

Linux Driver Test

Jinzai Solution Inc.

Linux Team

(Nguyen Viet Dung ▪ Cao Minh Hiep)

Date : 2016/07/12

Outline

1. Member Introduction.

2. Linux Driver Test

3. Failure Analysis Process

4. Other Activities

Driver Patch Development/Linux Tracing Tool.

5. New Activities

Upstream Deliverables Test

BSP's Common Test Environment Construction.

1. Member Introduction

Our Team:

- Engineers: 7 members + (2 new members are coming soon)
- Graduated from the universities in Hanoi Vietnam, Major of IT.
- 4 years experience in Linux driver test on Renesas boards.
- Communication: Japanese and English



Phuc (29Years old)



Nui (28Years old)



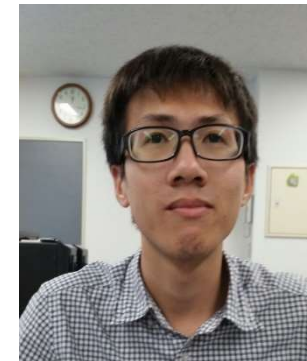
Duc (27 Years old)



Dung (33Years old)



Hiep (32 years old)



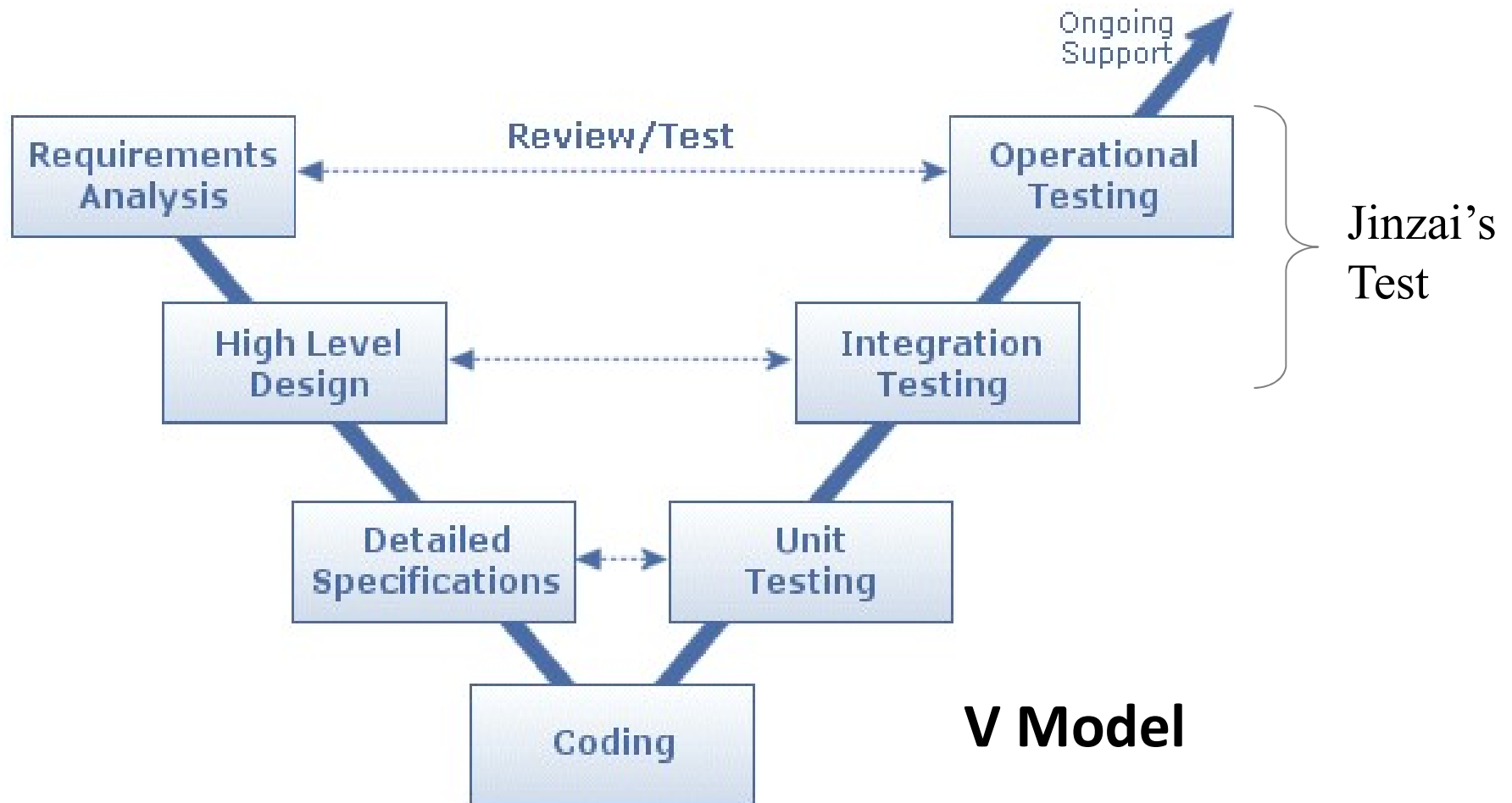
Truong (27 Years old)



