



STM32MPU Embedded Software architecture overview



Contents

1. STM32MPU Embedded Software architecture overview	3
2. Boot chains overview	7
3. Coprocessor management overview	11
4. OP-TEE overview	15
5. STM32MP1 Distribution Package	19
6. STM32MPU Embedded Software distribution	23
7. TF-A overview	27
8. U-Boot overview	31



CLASSIFICATION: PUBLIC / REVISION: 10/10/2019 / 1.000

A quality version of this page, accepted on *15 October 2019*, was based off this revision.

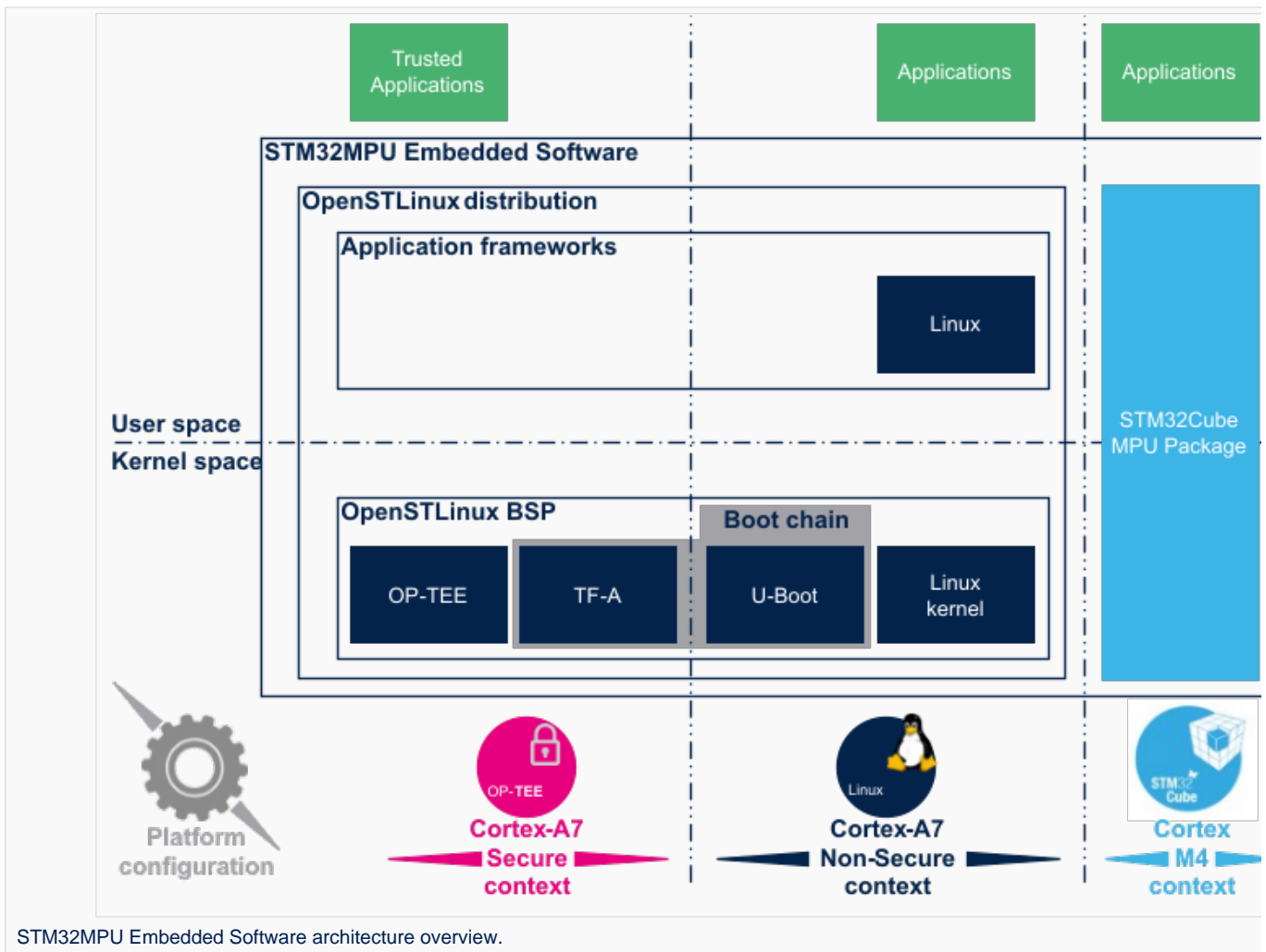


1 STM32MPU Embedded Software overview

The diagram below shows STM32MPU Embedded Software distribution main components:

- The **OpenSTLinux distribution**, running on the Arm[®]Cortex[®]-A, including:
 - The **OpenSTLinux BSP** with:
 - The **boot chain** based on TF-A and U-Boot.
 - The **OP-TEE** secure OS running on the Arm[®]Cortex[®]-A in secure mode.
 - The **Linux[®] kernel** running on the Arm[®]Cortex[®]-A in non-secure mode.
 - The **application frameworks** are composed of middlewares relying on the BSP and providing API:
 - on the **OP-TEE** side to run **Trusted Applications (TA)** that allow to manipulate secrets (not visible from the Linux and STM32Cube MPU Package)
 - on the **Linux** side to run **Applications** that typically interact with the user via the display, the touchscreen, etc.
- The **STM32Cube MPU Package** is running on the Arm[®]Cortex[®]-M: it is based on HAL drivers and middlewares, like other STM32 microcontrollers, completed with coprocessor management.

The figure below is clickable so that the user can directly jump to one of the sub-levels listed above.



STM32MPU Embedded Software architecture overview.





2 Open Source Software (OSS) philosophy

The **Open source software** source code is released under a license in which the copyright holder grants users the rights to study, change and distribute the software to anyone and for any purpose^[1].

STMicroelectronics maximizes the using of open source software and contributes to those communities. Notice that, due to the software review life cycle, it can take some time before getting all developments accepted in the communities, so

STMicroelectronics can also temporarily provide some source code on github^[2], until it is merged in the targeted repository.



