
高通多媒体技术期刊 20151118



Qualcomm Technologies, Inc.

Confidential and Proprietary – Qualcomm Technologies, Inc.

机密和专有信息——高通技术股份有限公司



Confidential and Proprietary – Qualcomm Technologies, Inc.

Confidential and Proprietary – Qualcomm Technologies, Inc.

NO PUBLIC DISCLOSURE PERMITTED: Please report postings of this document on public servers or web sites to: DocCtrlAgent@qualcomm.com. **禁止公开：**如在公共服务器或网站上发现本文档，请报告至：DocCtrlAgent@qualcomm.com.

Restricted Distribution: Not to be distributed to anyone who is not an employee of either Qualcomm or its affiliated without the express approval of Qualcomm's Configuration Management. **限制分发：**未经高通配置管理部门的明示批准，不得发布给任何非高通或高通附属及关联公司员工的人。 Not to be used, copied, reproduced, or modified in whole or in part, nor its contents revealed in any manner to others without the express written permission of Qualcomm Technologies, Inc. 未经高通技术股份有限公司明示的书面允许，不得使用、复印、复制、或修改全部或部分文档，不得以任何形式向他人透露其内容。

The user of this documentation acknowledges and agrees that any Chinese text and/or translation herein shall be for reference purposes only and that in the event of any conflict between the English text and/or version and the Chinese text and/or version, the English text and/or version shall be controlling. 本文档的用户知悉并同意中文文本和/或翻译仅供参考之目的，如英文文本和/或版本和中文文本和/或版本之间存在冲突，以英文文本和/或版本为准。

This document contains confidential and proprietary information and must be shredded when discarded. 未经高通明示的书面允许，不得使用、复印、复制全部或部分文档，不得以任何形式向他人透露其内容。本文档含有高通机密和专有信息，丢弃时必须粉碎销毁。

Qualcomm reserves the right to make changes to the product(s) or information contained herein without notice. No liability is assumed for any damages arising directly or indirectly by their use or application. The information provided in this document is provided on an "as is" basis. 高通保留未经通知即修改本文档中提及的产品或信息的权利。本公司对使用或应用本文档所产生的直接或间接损失概不负责。本文档中的信息为基于现状所提供，使用风险由用户自行承担。

Qualcomm is a trademark of QUALCOMM Incorporated, registered in the United States and other countries. All QUALCOMM Incorporated trademarks are used with permission. Other product and brand names may be trademarks or registered trademarks of their respective owners. Qualcomm是高通公司
在美国及其它国家注册的商标。所有高通公司的商标皆获得使用许可。其它产品和品牌名称可能为其各自所有者的商标或注册商标。

This technical data may be subject to U.S. and international export, re-export, or transfer ("export") laws. Diversion contrary to U.S. and international law is strictly prohibited. 本文档及所含技术资料可能受美国和国际出口、再出口或转移出口法律的 限制。严禁违反或偏离美国和国际的相关法律。

Qualcomm Technologies, Inc. 5775 Morehouse Drive San Diego, CA 92121 U.S.A.

高通技术股份有限公司，美国加利福尼亚州圣地亚哥市莫豪斯路 5775 号，邮编 92121

Revision History

Revision	Date	Description
A	Nov. 2015	Initial release

Note: There is no Rev. I, O, Q, S, X, or Z per Mil. standards.

内容

- Display
 - HW Cursor 不同平台支持的Size
 - HW Cursor Common Issue on 8996
 - HW Cursor Common Issue on 8976
 - HW Cursor Common Issue on 8952
- Android Stock Chromium
 - Support for WAP website
- SWE M42 Customizing
 - Support for third party jar
 - Add new resource in SWE



