│           ├── FlashLayout_nor-sdcard_stm32mp157c-ev1-optee.tsv    Flash layout file
│           ├── for NOR Flash (and microSD card) and trusted boot chain, with OP-TEE OS → STM32MP157C-EV1
│           ├── FlashLayout_nor-sdcard_stm32mp157c-ev1-trusted.tsv  Flash layout file
│           ├── for NOR Flash (and microSD card) and trusted boot chain → STM32MP157C-EV1
│           ├── FlashLayout_sdcard_stm32mp157a-dk1-basic.tsv        Flash layout file
│           ├── for microSD card and basic boot chain → STM32MP157A-DK1
│           ├── FlashLayout_sdcard_stm32mp157a-dk1-optee.tsv        Flash layout file
│           ├── for microSD card and trusted boot chain, with OP-TEE OS → STM32MP157A-DK1
│           ├── FlashLayout_sdcard_stm32mp157a-dk1-trusted.tsv      Flash layout file
│           ├── for microSD card and trusted boot chain (recommended setup) → STM32MP157A-DK1
│           ├── FlashLayout_sdcard_stm32mp157c-dk2-basic.tsv        Flash layout file
│           ├── for microSD card and basic boot chain → STM32MP157C-DK2
│           ├── FlashLayout_sdcard_stm32mp157c-dk2-optee.tsv        Flash layout file
│           ├── for microSD card and trusted boot chain, with OP-TEE OS → STM32MP157C-DK2
│           ├── FlashLayout_sdcard_stm32mp157c-dk2-trusted.tsv      Flash layout file
│           ├── for microSD card and trusted boot chain (recommended setup) → STM32MP157C-DK2
│           ├── FlashLayout_sdcard_stm32mp157c-ev1-basic.tsv        Flash layout file
│           ├── for microSD card and basic boot chain → STM32MP157C-EV1
│           └── FlashLayout_sdcard_stm32mp157c-ev1-optee.tsv        Flash layout file
```



Example of directory structure for Packages

```

for microSD card and trusted boot chain, with OP-TEE OS → STM32MP157C-EV1
├── FlashLayout_sdcard_stm32mp157c-ev1-trusted.tsv      Flash layout file
for microSD card and trusted boot chain (recommended setup) → STM32MP157C-EV1
├── [...]
├── scripts
└── create_sdcard_from_flashlayout.sh

```