3 References

- https://en.wikipedia.org/wiki/Open-source_software
- STM32MP1 Distribution Package

Arm[®] is a registered trademark of Arm Limited (or its subsidiaries) in the US and/or elsewhere.



Cortex[®]

Board support package

Operating System

Linux[®] is a registered trademark of Linus Torvalds.

Application programming interface

Open Portable Trusted Execution Environment

Trusted Application

Microprocessor Unit

Hardware Abstraction Layer

Open Source Software

Stable: 25.09.2020 - 08:36 / Revision: 25.09.2020 - 08:35

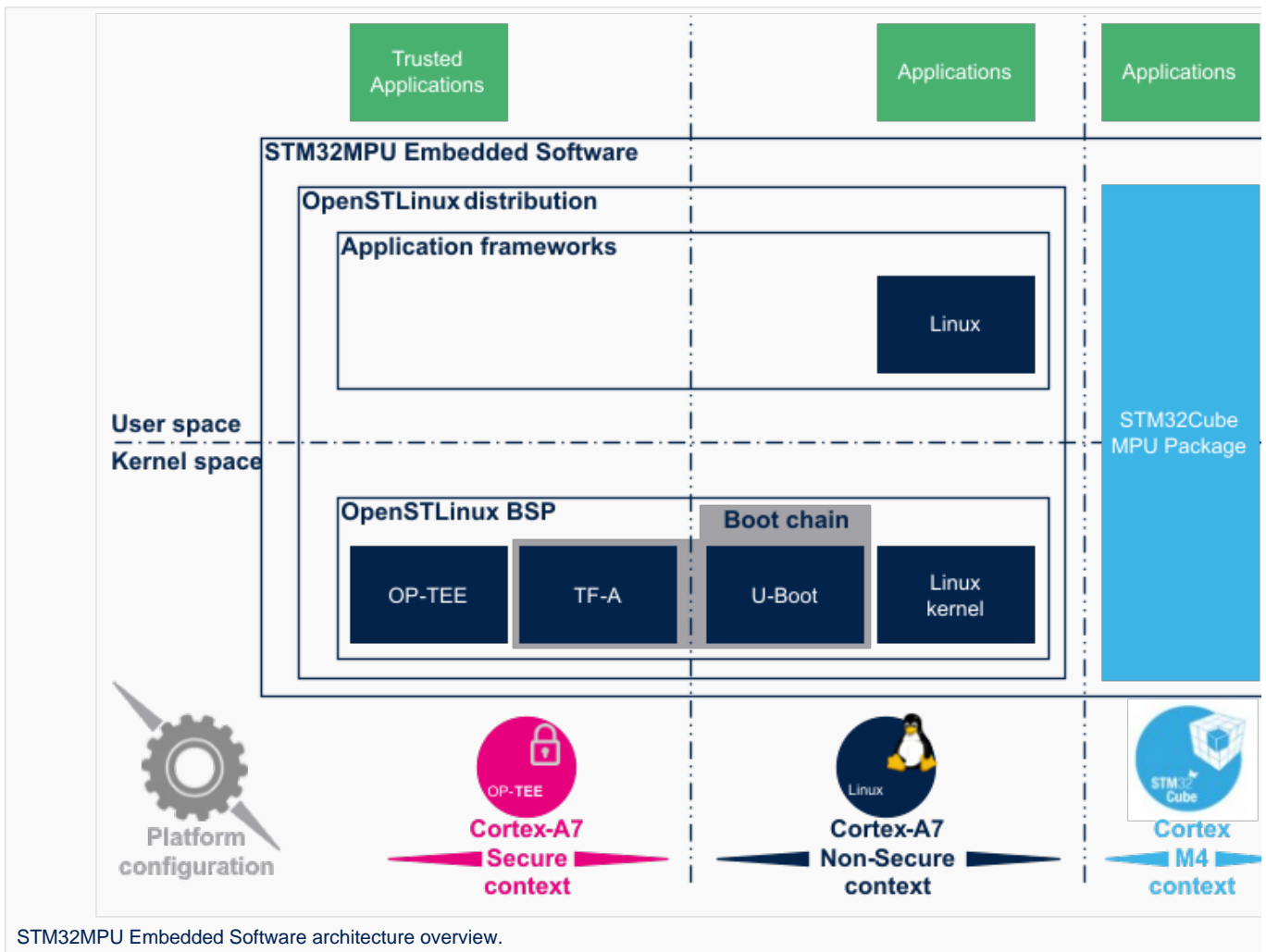


1 STM32MPU Embedded Software overview

The diagram below shows STM32MPU Embedded Software distribution main components:

- The **OpenSTLinux distribution**, running on the Arm[®]Cortex[®]-A, including:
 - The **OpenSTLinux BSP** with:
 - The **boot chain** based on TF-A and U-Boot.
 - The **OP-TEE** secure OS running on the Arm[®]Cortex[®]-A in secure mode.
 - The **Linux[®] kernel** running on the Arm[®]Cortex[®]-A in non-secure mode.
 - The **application frameworks** are composed of middlewares relying on the BSP and providing API:
 - on the **OP-TEE** side to run **Trusted Applications (TA)** that allow to manipulate secrets (not visible from the Linux and STM32Cube MPU Package)
 - on the **Linux** side to run **Applications** that typically interact with the user via the display, the touchscreen, etc.
- The **STM32Cube MPU Package** is running on the Arm[®]Cortex[®]-M: it is based on HAL drivers and middlewares, like other STM32 microcontrollers, completed with coprocessor management.

The figure below is clickable so that the user can directly jump to one of the sub-levels listed above.



STM32MPU Embedded Software architecture overview.





2 Open Source Software (OSS) philosophy

The **Open source software** source code is released under a license in which the copyright holder grants users the rights to study, change and distribute the software to anyone and for any purpose^[1].

STMicroelectronics maximizes the using of open source software and contributes to those communities. Notice that, due to the software review life cycle, it can take some time before getting all developments accepted in the communities, so

STMicroelectronics can also temporarily provide some source code on github^[2], until it is merged in the targeted repository.