Duc (31 Years old)

2. Linux Driver Test Overview

- Creation of Program Check List (PCL) from users manual
(Integration Testing and Operational Testing in V model)
- Integration with BSP group Test Program (TP)



2.1 Program Check List/Test Program

■ Program Check List:

- Total 20 test drivers and 640 test items for now in GEN2.
- Continuing to be updated more in GEN3.
- Normal Test, Abnormal Test, Boundary Test, Performance Test, SMP Test, Load Test and User Test, etc..
- 70% our checklist are tested by auto test scripts.

■ Test Programs to be added

- Community: JTA, Upstream TP in wiki <http://elinux.org/>
- BSP group: bug history

2.2 Program Check List Example

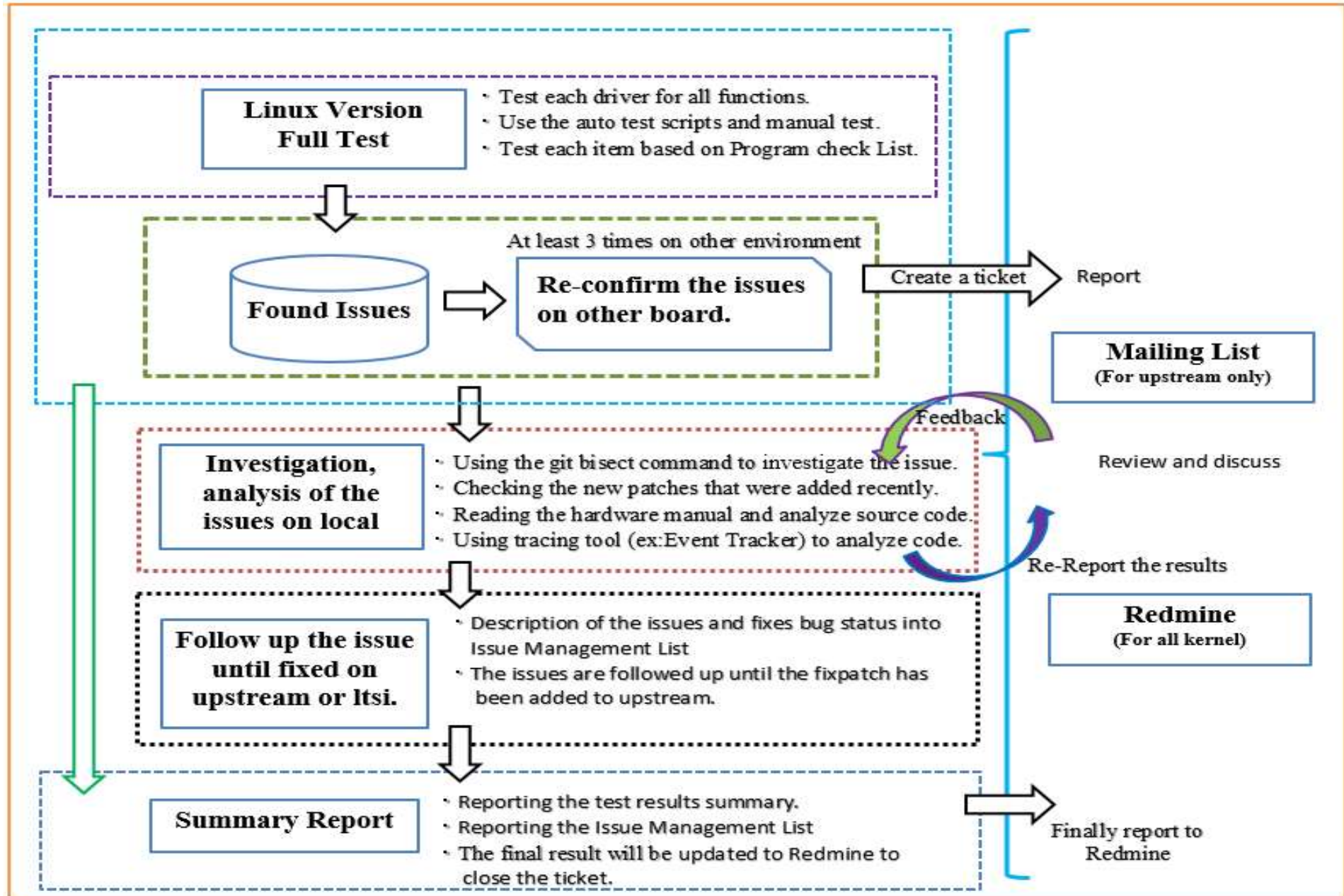
■ The summary of the Program Check List.

