【经验分享】SLN-LOCAL2-IOT OTW/OTA APP 更新测试

一 文档简介

最近遇到客户在做 SLN-LOCAL2-IOT 的 OTW 更新 APP 时,总是出现各种问题,所以为了方便客户使用该功能少入坑,本文给出详细的 SLN-LOCAL2-IOT OTW 和 OTA 的测试步骤, OTA 和 OTW 采用 JSON 接口数据包形式更新。

OTA: Over the Air, 利用板载 wifi 模组实现 TCP 连接以及 app 更新。 OTW: Over the Wire, 使用 UART 接口实现实现 APP 更新。 主要相关步骤:

- 1:擦除 FICA 区域 (0X61FC0000-0X61FFFFF)
- 2: 烧写 bootstrap/bootloader image 校验关闭+app A
- 3:运行OTW/OTA

下面给出具体测试步骤与过程

- 二 硬件软件准备
- 2.1 硬件 UART 端口连接

对于 SLN-LOCAL2-IOT,通常使用板载 USB 口集成的 UART 接口实现 shell 命令打 印与控制,但是进入 OTA/OTW 之后,这个 UART 口将会消失,所以实际的 OTW UART 下载接口是 UART6,需要额外焊接出来,连接 TTL-USB 工具实现与 PC 的通信与 APP 下 载。当使用 OTA 的时候,也会用于下载过程 log 的打印。



图1

图 2

TTL-USB UART_TX -> UART6_RX J26_10 TTL-USB UART_RX <- UART6_TX J26_20 TTL-USB GND <-> GND J26_15

2.2 软件代码下载

在运行 OTA/OTW 之前需要下载 SDK 代码到 SLN-LOCAL2-IOT, 自测可以关闭 bootloader/bootstrap 验证,如果不关闭验证,下载的时候还需要提供 app 签名文件,本文以不加签名为例。

使用 JLINK 下载工具下载如下代码到 SLN-LOCAL2-IOT 板子:

SDK_2_8_0_SLN-LOCAL2-IOT\boards\sln_local2_iot\sln_boot_apps\bootloader SDK_2_8_0_SLN-LOCAL2-IOT\boards\sln_local2_iot\sln_boot_apps\bootstrap SDK_2_8_0_SLN-LOCAL2-

IOT\boards\sln_local2_iot\sln_voice_examples\local_demo Bootloader 和 bootstrap 关闭 verification:

type filter text	Settings					>	
Resource							
Builders							
C/C++ Build	Configuration: Debug [Active]			Manage Configurations			
Build Variables							
Environment			_				
Logging	🛞 Tool Settings 🎤 Build steps 🤇		👻 Build Artifact 🛛 뒚 Bi	nary Parsers 🛛 🔕 Erro	Parsers		
MCU settings			Do not search s	rstern directories (-nost	dinc)		
Settings Teal Chain Editor		. Compiler	Drange series	(E)	anney		
C/C++ General	Preprocessor		Preprocess only				
MCIIVpresso Config Tools	Includes		Defined symbols	(-D)	🗐 💼	S 🖓	₽I
Project Natures	(Non	imization	SCANE ADVANCE	D_ENABLE=0			~
Projec K Edit Dialog			×	ASH= 1			
Run/E				R_ENABLE=1			
Task T Defined symbols (-	D)			D2			
> Valida DISABLE_IMAGE_VE	ERIFICATION=			00			
				ADDRESS-FICA IMG F		ADDR	
				R_TABLE=1			
				DFAULT_DISABLE=1			
		OK	Cancel	TRANSFER_NON_BLO	CKING=1		
			USB STACK ERFER	TOS_HEAP_SIZE=0005)		
		red Library Settings	ARM_MATH_CM7				~
	Architecture		Hadaffeed a make	8.8		0	
			ondernied symbo	Undefined symbols (-U)			21
	(N 14)	tioner					

local_demo APP 下载需要下载到 APP bank A: 0X60300000-0X60CFFFFF.