3 References

- https://en.wikipedia.org/wiki/Open-source_software
- STM32MP1 Distribution Package

Arm® is a registered trademark of Arm Limited (or its subsidiaries) in the US and/or elsewhere.



Cortex®

Board support package

Operating System

Linux® is a registered trademark of Linus Torvalds.

Application programming interface

Open Portable Trusted Execution Environment

Trusted Application

Microprocessor Unit

Hardware Abstraction Layer

Open Source Software

Stable: 08.03.2021 - 16:07 / Revision: 16.02.2021 - 17:01

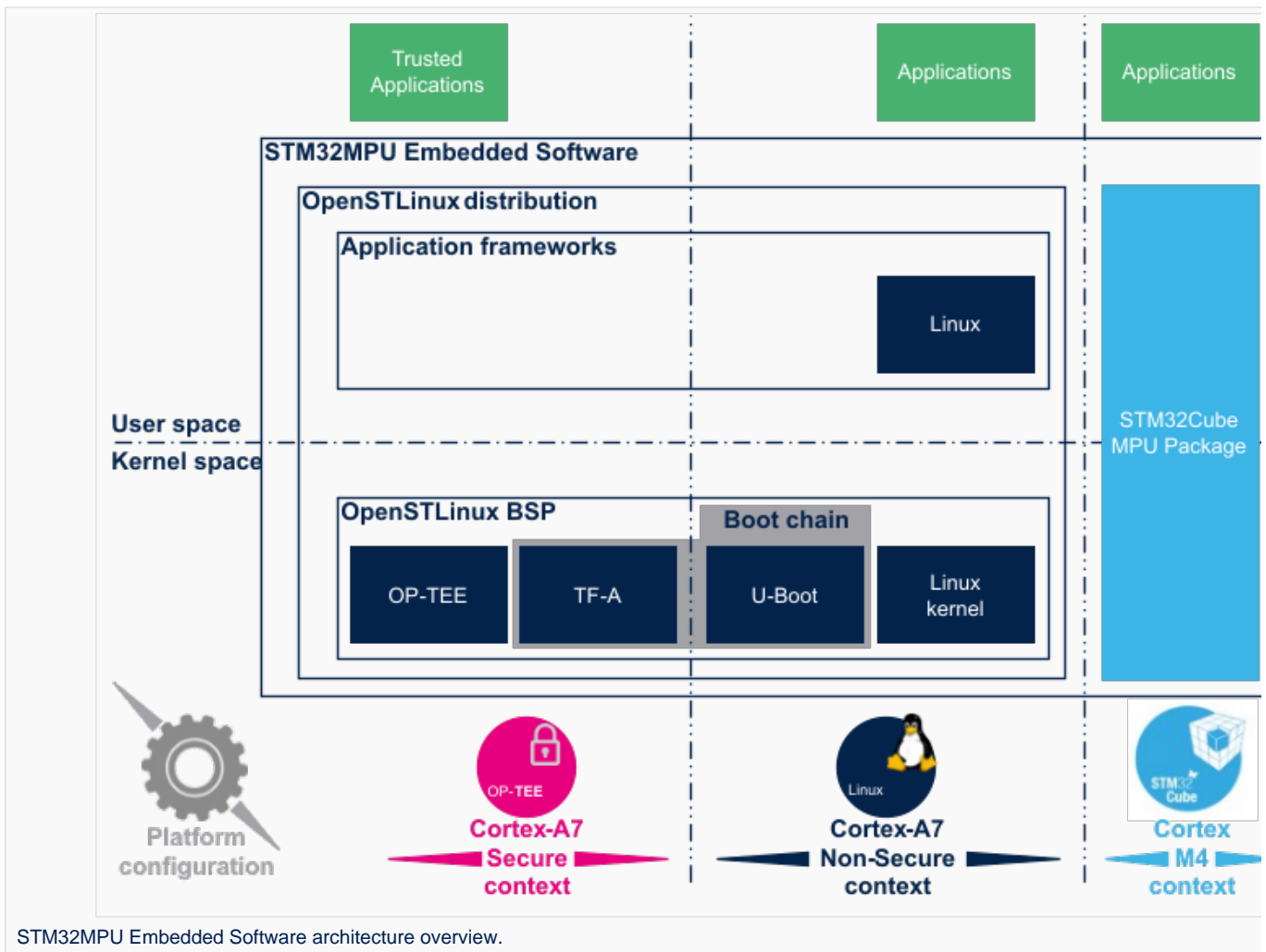


1 STM32MPU Embedded Software overview

The diagram below shows STM32MPU Embedded Software distribution main components:

- The **OpenSTLinux distribution**, running on the Arm®Cortex®-A, including:
 - The **OpenSTLinux BSP** with:
 - The **boot chain** based on TF-A and U-Boot.
 - The **OP-TEE** secure OS running on the Arm®Cortex®-A in secure mode.
 - The **Linux® kernel** running on the Arm®Cortex®-A in non-secure mode.
 - The **application frameworks** are composed of middlewares relying on the BSP and providing API:
 - on the **OP-TEE** side to run **Trusted Applications (TA)** that allow to manipulate secrets (not visible from the Linux and STM32Cube MPU Package)
 - on the **Linux** side to run **Applications** that typically interact with the user via the display, the touchscreen, etc.
- The **STM32Cube MPU Package** is running on the Arm®Cortex®-M: it is based on HAL drivers and middlewares, like other STM32 microcontrollers, completed with coprocessor management.

The figure below is clickable so that the user can directly jump to one of the sub-levels listed above.







2 Open Source Software (OSS) philosophy

The **Open source software** source code is released under a license in which the copyright holder grants users the rights to study, change and distribute the software to anyone and for any purpose^[1].

STMicroelectronics maximizes the using of open source software and contributes to those communities. Notice that, due to the software review life cycle, it can take some time before getting all developments accepted in the communities, so

STMicroelectronics can also temporarily provide some source code on github^[2], until it is merged in the targeted repository.



3 References

- https://en.wikipedia.org/wiki/Open-source_software
- STM32MP1 Distribution Package

Arm[®] is a registered trademark of Arm Limited (or its subsidiaries) in the US and/or elsewhere.



