STM32WL Lorawan & Sigfox

Coexistence is possible

Dual protocol

Key learning

- Cover both Lorawan & Sigfox protocol stack in **one app,**
- Basic introduction to sw implementation
- Working Lorawan & Sigfox application example in practice,

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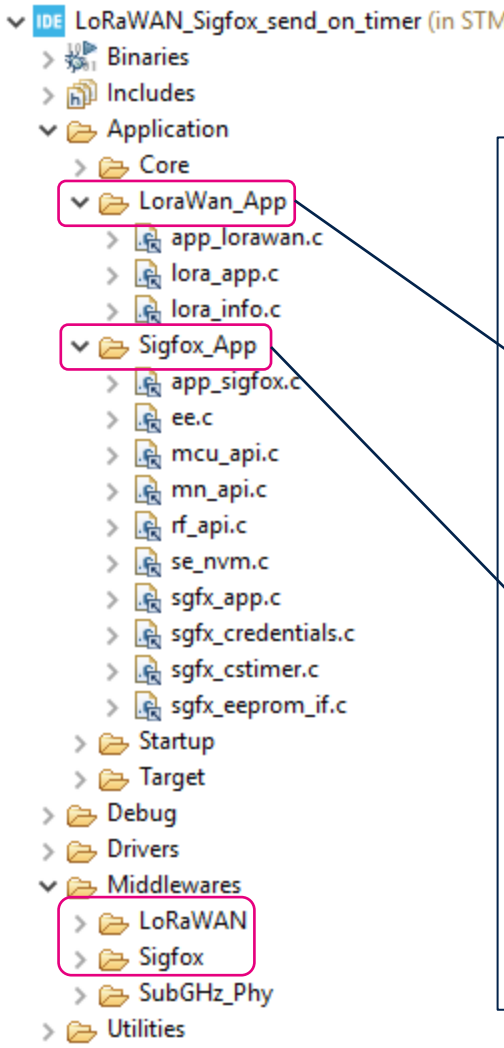
Dual protocol

Thanks to Sequencer it is easy to combine more than one app process




```
while (1)
  {
    if (active_app == ACTIVE_APP_LORAWAN)
    {
      MX_LoRaWAN_Process();
    }
    else
    {
      MX_Sigfox_Process();
    }
  }
```

STm32CubeIDE → File → Open Projects from File System… →
...\STM32WL_WS\Demo\LorawanSigfox\Projects\NUCLEO-WL55JC\Applications\LoRaWAN_Sigfox\LoRaWAN_Sigfox_send_on_timer\STM32CubeIDE

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Dual protocol

B1 button EXTI is used to switch active LPWAN protocol

```
void HAL_GPIO_EXTI_Callback(uint16_t GPIO_Pin)
{
switch (GPIO_Pin)
{
  case  SYS_BUTTON1_PIN:
    if (active_app == ACTIVE_APP_LORAWAN)
    {
      active_app= ACTIVE_APP_SIGFOX;
    }
    else
    {
      active_app= ACTIVE_APP_LORAWAN;
    }
    NVIC_SystemReset();
    break;
   .
   .
   .
}
```

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Dual protocol

App Sigfox/Lorawan control variable is placed in RAM2 and not initialized (no init) to keep value after MCU reset

```
UTIL_MEM_PLACE_IN_SECTION("MB_MEM2") uint32_t active_app;
```

Linker code excerpt

```
RAM2   (xrw)   : ORIGIN = 0x20008000, LENGTH = 32K    /* Backup SRAM2 */
.
.
MB_MEM2 (NOLOAD)        : { *(MB_MEM2) } >RAM2
```

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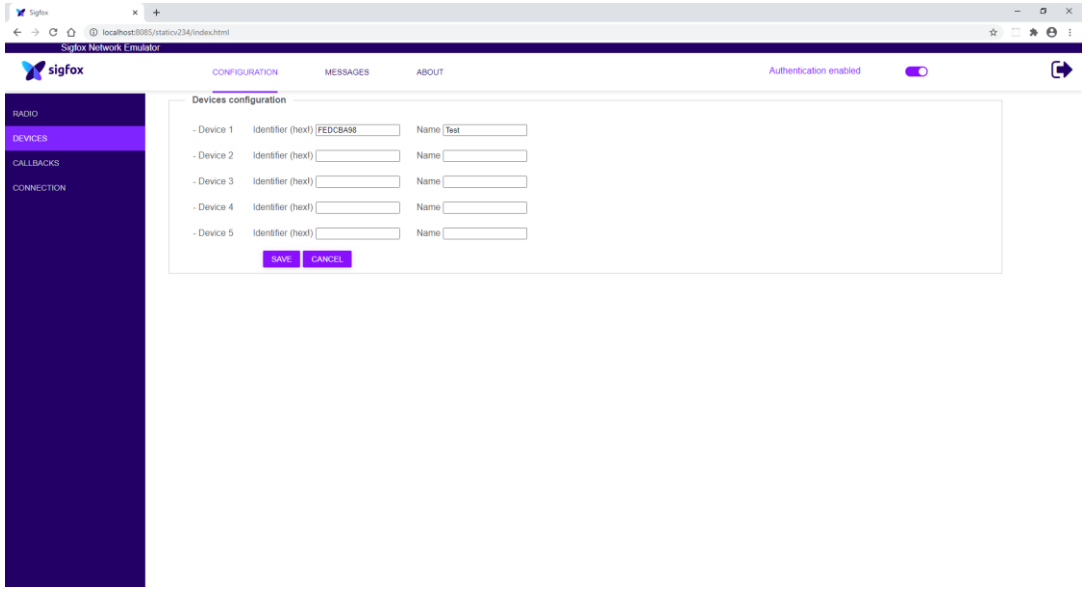
Dual protocol