LAGER 動作テスト							
テスト実施日	2016/06/07～ 2016/06/17						
担当者	人ソ/Linuxチーム						
カーネルバージョン	Linux v4.7-rc2						
モジュール名	正常	異常	合計	PASSED	FAILED	NOT TESED	残り件
LED	3	0	3	3	0	0	0
GPIO-RCAR	14	6	20	18	0	2	0
I2C	17	3	20	9	0	11	0
ETHERNET	12	12	24	24	0	0	0
SCIF	34	7	41	30	0	11	0
Display-Unit	24	1	25	15	5	5	0
SDHI	70	9	79	78	1	0	0
SATA	37	4	41	41	0	0	0
MMCIF	14	2	16	16	0	0	0
USB-HOST	118	25	143	130	1	12	0
USB-FUNCTION	42	6	48	40	0	8	0
QSPI-FLASH	12	3	15	15	0	0	0
RCAR-SOUND	20	7	27	13	14	0	0
ARM TIMER	5	1	6	6	0	0	0
PM	0	3	3	3	0	0	0
RCAR-THERMAL	6	2	8	7	1	0	0
DMAE	16	6	22	8	3	11	0
SPI-SH-MSIOF	9	0	9	0	0	9	0
V4L2 VSP1	53	0	53	0	0	53	0
Video Input	32	5	37	0	0	37	0
SUM	538	102	640	456	25	159	0