Cortex[®]

Board support package

Operating System

Linux[®] is a registered trademark of Linus Torvalds.

Application programming interface

Open Portable Trusted Execution Environment

Trusted Application

Microprocessor Unit

Hardware Abstraction Layer

Open Source Software

Stable: 13.05.2020 - 08:56 / Revision: 13.05.2020 - 08:54

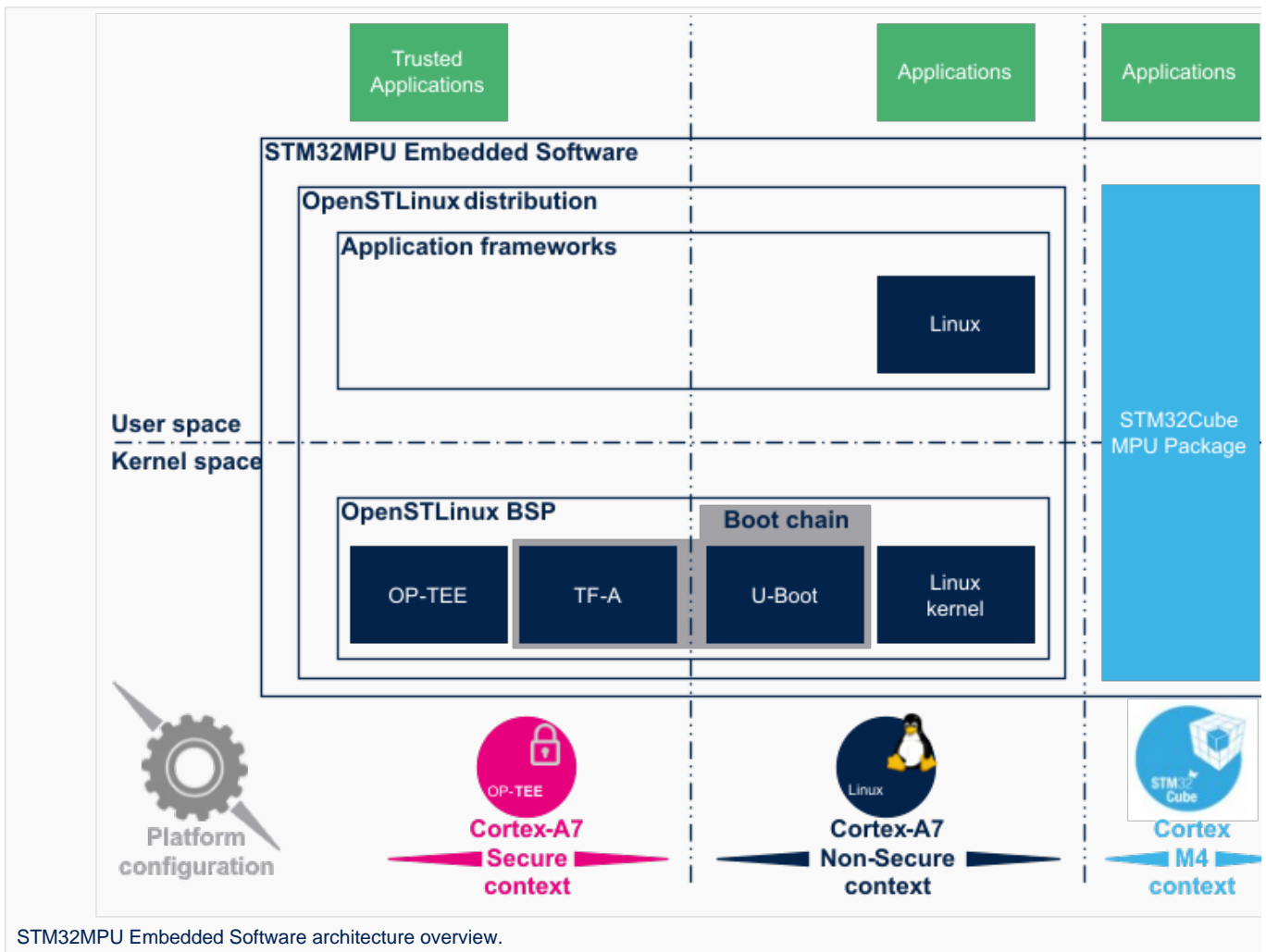


1 STM32MPU Embedded Software overview

The diagram below shows STM32MPU Embedded Software distribution main components:

- The **OpenSTLinux distribution**, running on the Arm®Cortex®-A, including:
 - The **OpenSTLinux BSP** with:
 - The **boot chain** based on TF-A and U-Boot.
 - The **OP-TEE** secure OS running on the Arm®Cortex®-A in secure mode.
 - The **Linux® kernel** running on the Arm®Cortex®-A in non-secure mode.
 - The **application frameworks** are composed of middlewares relying on the BSP and providing API:
 - on the **OP-TEE** side to run **Trusted Applications (TA)** that allow to manipulate secrets (not visible from the Linux and STM32Cube MPU Package)
 - on the **Linux** side to run **Applications** that typically interact with the user via the display, the touchscreen, etc.
- The **STM32Cube MPU Package** is running on the Arm®Cortex®-M: it is based on HAL drivers and middlewares, like other STM32 microcontrollers, completed with coprocessor management.

The figure below is clickable so that the user can directly jump to one of the sub-levels listed above.



STM32MPU Embedded Software architecture overview.





2 Open Source Software (OSS) philosophy

The **Open source software** source code is released under a license in which the copyright holder grants users the rights to study, change and distribute the software to anyone and for any purpose^[1].

STMicroelectronics maximizes the using of open source software and contributes to those communities. Notice that, due to the software review life cycle, it can take some time before getting all developments accepted in the communities, so

STMicroelectronics can also temporarily provide some source code on github^[2], until it is merged in the targeted repository.



3 References

- https://en.wikipedia.org/wiki/Open-source_software
- STM32MP1 Distribution Package

Arm® is a registered trademark of Arm Limited (or its subsidiaries) in the US and/or elsewhere.