maxpresso - sin_local2_jot_local_demo/startup/startup_mimxt106s.c - MCUXpresso IDE — 🗇 🗡						– 0 ×			
File Edit Source Refactor Nav	vigate Search Project	ConfigTools Run RTOS Analysis	Window Help						
📑 🕶 🔛 🐚 😸 🕶 🗞 🕶 📸 🞺 🖔	○ [●] ●] ● M 2.	◎ 20 弓ズ ● 10 ● ス ● 20 2	📓 🧿 👌 🥜 📕 🇐 🔻 🍢 🍅	🎄 🕶 🧿 🕶 💁 🕶 🌛	4 (51 (U		x ⇔ ≠ 🛃	Q. 🛛 😁 🛛 🔀	
🕒 Project E 🏽 🌃 Registers 🌞 🛙	Properties for sln_k	pcal2_iot_local_demo			-	0.00.050 D		· · · · · · · · · · · · · · · · · · ·	
 Sin_local2_iot_bootloader Sin_local2_iot_bootstrap 	type filter text	MCU settings							
 Sin_local2_iot_local_demo Project Settings Pliparias 	 Resource Builders C/C++ Build 	Available parts							
> @ Includes	Build Variables	- SDK MCUs			Preinstalled MCUs				
> G CMSIS	Environment	MCUs from installed SDKs. Please click above or visit mcuxpresso.nxp.com to obtain additional MCUs from preinstalled LPC and generic Cortex-M part support					support		
> 🖾 audio	Logging	SDKs.				Target			
> 😅 board	MCU settings	NXP MIMXRT106SxxxxA			^	> CTNxxx			
> 😕 cjson	Settings	> KW4x				> LPC1102			
> 😕 codec	Tool Chain Edi	> MIMXRT1010				> LPC112x			
> 🔒 component	> C/C++ General	> MIMXRT1015			11	> LPC11Axx			
> 🗳 config_files	MCUXpresso Cor	> MIMXRT1020			~	, > LPC11E6x			
> 😕 device	Project Natures	farnet architecture:				ortex-m7			
> 😀 drivers	Run/Debug Settir	Descention of the sector of th							
> 🐸 freertos	Task Tags	Preserve memory configuration							
V 🐸 IIDs	> Validation	Preserve project configuratio	Preserve project configuration						
in indsin_are.a		Memory details (MIMXRT106SxxxxA)*							
Dibela den toolhova.		Default LinkServer Flash Driver							
() Ouickstart Panel 😤 💷 Variable		Туре	Name	Alias	Loca	ation	Size	Driver	
Cucotar Fanci - Vanabie		Flash	BOARD_FLASH	Flash	0x60	0300000	0xa00000	MIMXRT106S-SLN-LOCAL2	
MCUXpresso IDE -		RAM	SRAM_DTC	RAM	0x20	0000000	0x78000		
Project: sln_local2_iot_local		RAM	SRAM_ITC	RAM2	0x0		0x8000		
- Create or import a project		RAM	SRAM_OC_NON_CACHEAB	RAM3	0x20	0200000	0x40000		
New project		RAM	SRAM_OC_CACHEABLE	RAM4 SRAM_C	OC_C/	ACHEABLE(RAM) Alias=R	AM4: Location=0x20240000 Si	ze=0x40000 (256k)	
Market SDK example(s).	< >								

图4

同时生成 APP bank A 和 B 的 APP.bin:

sln_local2_iot_local_demoA.bin

sln_local2_iot_local_demoB.bin

用于 OTW/OTA 下载, bankB 地址: 0X60D00000-0X616FFFFF.

