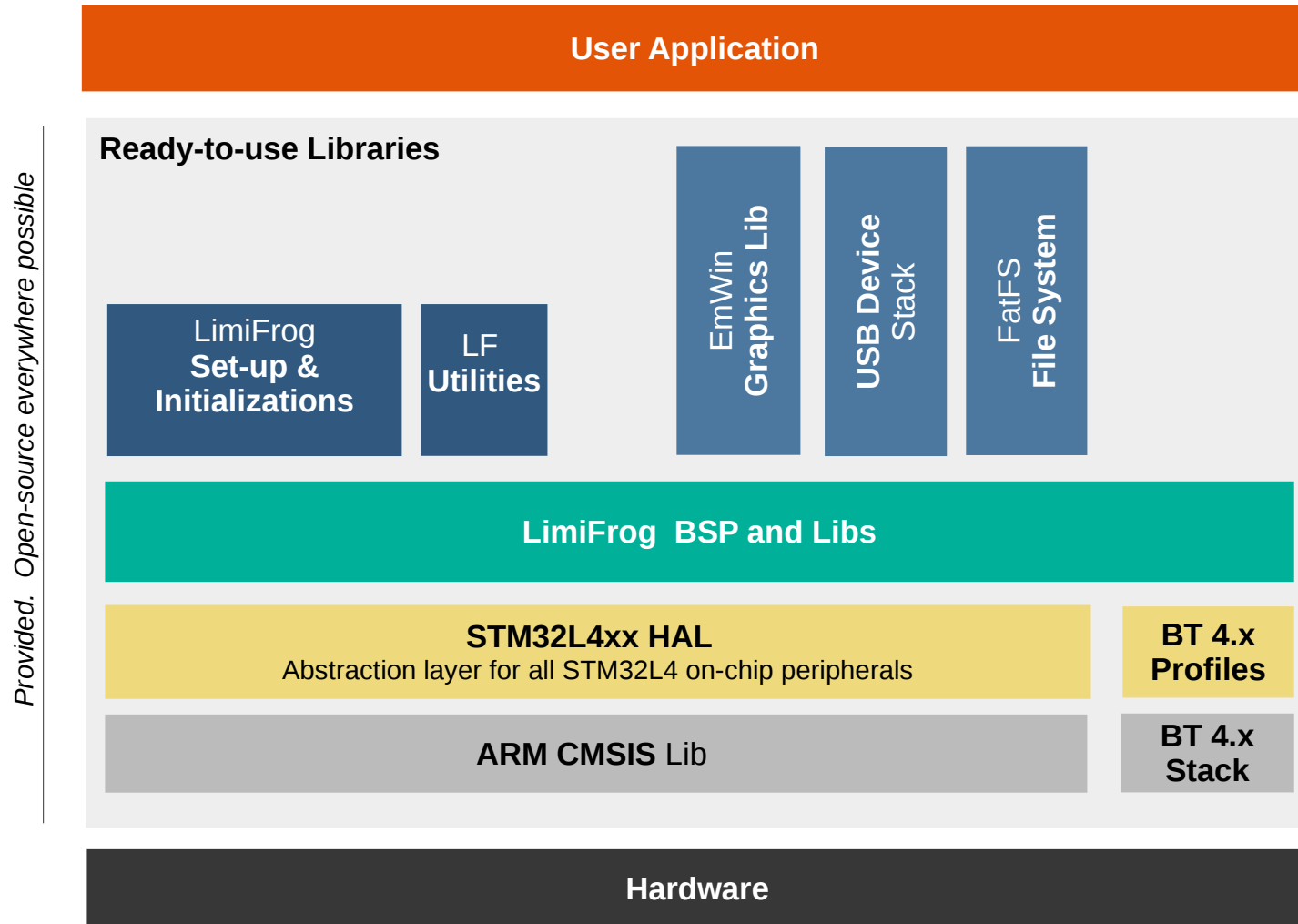


# Software Libraries



*Note.: Various options available as real-time/embedded OS kernel if needed, although not provided as part of imiFrog software package at this time.*

# Software Structure

/LimiFrog-SW

## **-- /libraries**

- /LimiFrog-Lib
  - # Board init and controls - LimiFrog specific
  - # Adaptation Layers for Middlewares (USBD, FatFS, emWin)
- /CMSIS\_L4xx
- /STM32L4xx\_HAL\_Driver
- /STM32L4\_USB-Device\_Library
- /FatFS\_Lib
- /StemWin\_Lib
- /Sensors\_APIs

*LimiFrog libraries*

*ST- and 3rd-party supplied libraries*

## **-- /projects**

### **-- /Project-A**

- /inc
- /src
- Makefile
- /obj

### **-- /Project-B**

- .....