Cortex®

Board support package

Operating System

Linux® is a registered trademark of Linus Torvalds.

Application programming interface

Open Portable Trusted Execution Environment

Trusted Application

Microprocessor Unit

Hardware Abstraction Layer

Open Source Software

Stable: 31.03.2021 - 16:46 / Revision: 31.03.2021 - 14:46

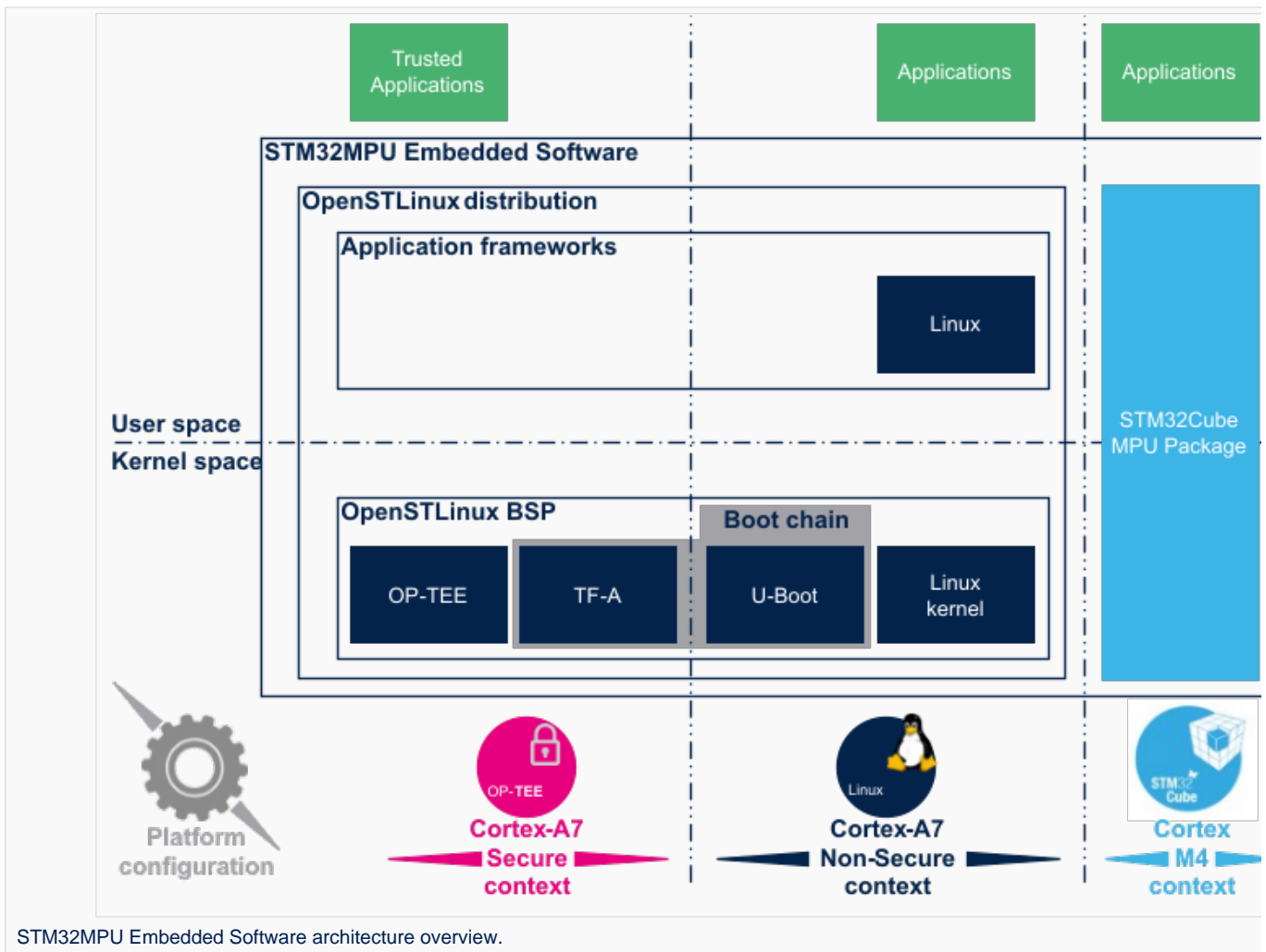


1 STM32MPU Embedded Software overview

The diagram below shows STM32MPU Embedded Software distribution main components:

- The **OpenSTLinux distribution**, running on the Arm®Cortex®-A, including:
 - The **OpenSTLinux BSP** with:
 - The **boot chain** based on TF-A and U-Boot.
 - The **OP-TEE** secure OS running on the Arm®Cortex®-A in secure mode.
 - The **Linux® kernel** running on the Arm®Cortex®-A in non-secure mode.
 - The **application frameworks** are composed of middlewares relying on the BSP and providing API:
 - on the **OP-TEE** side to run **Trusted Applications (TA)** that allow to manipulate secrets (not visible from the Linux and STM32Cube MPU Package)
 - on the **Linux** side to run **Applications** that typically interact with the user via the display, the touchscreen, etc.
- The **STM32Cube MPU Package** is running on the Arm®Cortex®-M: it is based on HAL drivers and middlewares, like other STM32 microcontrollers, completed with coprocessor management.

The figure below is clickable so that the user can directly jump to one of the sub-levels listed above.







2 Open Source Software (OSS) philosophy

The **Open source software** source code is released under a license in which the copyright holder grants users the rights to study, change and distribute the software to anyone and for any purpose^[1].

STMicroelectronics maximizes the using of open source software and contributes to those communities. Notice that, due to the software review life cycle, it can take some time before getting all developments accepted in the communities, so

STMicroelectronics can also temporarily provide some source code on github^[2], until it is merged in the targeted repository.



3 References

- https://en.wikipedia.org/wiki/Open-source_software
- STM32MP1 Distribution Package

Arm® is a registered trademark of Arm Limited (or its subsidiaries) in the US and/or elsewhere.



Cortex®

Board support package

Operating System

Linux® is a registered trademark of Linus Torvalds.