- Lorawan hands-on scenario is reused (uplink/downlink),
- Sigfox app (default) sends periodically to the network temperature value (2 bytes),
- Public Key is used for Sigfox app,

```
if (E2P_Read_KeyType()!=CREDENTIALS_KEY_PUBLIC)
{
  E2P_Write_KeyType(CREDENTIALS_KEY_PUBLIC);
}
```

- SDR Dongle and Sigfox Network Emulator is used

  www.sdrdongle.sigfox.com



Dual protocol

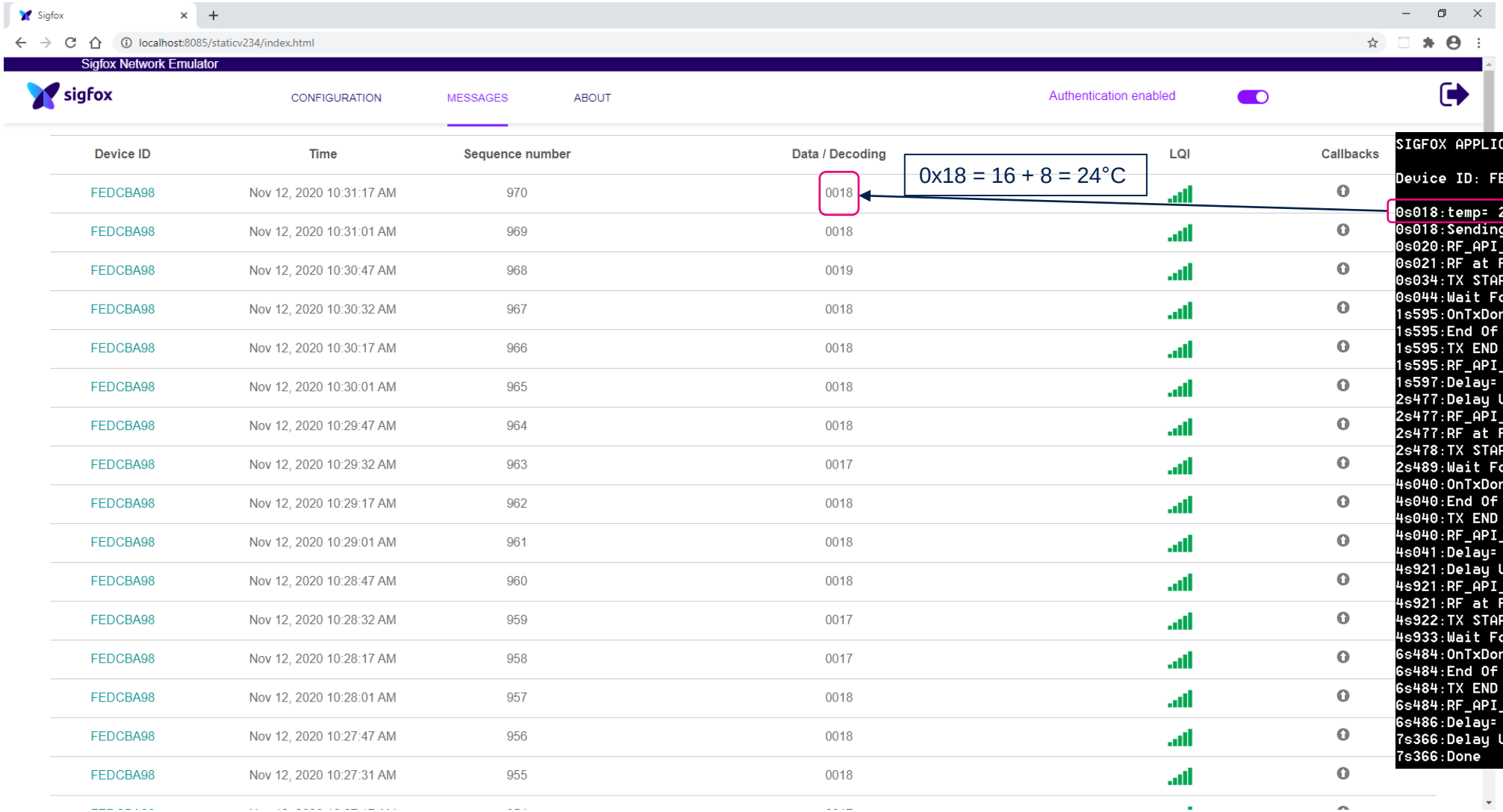
Memory footprint, STM32CubeIDE, Optimization level: NONE (-O0)