### **-- /Project-X**

- .....

### **-- /STARTUP**

- startup\_stm32l476xx.s
- STM32L476RE\_FLASH.ld
- sysmem.c
- system\_stm32l4xx.c

## **-- /documentation**

*Typically,  
user would customize  
these files*

# Software : LimiFrog-Lib Contents

/libraries

-- /LimiFrog-Lib

-- /src

-- /LBF\_Board\_Inits

-- /LBF\_API

-- /Utilities

-- /LBF\_USB\_MassStorage

-- /LBF\_DataFlash\_FatFS

-- /LBF\_STemWin

-- /inc

-- <same structure>

> IO configuration routines  
> On-chip peripheral inits  
> On-board chip inits  
(fixed and selective – based on  
user configuration files in /Project-xx)

API functions :  
>For access to on-board hardware and  
busses (LED, Switches, Data Flash,  
I2C, ...)  
>To use some STM32 peripherals at  
higher level than HAL

Adaptation layer between ST-supplied  
middleware and LimiFrog  
(any file that is a « template » in ST  
deliverable or needed customization is  
here)

# Software : User Project Contents

/projects

-- / <project name>

-- /src

-- /main.c

-- /<other\_user\_files>.c

-- /stm32\_it.c

-- /inc

-- /User\_Configuration.h

-- /IT\_Priorities\_UserDefinable.h

-- /obj

-- Makefile

-- ReadMe.txt

> Proposed template does full board initialization and leaves user concentrate on his/her application.

Interrupt request handlers  
& associated callback functions.  
Template proposed.

User defined configurations, esp. :  
- configuration of signals / interfaces  
provided on extension port  
- OLED and BTLE usage

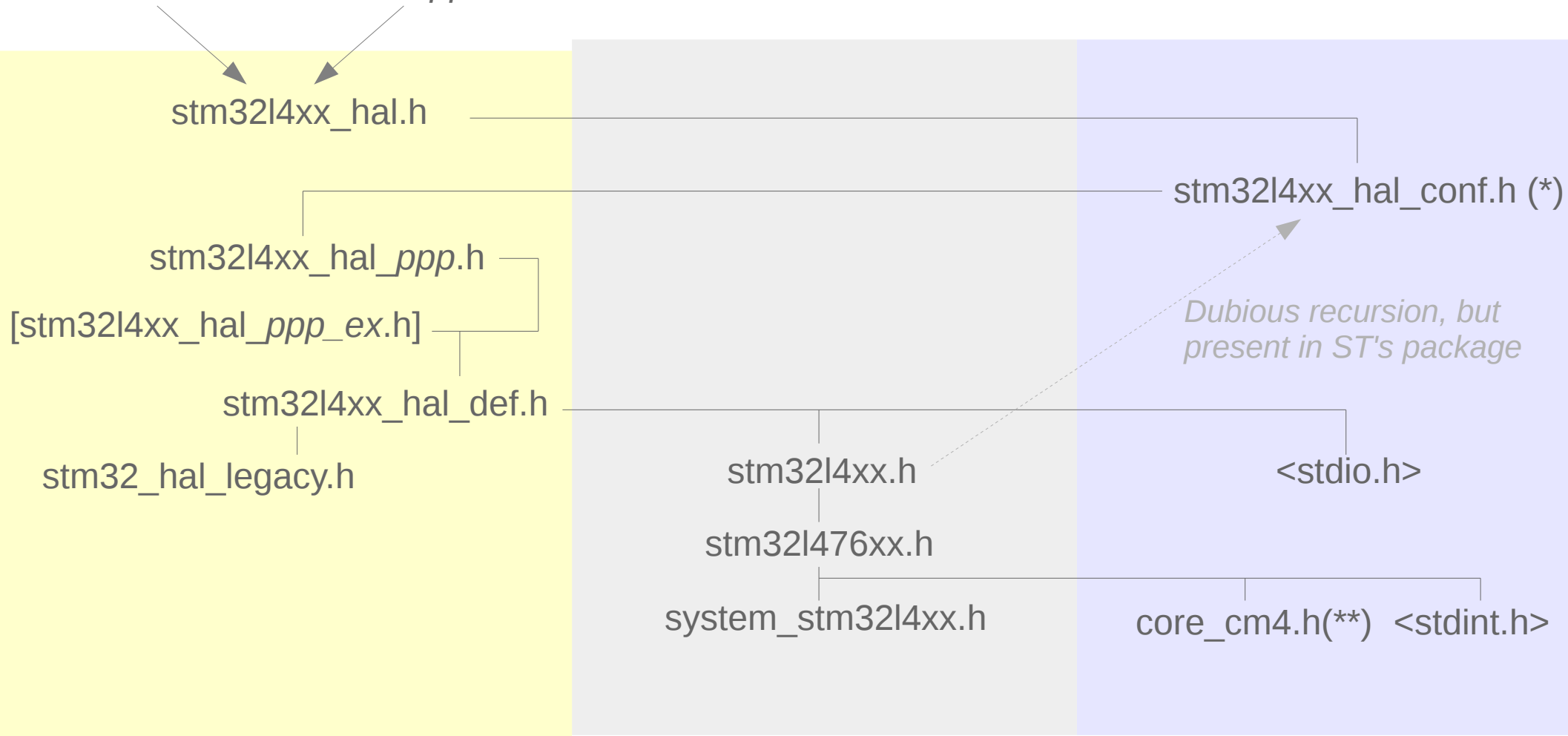
User modifiable priorities of all LimiFrog  
potential interrupt sources.  
All defined in this single central file.