Application programming interface

Open Portable Trusted Execution Environment

Trusted Application

Microprocessor Unit

Hardware Abstraction Layer

Open Source Software

Stable: 15.04.2020 - 14:24 / Revision: 15.04.2020 - 14:21

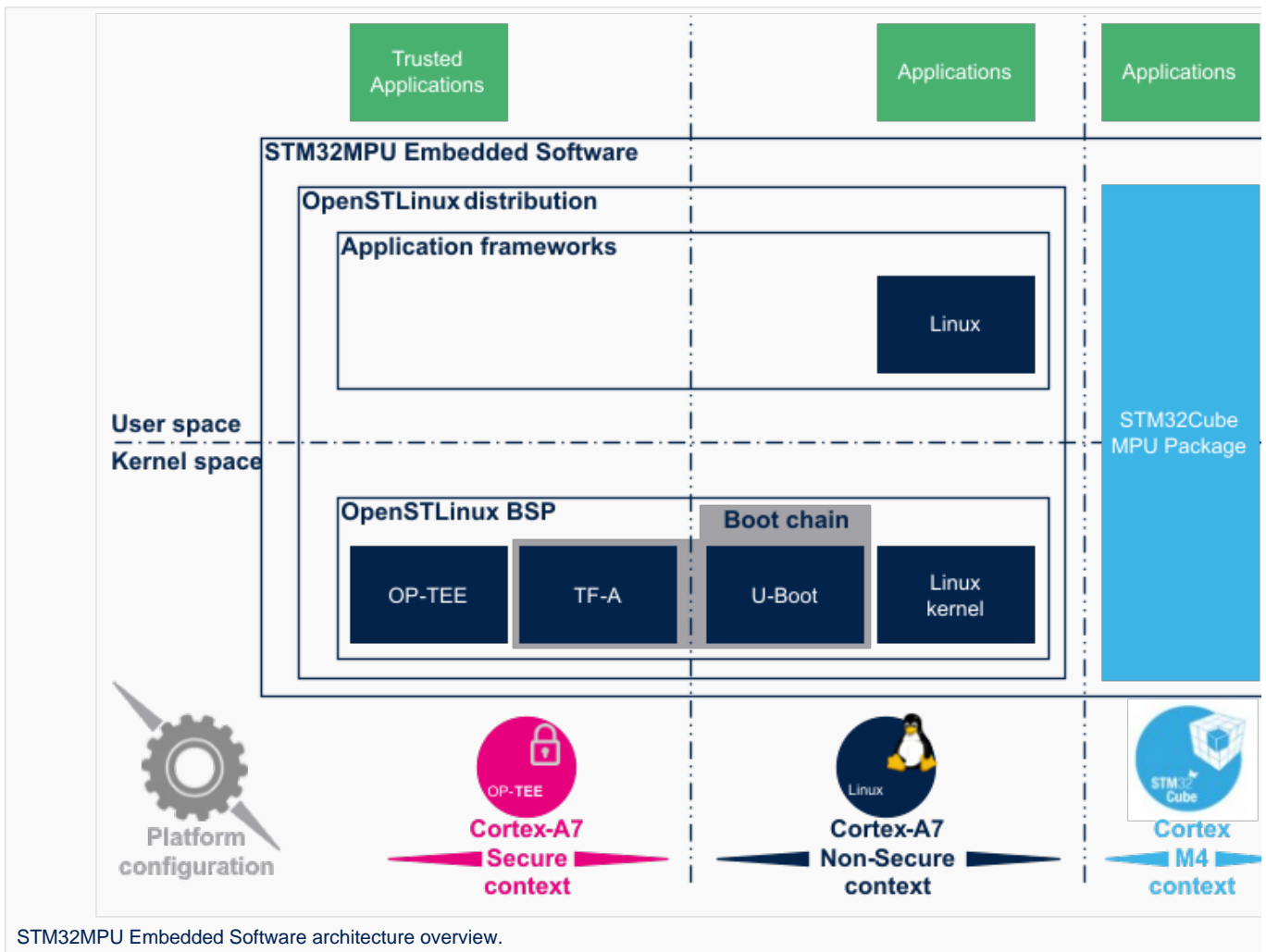


1 STM32MPU Embedded Software overview

The diagram below shows STM32MPU Embedded Software distribution main components:

- The **OpenSTLinux distribution**, running on the Arm[®]Cortex[®]-A, including:
 - The **OpenSTLinux BSP** with:
 - The **boot chain** based on TF-A and U-Boot.
 - The **OP-TEE** secure OS running on the Arm[®]Cortex[®]-A in secure mode.
 - The **Linux[®] kernel** running on the Arm[®]Cortex[®]-A in non-secure mode.
 - The **application frameworks** are composed of middlewares relying on the BSP and providing API:
 - on the **OP-TEE** side to run **Trusted Applications (TA)** that allow to manipulate secrets (not visible from the Linux and STM32Cube MPU Package)
 - on the **Linux** side to run **Applications** that typically interact with the user via the display, the touchscreen, etc.
- The **STM32Cube MPU Package** is running on the Arm[®]Cortex[®]-M: it is based on HAL drivers and middlewares, like other STM32 microcontrollers, completed with coprocessor management.

The figure below is clickable so that the user can directly jump to one of the sub-levels listed above.







2 Open Source Software (OSS) philosophy

The **Open source software** source code is released under a license in which the copyright holder grants users the rights to study, change and distribute the software to anyone and for any purpose^[1].

STMicroelectronics maximizes the using of open source software and contributes to those communities. Notice that, due to the software review life cycle, it can take some time before getting all developments accepted in the communities, so

STMicroelectronics can also temporarily provide some source code on github^[2], until it is merged in the targeted repository.



3 References

- https://en.wikipedia.org/wiki/Open-source_software
- STM32MP1 Distribution Package

Arm® is a registered trademark of Arm Limited (or its subsidiaries) in the US and/or elsewhere.



Cortex®

Board support package

Operating System

Linux® is a registered trademark of Linus Torvalds.

