STM32 HAL Ethernet
# Driver Migration Guidelines

STMicroelectronics / MCD

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Scope

- This document aims to provide simple steps to update an existing project using legacy Ethernet HAL driver with LwIP, in order to use the new Ethernet HAL driver.

- Last section of the document explains how to keep using legacy Ethernet HAL driver when the new driver is released in the STM32 CubeFW package.

Reception Process using LWIP

1. Modify the interface reception function: *low_level_input()* by replacing *HAL_ETH_GetRxDataBuffer()*, *HAL_ETH_GetRxDataLength()* and *HAL_ETH_BuildRxDescriptors()* with the new API: *HAL_ETH_ReadData().*

Legacy Architecture	New Architecture
HAL_ETH_GetRxDataBuffer() *HAL_ETH_GetRxDataLength()* *HAL_ETH_BuildRxDescriptors()*	*HAL_ETH_ReadData()*
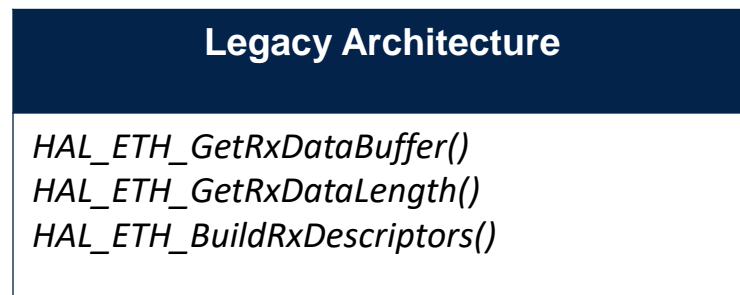
2. Fill the callback function to allocate the reception buffer: *HAL_ETH_RxAllocateCallback*().
3. Fill the callback function to Link received Data : *HAL_ETH_RxLinkCallback*().

Legacy Architecture	New Architecture
No APIs present.	*HAL_ETH_RxAllocateCallback()* *HAL_ETH_RxLinkCallback()*
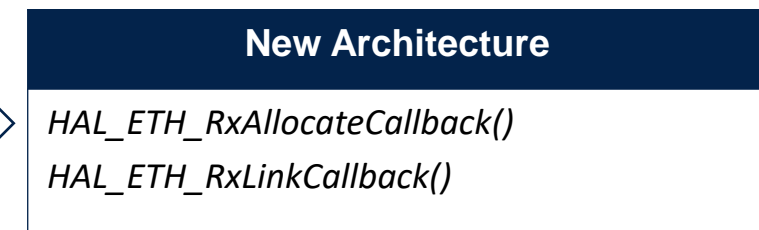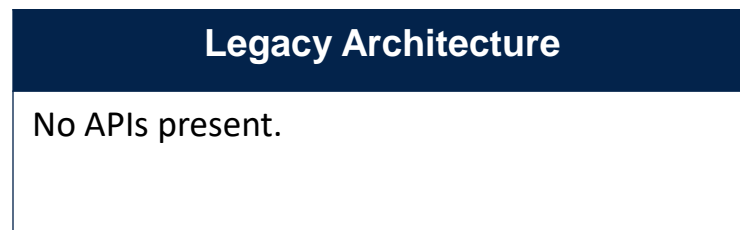
Transmission Process using LwIP

1. In interface transmission function: *low_level_output():*
   a. Add *pbuf_ref()* to prevent LWIP from freeing TX buffer.
   b. Replace *HAL_ETH_Transmit()* by *HAL_ETH_Transmit_IT()*.
   c. Add a semaphore to wait for transmission end.
   d. Add the ethernet driver function: *HAL_ETH_ReleaseTxPacket()* to release transmitted packets.

Legacy Architecture
HAL_ETH_Transmit()

New Architecture
pbuf_ref()
HAL_ETH_Transmit_IT()
osSemaphoreWait (TxPktSemaphore)
HAL_ETH_ReleaseTxPacket()

2. In interface transmission function: *low_level_output()*, fill the *HAL_ETH_TxFreeCallback().*

Legacy Architecture
No APIs present.

New Architecture
*void HAL_ETH_TxFreeCallback(uint32_t * buff)*   *{*   *pbuf_free((struct pbuf *)buff);*   *}*

How to keep using Legacy ETH driver

- New Ethernet driver is released in new STM32 CubeFW packages. But in some cases, users want to keep the older version of the driver. This is still possible by integrating the following files:
  - *Drivers\STM32H7xx_HAL_Driver\Src\Legacy\stm32xxxx_hal_eth.c/.h*
  - *Drivers\STM32H7xx_HAL_Driver\Src\Legacy\stm32xxxx_hal_eth_ex.c/.h*

- Following steps shall be followed in order to deploy legacy Ethernet driver:
  1. In the application project: replace new Ethernet driver with the legacy driver.
     - *Drivers\STM32H7xx_HAL_Driver\Src\Legacy\stm32xxxx_hal_eth.c*
     - *Drivers\STM32H7xx_HAL_Driver\Src\Legacy\stm32xxxx_hal_eth_ex.c*
  2. In Application projects, add the legacy path: *Drivers\STM32H7xx_HAL_Driver\Inc\Legacy*
  3. In *stm32xxxx_hal_conf.h,* enable legacy Ethernet driver by activating legacy mode:

  #define HAL_ETH_LEGACY_MODULE_ENABLED
  #ifdef HAL_ETH _LEGACY _MODULE_ENABLED
  * #include "stm32h7xx_hal_eth_legacy.h"*
  #endif / HAL_ETH _LEGACY _MODULE_ENABLED */*

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