2.3 FICA 清除

做本部分原因是如果自行修改过代码或者该区域,会导致 OTA/OTW 下载最后一步 self_test 出现问题,如下图:



图 5

经过专家帮忙,需要清除 FICA 区域,这样 bootloader 在检测到 FICA 区域为空会重新生成入口数据予以匹配。

关于 FICA 区域数据清除,可以借助 MCUBootUtility 工具,进入到 serial download 模式擦除:

use Operation Utility Boot Device Memory set: 0x40000 bin/s19/hec: Browse ss Ease Write (Auto Ease) Execute From Start f f f f f f f f f f f f f f f f f f f
use Operation Unity Bore Denie Memory esc) 0x40000 Bin/S19/Nec Browse ss Erase Write (Auto Erase) Execute From Start f f f f f f f f f f f f f f f f f f f
Exe. Demos Is mes. Browse as Erase Write (Auto Erase) Execute From Start f df df ff ff df ff df df df df ff df df df df f df df ff ff df ff df df df df df ff df df df df df
ss Erase Write (Auto Erase) Execute From Start f ff
f ff ff ff ff ff ff
f ff ff ff ff ff f ff ff ff ff ff f ff ff ff ff ff
f ff ff ff ff ff ff
I II II II II II II
* ** ** ** ** **
f ff ff ff ff ff
Save image/data file to Browse
f f f f f f f f f f

图 6

到目前为止,准备工作就绪。

三 OTW 更新测试步骤

3.1 软件配置

OTW 的下载, 需要使用 lvaldi_sln_local2_iot,下载链接:

https://www.nxp.com/webapp/Download?colCode=Ivaldi_sln_local2_iot&appType =license

然后参考文件夹里面的 README.md 予以配置。

本文在 windows 平台使用 Git bash 配置, 命令如下:

pip install virtualenv

virtualenv env

source env/scripts/activate

下面查看 UART6 对应的 UART port, 并且修改 fwupdate_client.py 中的 COM port, fwupdate_client.py 可以在 SDK 路径中找到:

SDK 2 8 0 SLN-LOCAL2-

IOT\middleware\sln_iot_common_platform\fwupdate\unit_tests



图 7

如上图可以看到实际的 UART6->TTL-USB 连接的是 COM11 接口,所以需要修改 fwupdate_client.py 脚本 COM_PORT=' COM11'。

可以把修改后的 fwupdate_client.py 拷贝到配置好的 lvaldi_sln_local2_iot 下面运行。 正式运行 OTW 之前,需要先在 USB 的 UART shell port 中选择进入 OTW 模式:

"updateotu": Restarts the board in the OTA update mode. "updateota": Restarts the board in the OTA update mode. "version": Print firmware version

SHELL>> version SHELL>> Firmware version: 2.8.0, App type: AppA SHELL>> updateotw

Reseting the board in OTH update mode BHELL>>

图 8

下面使用 Git Bash 输入如下命令。

python -m venv env

source env/scripts/activate

python -m pip install pyserial

python -m pip install libscrc

python fwupdate_client.py





Firmware Update Progress (99.92%): 2940928/2943212 , irinmware Update Progress (100.0%): 2943212/2943212 unit_test_fwupdate_complete_req "messageType": 1, "fwupdate_message": {"messageType": 1, "fwupdate_server_message": {"messageType": 1}}} , nit_test_fwupdate_activate_img "messageType": 1, "fwupdate_message": {"messageType": 1, "fwupdate_server_message": {"messageType": 3}}} 。 unit_test_fwupdate_self_test_start {"messageType": 1, "fwupdate_message": {"messageType": 1, "fwupdate_server_message": {"messageType": 2}}} irmware Update succeeded

图 11

可以看到, 最后通过 OTW 成功下载代码到 APP B。

这时候,可以看到板子会重新启动,在 UART shell 中查看 version,会发现 APP B 已经 运行。



这里需要注意,如果运行 APP bankA 代码,则需要更新的是 APP bankB;如果运行的是 APP bankB,则需要更新的是 APP bankA。 具体相关命令:

python fwupdate_client.py local OTW B sln_local2_iot_local_demoB.bin None python fwupdate client.py local OTW A sln local2 iot local demoA.bin None