```

partition └── st-image-bootfs-openstlinux-weston-stm32mp1.ext4      Binary for bootfs
partition └── st-image-userfs-openstlinux-weston-stm32mp1.ext4     Binary for userfs
s partition └── st-image-vendorfs-openstlinux-weston-stm32mp1.ext4 Binary for vendorfs
partition └── st-image-weston-openstlinux-weston-stm32mp1.ext4     Binary for rootfs
device tree blob files for bootfs partition → STM32MP157A-DK1
├── stm32mp157a-dk1[*].dtb                                           Linux kernel
device tree blob files for bootfs partition → STM32MP157C-DK2
├── stm32mp157c-dk2[*].dtb                                           Linux kernel
device tree blob files for bootfs partition → STM32MP157C-EV1
├── stm32mp157c-e[*].dtb                                             Linux kernel
TEE OS runtime services (trusted boot chain) → STM32MP157A-DK1
├── tee-[header/pageable/pager]_v2-stm32mp157a-dk1-optee.stm32     Binaries for OP-
TEE OS runtime services (trusted boot chain) → STM32MP157C-DK2
├── tee-[header/pageable/pager]_v2-stm32mp157c-dk2-optee.stm32     Binaries for OP-
TEE OS runtime services (trusted boot chain) → STM32MP157C-EV1
├── tee-[header/pageable/pager]_v2-stm32mp157c-ev1-optee.stm32     Binaries for OP-
for TF-A, with OP-TEE OS → trusted boot firmware stage
├── tf-a-bl2-optee.elf                                               Debug symbol file
for TF-A → trusted boot firmware stage
├── tf-a-bl2-trusted.elf                                             Debug symbol file
for TF-A → runtime software stage
├── tf-a-bl32-trusted.elf                                            Debug symbol file
BL partition (trusted boot chain), with OP-TEE OS → STM32MP157A-DK1
├── tf-a-stm32mp157a-dk1-trusted.stm32                               TF-A binary for FS
BL partition (trusted boot chain) → STM32MP157A-DK1
├── tf-a-stm32mp157a-dk1-optee.stm32                                TF-A binary for FS
BL partition (trusted boot chain), with OP-TEE OS → STM32MP157C-DK2
├── tf-a-stm32mp157c-dk2-trusted.stm32                               TF-A binary for FS
BL partition (trusted boot chain) → STM32MP157C-DK2
├── tf-a-stm32mp157c-dk2-optee.stm32                                TF-A binary for FS
BL partition (trusted boot chain), with OP-TEE OS → STM32MP157C-EV1
├── tf-a-stm32mp157c-ev1-trusted.stm32                               TF-A binary for FS
BL partition (trusted boot chain) → STM32MP157C-EV1
├── tf-a-stm32mp157c-ev1-optee.stm32                                TF-A binary for FS
FSBL partition (basic boot chain) → STM32MP157A-DK1
├── u-boot-spl.stm32-stm32mp157a-dk1-basic                           U-Boot binary for
FSBL partition (basic boot chain) → STM32MP157C-DK2
├── u-boot-spl.stm32-stm32mp157c-dk2-basic                           U-Boot binary for
FSBL partition (basic boot chain) → STM32MP157C-EV1
├── u-boot-spl.stm32-stm32mp157c-ev1-basic                           U-Boot binary for
SSBL partition (basic boot chain) → STM32MP157A-DK1
├── u-boot-stm32mp157a-dk1-basic.img                                  U-Boot binary for
for U-Boot, with OP-TEE OS → STM32MP157A-DK1
├── u-boot-stm32mp157a-dk1-optee.elf                                Debug symbol file
for U-Boot → STM32MP157A-DK1
├── u-boot-stm32mp157a-dk1-trusted.stm32                             U-Boot binary for
SSBL partition (trusted boot chain), with OP-TEE OS → STM32MP157A-DK1
├── u-boot-stm32mp157a-dk1-trusted.elf                               Debug symbol file
for U-Boot → STM32MP157A-DK1
├── u-boot-stm32mp157a-dk1-optee.stm32                               U-Boot binary for
SSBL partition (trusted boot chain) → STM32MP157A-DK1
├── u-boot-stm32mp157a-dk1-trusted.stm32                             U-Boot binary for
SSBL partition (basic boot chain) → STM32MP157C-DK2
├── u-boot-stm32mp157c-dk2-basic.img                                  U-Boot binary for
├── u-boot-stm32mp157c-dk2-optee.elf                                Debug symbol file

```




Example of directory structure for Packages

```

for U-Boot, with OP-TEE OS → STM32MP157C-DK2
├── u-boot-stm32mp157c-dk2-optee.stm32          U-Boot binary for
SSBL partition (trusted boot chain), with OP-TEE OS → STM32MP157C-DK2
├── u-boot-stm32mp157c-dk2-trusted.elf        Debug symbol file
for U-Boot → STM32MP157C-DK2
├── u-boot-stm32mp157c-dk2-trusted.stm32      U-Boot binary for
SSBL partition (trusted boot chain) → STM32MP157C-DK2
├── u-boot-stm32mp157c-ev1-basic.img          U-Boot binary for
SSBL partition (basic boot chain) → STM32MP157C-EV1
├── u-boot-stm32mp157c-ev1-optee.elf         Debug symbol file
for U-Boot, with OP-TEE OS → STM32MP157C-EV1
├── u-boot-stm32mp157c-ev1-optee.stm32       U-Boot binary for
SSBL partition (trusted boot chain), with OP-TEE OS → STM32MP157C-EV1
├── u-boot-stm32mp157c-ev1-trusted.elf       Debug symbol file
for U-Boot → STM32MP157C-EV1
├── u-boot-stm32mp157c-ev1-trusted.stm32     U-Boot binary for
SSBL partition (trusted boot chain) → STM32MP157C-EV1
├── uImage                                    Linux kernel
binary image file (with U-Boot wrapper) for bootfs partition
├── vmlinux                                   Debug symbol file
for Linux kernel
├── [...]
└── [...]

```

Das U-Boot -- the Universal Boot Loader (see [U-Boot_overview](#))