# Software : Include Model - HAL

*HAL C source files*

*LimiFrog header files*

*Application header files*



*Files located under :*

*.../STM32L4xx\_HAL\_Driver/Inc*

*Under :*

*.../CMSIS\_L4xx/Device/  
ST/STM32L4xx/Include*

*Other locations*

*(\*) .../libraries/LimiFrog-Lib/inc*

*(\*\*) .../CMSIS\_L4xx/Include*

*\_ppp = peripheral name*

# Software : Include Model - Others

- *main.c*
- *stm32\_it.c*
- *Other user's application source files*

<application-specific  
header files>

LBF\_Global.h

stm32l4xx\_hal.h

Header files of :  
LimiFrog BSP and Libs  
+ Utilities  
+ Sensor APIs  
+ Middlewares  
(USB, FatFs, emWin)

Header files located under :  
.../LimiFrog\_Lib/inc/...

Under :  
.../STM32L4xx\_HAL  
\_Driver/Inc

Some C files in LimiFrog-Lib :

- *LBF\_User\_Conf.c*
- *LBF\_Board\_Selective\_Inits.c*
- *LBF\_BTLE\_Inits.c*

C files involving  
IT set-up in  
LimiFrog-Lib/src

User\_Configuration.h

IT\_Priorities\_User\_Defined.h

Header files located under  
.../projects/<project\_name>/inc

# Software : Include Model - Others

*main.c, stm32\_it.c,  
other user's application source files*

<application-specific  
header files>

LBF\_Global.h

stm32l4xx\_hal.h

...

*Top-level board inits*

LBF\_Board\_Fixed\_Inits.h

LBF\_Board\_Selective\_Inits.h

*API to LimiFrog BSP and libs*

LBF\_lowlev\_API.h

*Debug utilities*

Debug\_Uutilities.h

*Sensor APIs*

LBF\_Ism6ds3.h

LBF\_lps25h.h

...

*Middleware APIs*

(USB)

LBF\_USB\_MassStorage.h

(emWin Graphics)

LBF\_emWin\_Init.h

WM.h

Gui.h

(FAT File System)

LBF\_FatFS\_Init.h

ff\_gen\_drv.h

*Header files of :*

*LimiFrog BSP and Libs*

+ *Utilities*

+ *Sensor APIs*

+ *Middlewares*

(USB, FatFs, emWin)

<stdbool.h>

stm32l4xx\_hal.h

LBF\_global\_variables.h

LBF\_custom\_types.h

LBF\_pin\_aliases.h

LBF\_OnBoard\_chip\_aliases.h

LBF\_services.h

LBF\_xxx\_lowlevAPI.h

...

arm\_math.h

+

#define

ARM\_MATH\_CM4

*Under : .../LimiFrog\_Lib/inc/...*