2.3 The Issues of Linux Upstream v4.7-rc2

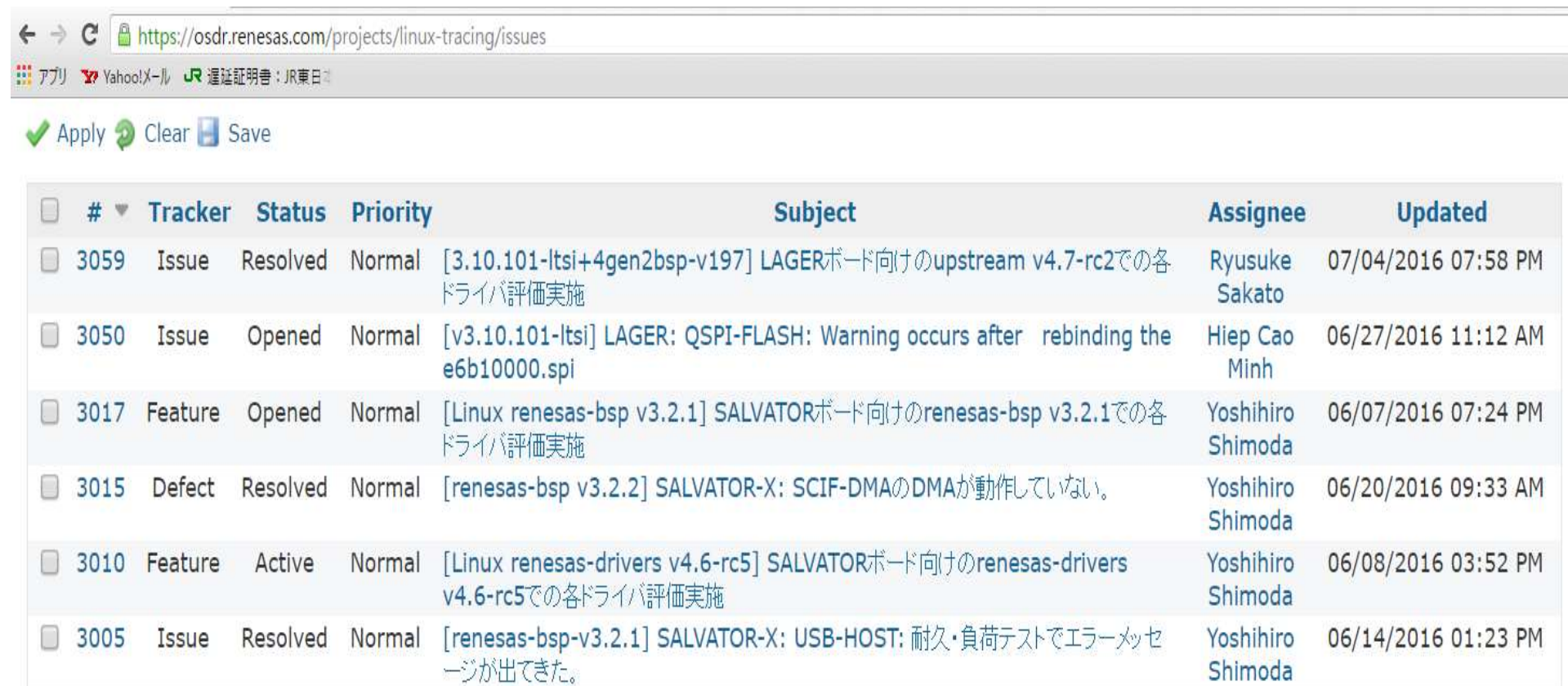
No.	Issues Content	Lager	<u>Koelsch</u>	Ticket No.
1	<u>Rcar</u> -Thermal : LM-SENSORS: Could not recognize thermal sensor.	NG	NG	2913
2	<u>Rcar</u> -Thermal: After unbinding the device, could not rebind again.	NG	NG	3042
3	<u>Rcar</u> -SOUND: Kernel panics after Unbind-Rebind the device.	NG	NG	2103
4	<u>Rcar</u> SOUND: The overrun error message occurs during record a sound, and having noise from the recorded sound file when playing.	NG	NG	3082
5	Lager: Bad image quality when show on HDMI Display.	NG	-	2567
6	<u>Koelsch</u> : Cannot show an image on HDMI Display	-	NG	2877
7	DMAC: Warning message when unbinding	NG	NG	2315
8	SDHI: Kernel WARNING occurs when abnormally access SDHI after removing the device	NG	NG	3043
9	USB-HOST: Kernel WARNING occurs when abnormally access usb after removing the device	NG	NG	3079

3. Failure Analysis Process



3.1 Bug registration/ Redmine Ticket Creation

- The ticket is created for each issue like this.
- The investigated result will be updated and reported here and ML
- The issue is followed up until the improvement patch has been reflected in upstream or ltsi version.