Memory Regions | Memory Details

Region	Start address	End address	Size	Free	Used	Usage (%)
ROM	0x08000000	0x08040000	256 KB	117,8 KB	138,2 KB	53,99%
SIGFOX_DATA	0x0803e500	0x0803e800	768 B	768 B	0 B	0,00%
RAM1	0x20000000	0x20008000	32 KB	19,55 KB	12,45 KB	38,89%
RAM2	0x20008000	0x20010000	32 KB	32 KB	4 B	0,01%

Dual protocol

Sigfox Network Emulator, MESSAGES view



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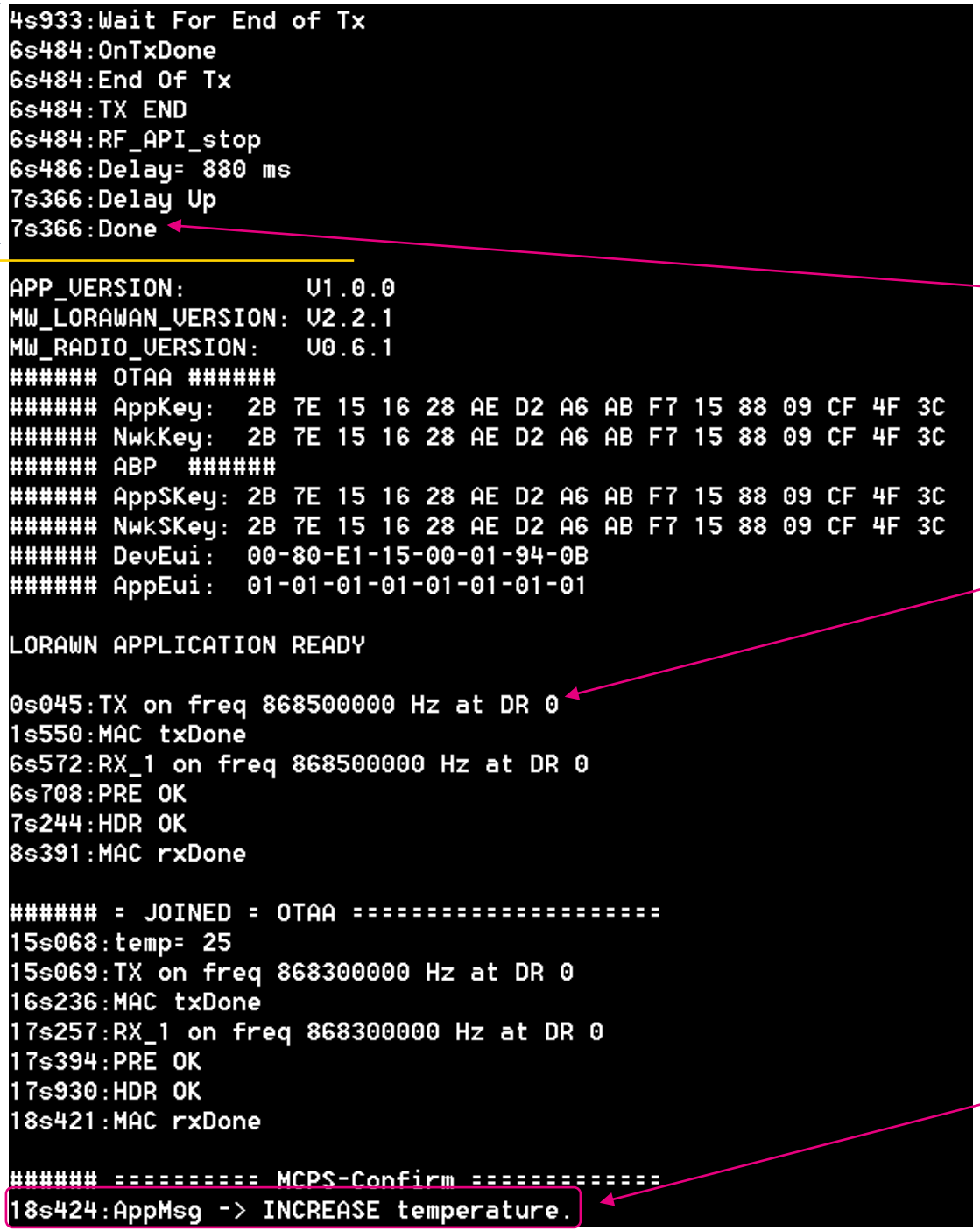
Dual protocol

Sigfox app

B1 button press

Lorawan app



Sigfox uplink done

Lorawan uplink

Lorawan downlink

VCP: 115200,8,N,1

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Thank you

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