Application programming interface

Open Portable Trusted Execution Environment

Trusted Application

Microprocessor Unit

Hardware Abstraction Layer

Open Source Software

Stable: 22.04.2021 - 11:23 / Revision: 09.04.2021 - 13:17

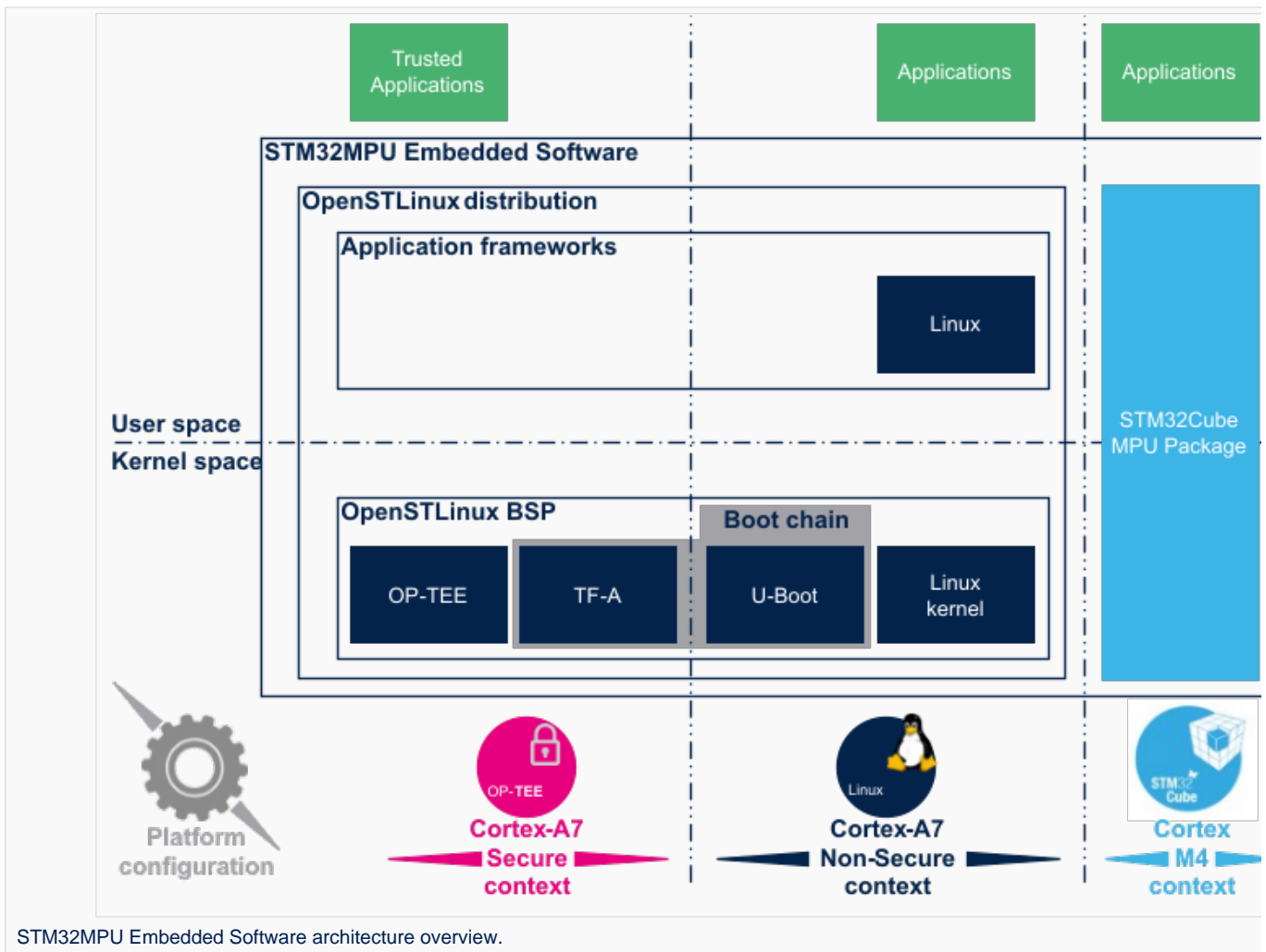


1 STM32MPU Embedded Software overview

The diagram below shows STM32MPU Embedded Software distribution main components:

- The **OpenSTLinux distribution**, running on the Arm[®]Cortex[®]-A, including:
 - The **OpenSTLinux BSP** with:
 - The **boot chain** based on TF-A and U-Boot.
 - The **OP-TEE** secure OS running on the Arm[®]Cortex[®]-A in secure mode.
 - The **Linux[®] kernel** running on the Arm[®]Cortex[®]-A in non-secure mode.
 - The **application frameworks** are composed of middlewares relying on the BSP and providing API:
 - on the **OP-TEE** side to run **Trusted Applications (TA)** that allow to manipulate secrets (not visible from the Linux and STM32Cube MPU Package)
 - on the **Linux** side to run **Applications** that typically interact with the user via the display, the touchscreen, etc.
- The **STM32Cube MPU Package** is running on the Arm[®]Cortex[®]-M: it is based on HAL drivers and middlewares, like other STM32 microcontrollers, completed with coprocessor management.

The figure below is clickable so that the user can directly jump to one of the sub-levels listed above.



STM32MPU Embedded Software architecture overview.





2 Open Source Software (OSS) philosophy

The **Open source software** source code is released under a license in which the copyright holder grants users the rights to study, change and distribute the software to anyone and for any purpose^[1].

STMicroelectronics maximizes the using of open source software and contributes to those communities. Notice that, due to the software review life cycle, it can take some time before getting all developments accepted in the communities, so

STMicroelectronics can also temporarily provide some source code on github^[2], until it is merged in the targeted repository.



3 References

- https://en.wikipedia.org/wiki/Open-source_software
- STM32MP1 Distribution Package

Arm[®] is a registered trademark of Arm Limited (or its subsidiaries) in the US and/or elsewhere.



Cortex[®]

Board support package

Operating System

Linux[®] is a registered trademark of Linus Torvalds.