<input type="checkbox"/>	#	Tracker	Status	Priority	Subject	Assignee	Updated
<input type="checkbox"/>	3059	Issue	Resolved	Normal	[3.10.101-ltsi+4gen2bsp-v197] LAGERボード向けのupstream v4.7-rc2での各ドライバ評価実施	Ryusuke Sakato	07/04/2016 07:58 PM
<input type="checkbox"/>	3050	Issue	Opened	Normal	[v3.10.101-ltsi] LAGER: QSPI-FLASH: Warning occurs after rebinding the e6b10000.spi	Hiep Cao Minh	06/27/2016 11:12 AM
<input type="checkbox"/>	3017	Feature	Opened	Normal	[Linux renesas-bsp v3.2.1] SALVATORボード向けのrenesas-bsp v3.2.1での各ドライバ評価実施	Yoshihiro Shimoda	06/07/2016 07:24 PM
<input type="checkbox"/>	3015	Defect	Resolved	Normal	[renesas-bsp v3.2.2] SALVATOR-X: SCIF-DMAのDMAが動作していない。	Yoshihiro Shimoda	06/20/2016 09:33 AM
<input type="checkbox"/>	3010	Feature	Active	Normal	[Linux renesas-drivers v4.6-rc5] SALVATORボード向けのrenesas-drivers v4.6-rc5での各ドライバ評価実施	Yoshihiro Shimoda	06/08/2016 03:52 PM
<input type="checkbox"/>	3005	Issue	Resolved	Normal	[renesas-bsp-v3.2.1] SALVATOR-X: USB-HOST: 耐久・負荷テストでエラーメッセージが出てきた。	Yoshihiro Shimoda	06/14/2016 01:23 PM

3.2 Failure Management Process.

The issue Management List (Gen3 Upstream Version)

VERSION	No.	Salvator-X(Rcar-H3)									
		不具合内容	UPSTREAM	BSP	チケット下番号	評価日付	原因調査と対策パッチ	確認状況	確認日	備考	評価チーム
renesas-drivers-v4.6-rc5 & renesas-bsp-v3.2.1 (新規評価)	1	PM: Suspendしてから自動的にResumeになる。	NG	NG	2996	2016/05/18～ 2016/06/03	チケットをご参考下さい	調査中	2016/6/17	不具合を発見しましたので、これから調査します。	人ソ LINUX-TEAM
	2	HDMIケーブルとUSB-SOUNDデバイスをボードにInsert/removeの時、同じエラーメッセージが出た	NG	NG	2997		チケットをご参考下さい	解決済み	2016/6/17	v4.6とv3.2.2で問題が改善されたことを確認した。	
	3	Rcar-Thermal: 温度が取れますが、エラーメッセージが出た。	未サポート	NG GEN2と同じ	2913		チケットをご参考下さい	調査済み	2016/6/23	現在、GEN2と同じ現象で、GEN2向けの修正パッチが有	
	4	SOUND: 音が出たが、Overrunエラー、Underrunエラー、ノイズが出てきました。	NG	NG	2995		チケットをご参考下さい	調査済み	2016/6/23	森本さんとやり取りで森本さんから送って頂いたパッチを	
	5	SOUND: Unbind-Rebind後、Kernel Panicが発生した。	NG GEN2と同じ	NG GEN2と同じ	2103		チケットをご参考下さい	調査済み	2016/6/17	GEN2と同じ不具合です。既知の問題です。	
	6	USB-HOST: 負荷テストで途中でKernel panicのようなエラーメッセージが出た。	OK	NG	3005		チケットをご参考下さい	解決済み	2016/6/17	本不具合についてbsp-v3.2.2でシェルスクリプトを2回	
	7	DMAE: Unbind-Rebind後、Kernel Panicが発生した。	NG GEN2と同じ	NG GEN2と同じ	2315		チケットをご参考下さい	調査済み	2016/6/17	GEN2と同じ不具合です。既知の問題です。	
	8	SCIF-DMA: SCIF_DMAを有効したら、カーネルをブートできなくなる。	NG	OK	2993		チケットをご参考下さい	解決済み	2016/6/17	renesas-drivers-v4.6とBSPの方で確認したら、v4.6-rc5で	
	9	USB-FUNCTION: Moduleをロードするときにエラーメッセージが出て、ロードできない。	NG	NG	2994		チケットをご参考下さい	調査済み	2016/6/17	下田さんから対応パッチをいただいて、当てたら、動くよう	
renesas-drivers-v4.7-r2 & renesas-bsp-v3.2.2 (不具合再確認)	1	PM: Suspendしてから自動的にResumeになる。	NG	NG	2996	2016/06/19～ 2016/06/24	チケットをご参考下さい	調査不要	2016/6/24	既知の問題。Ubootから発生する割り込み関係です。	人ソ LINUX-TEAM
	2	HDMIケーブルとUSB-SOUNDデバイスをボードにInsert/removeの時、同じエラーメッセージが出た	OK	OK	2997		チケットをご参考下さい	解決済み	2016/6/24	v4.6とv3.2.2で問題が改善されたことを確認した。	
	3	Rcar-Thermal: 温度が取れますが、エラーメッセージが出た。	未サポート	NG GEN2と同じ	2913		チケットをご参考下さい	調査済み	2016/6/24	現在、GEN2と同じ現象で、GEN2向けの修正パッチが有	
	4	SOUND: 音が出たが、Overrunエラー、Underrunエラー、ノイズが出てきました。	OK	OK	2995		チケットをご参考下さい	調査済み	2016/6/24	森本さんとやり取りで森本さんから送って頂いたパッチを	
	5	SOUND: Unbind-Rebind後、Kernel Panicが発生した。	NG GEN2と同じ	NG GEN2と同じ	2103		チケットをご参考下さい	調査済み	2016/6/24	GEN2と同じ不具合です。既知の問題です。	
	6	USB-HOST: 負荷テストで途中でKernel panicのようなエラーメッセージが出た。	OK	OK	3005		チケットをご参考下さい	解決済み	2016/6/24	本不具合についてbsp-v3.2.2でシェルスクリプトを2回	
	7	DMAE: Unbind-Rebind後、Kernel Panicが発生した。	NG GEN2と同じ	NG GEN2と同じ	2315		チケットをご参考下さい	調査済み	2016/6/24	GEN2と同じ不具合です。既知の問題です。	
	8	SCIF-DMA: SCIF_DMAを有効したら、カーネルをブートできなくなる。	OK	OK	2993		チケットをご参考下さい	解決済み	2016/6/24	renesas-drivers-v4.6とBSPの方で確認したら、v4.6-rc5で	
	9	USB-FUNCTION: Moduleをロードするときにエラーメッセージが出て、ロードできない。	-	-	2994		チケットをご参考下さい	調査済み	2016/6/24	下田さんから対応パッチをいただいて、当てたら、動くよう	