四 OTA 更新测试步骤

对于 OTA 的这里不予多讲,可以查看官方文档 SLN-LOCAL2-IOT-DG.pdf, chapter 9.6 Running the test script,已经给出了详细的步骤与测试结果。

在更新之前需要先配置 wifi, 使用 setup my_ssid my_pw 连接 wifi 网络。

下载代码的 PC 也需要连接同样的 wifi 网络,否则无法下载。

使用 shell 输入: updateota 进入 ota 更新流程。

相关命令:

cd C:\sln_imx_rt_prog_and_test

python -m venv env

source env/Scripts/activate

python -m pip install pyserial

python -m pip install libscrc

python fwupdate_client.py local OTA B sln_local2_iot_local_demoB.bin None python fwupdate client.py local OTA A sln local2 iot local demoA.bin None

这里给出部分 OTA 下载 log:

nxa07323@NXL66256 MINGW64 /c/sln_imx_rt_prog_and_test

\$ python fwupdate_client.py local OTA B sln_local2_iot_local_demoB.bin None

Device IP:192.168.43.63

unit_test_fwupdate_send_ota_command

{"messageType": 2} 0

Connected starting OTA ...

unit_test_fwupdate_start_req

Sending Start Request

0

unit_test_fwupdate_block_transfer

0

Firmware Update Progress (0.14%): 4096/2943212

0

Firmware Update Progress (0.28%): 8192/2943212 0

Firmware Update Progress (0.42%): 12288/2943212

... 0

```
Firmware Update Progress (99.64%): 2932736/2943212
0
Firmware Update Progress (99.78%): 2936832/2943212
0
Firmware Update Progress (99.92%): 2940928/2943212
0
Firmware Update Progress (100.0%): 2943212/2943212
unit_test_fwupdate_complete_req
{"messageType": 1, "fwupdate message": {"messageType": 1, "fwupdate server message":
{"messageType": 1}}}
0
unit_test_fwupdate_activate_img
{"messageType": 1, "fwupdate_message": {"messageType": 1, "fwupdate_server_message":
{"messageType": 3}}}
0
Connecting after reset ...
Connected !
unit_test_fwupdate_self_test_start
{"messageType": 1, "fwupdate message": {"messageType": 1, "fwupdate server message":
{"messageType": 2}}}
0
(env)
```

```
同时可以通过 UART6 查看具体通信连接情况。
```