Application programming interface

Open Portable Trusted Execution Environment

Trusted Application

Microprocessor Unit

Hardware Abstraction Layer

Open Source Software

Stable: **Not stable** 7 Revision: 22.09.2021 - 06:38

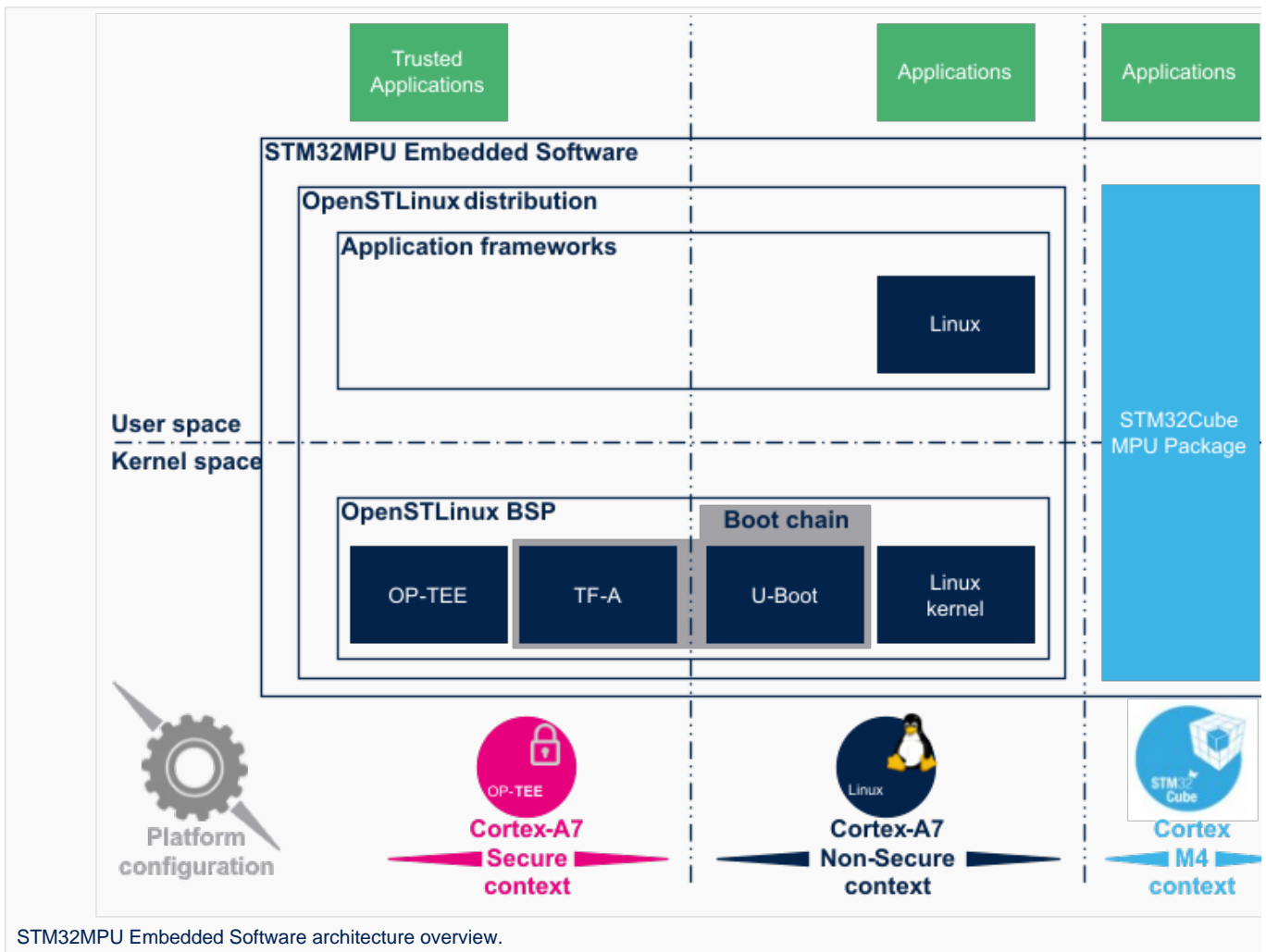


1 STM32MPU Embedded Software overview

The diagram below shows STM32MPU Embedded Software distribution main components:

- The **OpenSTLinux distribution**, running on the Arm[®]Cortex[®]-A, including:
 - The **OpenSTLinux BSP** with:
 - The **boot chain** based on TF-A and U-Boot.
 - The **OP-TEE** secure OS running on the Arm[®]Cortex[®]-A in secure mode.
 - The **Linux[®] kernel** running on the Arm[®]Cortex[®]-A in non-secure mode.
 - The **application frameworks** are composed of middlewares relying on the BSP and providing API:
 - on the **OP-TEE** side to run **Trusted Applications (TA)** that allow to manipulate secrets (not visible from the Linux and STM32Cube MPU Package)
 - on the **Linux** side to run **Applications** that typically interact with the user via the display, the touchscreen, etc.
- The **STM32Cube MPU Package** is running on the Arm[®]Cortex[®]-M: it is based on HAL drivers and middlewares, like other STM32 microcontrollers, completed with coprocessor management.

The figure below is clickable so that the user can directly jump to one of the sub-levels listed above.



STM32MPU Embedded Software architecture overview.





2 Open Source Software (OSS) philosophy

The **Open source software** source code is released under a license in which the copyright holder grants users the rights to study, change and distribute the software to anyone and for any purpose^[1].

STMicroelectronics maximizes the using of open source software and contributes to those communities. Notice that, due to the software review life cycle, it can take some time before getting all developments accepted in the communities, so

STMicroelectronics can also temporarily provide some source code on github^[2], until it is merged in the targeted repository.



3 References

- https://en.wikipedia.org/wiki/Open-source_software
- STM32MP1 Distribution Package

Arm[®] is a registered trademark of Arm Limited (or its subsidiaries) in the US and/or elsewhere.



Cortex[®]

Board support package

Operating System

Linux[®] is a registered trademark of Linus Torvalds.

Application programming interface

Open Portable Trusted Execution Environment

Trusted Application

Microprocessor Unit

Hardware Abstraction Layer

Open Source Software