4. Other Activities- Driver Patch Development

■ QSPI, I2C Driver Development.

- Developed QSPI, I2C drivers for Rcar-Gen2.
- These drivers were added to Linux Upstream.

■ Created patches to improve SPI performance for Rcar-Gen2.

(spi: Using Trigger number to transmit/receive data)

- Using Trigger level function at SPI to transfer 32bytes of data instead of each 1byte in PIO Operation Mode.
- This patch is added to Linux Upstream.

4. Other Activities - Linux Tracing

During the performance analysis, using dedicated tools to analyze the issue.

- Partner Jet.
- Bootchart.
- LTTng.

Screen shot of partner-Jet (event-tracker)



5. New Activity

■ Upstream Deliverables Test

- In order to improve the quality of patches and feedback to developer early.
- Testing the deliverables before delivery to REL.
- If an issue is found, feedback to developers to fix it early.
- Test contents are based on deliverables documents.

5. New Activity

■ Upstream Deliverables Test

- SCIF/HSCIF driver before deliverable (Example):

TEST VERSION: renesas-drivers-2016-05-17-v4.6							
Tested By	Linux Team	Normal	N	BOARD (Function)	SALVATOR-X (SCIFx, HSCIFx)		
Test Date	2016/06/14	Abnormal	A				
No.	Test Items	Type	Prerequisite	Test Procedure	Expected Value	Remarks	Result
3	DMA Transfer: Transfers between SCIF3 and HSCIF3 From SCIF3 to HSCIF3:	N	Connect the evaluation board and HOST PC by RS232 cable. # CONFIG_SERIAL_SH_SCI_DMA=y Insert Samtec-Breakout-Adapters device to EXIO Connector C on board	1. Start-up the evaluation board. 2. Connect SCIF3 TXD (EXIO Connect D pin 21) to HSCIF3 RXD (EXIO Connect D pin 28) 3. Execute the following command: # fifotest \$scif3 \$hscif3 -s 1000000 -n 100	Expected output for all two tests above (after ca. 12 seconds): MSG: 100, TX: 55208 bytes, RX: 25932 bytes	[1.318538] [drm] No driver support for vblank timestamp query. [1.324533] rcar-du feb00000.display: failed to initialize DRM/KMS (-517) [1.336019] rcar-du feb00000.display: failed to initialize DRM/KMS (-517)	NG
4	DMA Transfer: Transfers between SCIF3 and HSCIF3 From HSCIF3 to SCIF3:	N	Connect the evaluation board and HOST PC by RS232 cable. # CONFIG_SERIAL_SH_SCI_DMA=y Insert Samtec-Breakout-Adapters device to EXIO Connector C on board	1. Start-up the evaluation board. 2. Connect SCIF3 RXD (EXIO Connect D pin 27) to HSCIF3 TXD (EXIO Connect D pin 30) 3. Execute the following command: # fifotest \$hscif3 \$scif3 -s 1000000 -n 100	Expected output for all two tests above (after ca. 12 seconds): MSG: 100, TX: 55208 bytes, RX: 25932 bytes	[1.318538] [drm] No driver support for vblank timestamp query. [1.324533] rcar-du feb00000.display: failed to initialize DRM/KMS (-517) [1.336019] rcar-du feb00000.display: failed to initialize DRM/KMS (-517)	NG