下面给出实际 UART6 对应的 log 信息,可以发现 OTA 成功下载并且复位运行。

DIDENTED (2.4.1) Solution. DIDENTED (2.4.1) Solution. DIDENTED (2.4.2) Solution 1 is explu- DIDENTED (2.4.2) Solution 1 is explu- DIDENTED (2.4.2) Solution 1 is explu- DIDENTED (2.4.2) Solution 1 is inclusion. DIDENTED (2.4.2.3) Solution. DIDENTED (2.4.2.3.3) Solution. DIDENTED (2.4.3.3.3.3.3.3.3.3.3.3.3.3.3.3.3.3.3.3.	
4 G 1900T GERE V.S.U 444	
<pre>b 1000000000000000000000000000000000000</pre>	
AsyncInterrupt is not supported ULAN MAC Address : 74:78:90:88:E5:6F	
Link Finnans : a tall bet 2: 2010 05:37-16: wersion 7.6.56.9.44 (r72000 07) PHB 06 1-2566662 Bit Off, Bit J. 22 Datas : Link D. Songlart : Lo 4: Chargon 7:1.8.3.5 (vestion: 2016-12:12 06:06:50 E4:550: B0010666; Daki Entero, 1: to consel to a stin steaker NB 6 Disc 2018 0010667; Daki Entero, 1: to consel to a stin steaker NB 6 Disc 2018 0010667; Daki Entero, 1: to consel to a stin steaker Disc 2018 0010667; Daki Network : to consel to a stin steaker Disc 2018 0010667; Daki Network consection state, a Disc 2018 0010667; Daki Detation Bakes consection 2019;	
19 10252 (BOOTLOHDER Task) IPv4 Address: 192.108.43.63 20 10252 (BOOTLOHDER Task) DHCP OK	
2: 1955: 2007.00007.00007.0007.0007.0007.0007.00	2015 51278 (TBP Comes Server) Educations (FB table 2015 51278 (TBP Comes Server) Educations NFD Li 2017 51278 (TBP Comes Server) Educations NFD Li 2018 51278 (TDP Comes Server) Educations NFD Li 2018 51278 (TDP Comes Server) Educations NFD Comes Server Educations of the education of the educatio
49 3956 (117) Comp. Server 11 1951 Jush (13) Already initialized 99 3056 (117) Comp. Server 11 1951 Jush (15) Initialization couplets 49 3956 (117) Comp. Server 11 1951 Jush (15) Initialization couplets 49 3956 (117) Comp. Server 11 1951 Jush (15) Initialization 51 3956 (117) Comp. Server 11 1951 Jush (15) Initialization 51 3956 (117) Comp. Server 11 1951 Jush (15) Initialization 51 3956 (117) Comp. Server 11 1951 Jush (15) Initialization 51 3956 (117) Comp. Server 11 1951 Jush (15) Initialization 51 3956 (117) Comp. Server 11 1951 Jush (15) Initialization 51 3956 (117) Comp. Server 11 1951 Jush (15) Initialization 51 3956 (117) Comp. Server 11 1951 Jush (15) Initialization 51 3956 (117) Comp. Server 11 1951 Jush (15) Initialization 51 3956 (117) Comp. Server 11 1951 Jush (15) Initialization 51 3956 (117) Comp. Server 11 1951 Jush (15) Initialization 51 3956 (117) Comp. Server 11 1951 Jush (15) Initialization 51 3956 (117) Comp. Server 11 1951 Jush (15) Initialization 51 3956 (117) Comp. Server 11 1971 Jush (15) Initialization 51 3956 (117) Comp. Server 11 1971 Jush (15) Initialization 51 3956 (117) Comp. Server 11 1971 Jush (15) Initialization 51 3956 (117) Comp. Server 11 1971 Jush (15) Initialization 51 3956 (117) Comp. Server 11 1971 Jush (15) Initialization 51 3956 (117) Comp. Server 11 1971 Jush (15) Initialization 51 3956 (117) Comp. Server 11 1971 Jush (15) Initialization 51 3956 (117) Comp. Server 11 1971 Jush (15) Initialization 51 3956 (117) Comp. Server 11 1971 Jush (15) Initialization 51 3956 (117) Comp. Server 11 1971 Jush (15) Initialization 51 3956 (117) Comp. Server 11 1971 Jush (15) Initialization 51 3956 (117) Comp. Server 11 1971 Jush (15) Initialization 51 3956 (117) Comp. Server 11 1971 Jush (15) Initialization 51 3956 (117) Comp. Server 11 1971 Jush (15) Initialization 51 3956 (117) Comp. Server 111 110 (15) Initialization 51 3956 (117) Comp. Server 111 110 (15) Initialization 51 3956 (117) Comp. Server 111 110 (15) Initialization 51 3956 (117) Comp. Serve	D IONIDEES V.1.0 Version of the status - 7 20 IONIDADES Taski Context 1 KIB evolut - 7 20 IONIDADES Taski Context check status - 7 30 IONIDADES Taski Context check status - 7 50 IONIDADES Taski Forming recorded XI mode, ipore error. 50 IONIDADES Taski Forming in mortograd XI mode, ipore error. 50 IONIDADES Taski First in First Park Model 10 IONIDADES Taski First in First Park Model 00 IONIDADES Taski First in First Park Model 00 IONIDADES Taski First in First Not Annowal mittalized 10 IONIDADES Taski First First First Not Annowal mittalized 10 IONIDADES Taski First First First First Not Annowal mittalized for Complete Status for the Tirge First Fir



图13