- SCIF/HSCIF driver after deliverable (Example):

TEST VERSION: renesas-drivers-2016-05-31-v4.7-rc1							
Tested By	Linux Team	Normal	N	BOARD (Function)	SALVATOR-X (SCIFx, HSCIFx)		
Test Date	2016/06/14	Abnormal	A				
No.	Test Items	Type	Prerequisite	Test Procedure	Expected Value	Remarks	Result
3	DMA Transfer: Transfers between SCIF3 and HSCIF3 From SCIF3 to HSCIF3:	N	Connect the evaluation board and HOST PC by RS232 cable. # CONFIG_SERIAL_SH_SCI_DMA=y Insert Samtec-Breakout-Adapters device to EXIO Connector C on board.	1. Start-up the evaluation board. 2. Connect SCIF3 TXD (EXIO Connect D pin 21) to HSCIF3 RXD (EXIO Connect D pin 28) 3. Execute the following command: # fifotest \$scif3 \$hscif3 -s 1000000 -n 100	Expected output for all two tests above (after ca. 12 seconds): MSG: 100, TX: 55208 bytes, RX: 25932 bytes	U-Boot 2015.04 (Mar 30 2016 - 12:41:37) CPU: Renesas Electronics R8A7795 rev 1.0 Board: Salvator-X I2C: ready DRAM: 896 MiB	OK
4	DMA Transfer: Transfers between SCIF3 and HSCIF3 From HSCIF3 to SCIF3:	N	Connect the evaluation board and HOST PC by RS232 cable. # CONFIG_SERIAL_SH_SCI_DMA=y Insert Samtec-Breakout-Adapters device to EXIO Connector C on board.	1. Start-up the evaluation board. 2. Connect SCIF3 RXD (EXIO Connect D pin 27) to HSCIF3 TXD (EXIO Connect D pin 30) 3. Execute the following command: # fifotest \$hscif3 \$scif3 -s 1000000 -n 100	Expected output for all two tests above (after ca. 12 seconds): MSG: 100, TX: 55208 bytes, RX: 25932 bytes	U-Boot 2015.04 (Mar 30 2016 - 12:41:37) CPU: Renesas Electronics R8A7795 rev 1.0 Board: Salvator-X I2C: ready	OK

5. New Activity

BSP group Common Test Environment Construction

■ Linux BSP Product Quality Improvement.

- Making a common test environment for Upstream/LTSI/BSP test.
- Translating the Test Program(TP) into English.
- Improving the test items in Test Program(TP) of BSP.

(The Items not in BSP/TP)

■ Work Performances:

- Translated all 15 of the Test Programs into English.
- Updated the test items of Jinso/TPs to BSP/TPs (The Items not in BSP/TP)

5. List to do

- To analyze the issues that related to Rcar-Sound(overflow message and unbind/rebind), DMA unbind/rebind.
- To investigate the test methods for MSIOF and V4L2.
- VIN does not support enough to test for Upstream,
- For upstream Deliverables Test, to prepare the test environment, need to receive test method documents at least 2 weeks before deliverable.

Finally, We would like to say “Thanks to all upstream members and BSP members for your kind supports”.

“We are looking forward to receive the same kind supports in the future!”.

Thank You For Listening