Display

HW Cursor 不同平台支持的Size

- 如何查看不同平台支持的HW cursor size :
- a) 在 kernel/include/uapi/linux/msm_mdp.h 中可以找到不同平台上MDP的定义：
 - #define MDSS_MDP_HW_REV_107 MDSS_MDP_REV(1, 7, 0) /* 8996 v1 */
 - #define MDSS_MDP_HW_REV_107_1 MDSS_MDP_REV(1, 7, 1) /* 8996 v2 */
 - #define MDSS_MDP_HW_REV_107_2 MDSS_MDP_REV(1, 7, 2) /* 8996 v3 */
 - #define MDSS_MDP_HW_REV_108 MDSS_MDP_REV(1, 8, 0) /* 8939 v1.0 */
 - #define MDSS_MDP_HW_REV_109 MDSS_MDP_REV(1, 9, 0) /* 8994 v2.0 */
 - #define MDSS_MDP_HW_REV_110 MDSS_MDP_REV(1, 10, 0) /* 8992 v1.0 */
 - #define MDSS_MDP_HW_REV_200 MDSS_MDP_REV(2, 0, 0) /* 8092 v1.0 */
 - #define MDSS_MDP_HW_REV_112 MDSS_MDP_REV(1, 12, 0) /* 8952 v1.0 */
 - #define MDSS_MDP_HW_REV_111 MDSS_MDP_REV(1, 11, 0) /* 8956/76 v1.0 */
- b) 在mdss_mdp.c中，函数 mdss_mdp_hw_rev_caps_init 可以查看到支持的cursor size，举例如下：
 - case MDSS_MDP_HW_REV_107_2: // 8996 v3
 - mdata->max_cursor_size = 128;

HW Cursor 不同平台支持的Size – cont.

- 另外，可以通过下面command来查看支持的cursor size：
 - adb shell cat "/sys/class/graphics/fb0/mdp/caps"
- 示例，在8996上，
 - mdp_version=5
hw_rev=268894210
rgb_pipes=4
vig_pipes=4
dma_pipes=2
blending_stages=7
cursor_pipes=2
max_cursor_size=128
smp_count=0
smp_size=0
smp_mb_per_pipe=0
max_downscale_ratio=4
max_upscale_ratio=20
scale_factor=1
max_bandwidth_low=9600000
max_bandwidth_high=9600000
max_pipe_width=2560
max_mixer_width=2560
max_pipe_bw=4500000
max_mdp_clk=412500000

HW Cursor Common Issue on 8996

- Issue description:
 - HW cursor 有旋转时，HW cursor pipe没有被使用，而使用了MDP Pipe。此问题主要为了解决，cursor即使有旋转，也需要使用HW cursor pipe。
- Analysis:
 - 在没有旋转的情况下，HW cursor 使用 HW cursor Pipe, 如下图所示。

```
h/w composer state:
  h/w composer present and enabled
Hardware Composer state (version 01040000):
  mDebugForceFakeVSync=0
  Display[0] configurations (* current):
    * 0: 1600x2560, xdpi=489.638000, ydpi=488.902008, refresh=16666666
  numHwLayers=5, flags=00000000
```

type	handle	hint	flag	tr	blnd	format	source crop (l,t,r,b)	frame	name
HWC	7f9041e080	0002	0000	00	0100	RGBA_8888	0.0, 0.0, 1600.0, 2560.0	0, 0, 1600, 2560	com.google.android.gm/com
HWC	7f9041d540	0002	0000	00	0105	RGBA_8888	0.0, 0.0, 1600.0, 72.0	0, 0, 1600, 72	StatusBar
HWC	7f9041e0e0	0002	0000	00	0105	RGBA_8888	0.0, 0.0, 1600.0, 144.0	0, 2416, 1600, 2560	NavigationBar
HWC_CURSOR	7f8d6fe3e0	0000	0002	00	0105	RGBA_8888	0.0, 0.0, 99.0, 99.0	905, 1691, 1004, 1790	Sprite
FB TARGET	7f8d71cf40	0000	0000	00	0105	RGBA_8888	0.0, 0.0, 1600.0, 2560.0	0, 0, 1600, 2560	HWC_FRAMEBUFFER_TARGET

HW Cursor Common Issue on 8996 – cont1

- SDM info:
 - 0x400 表示 HW cursor0 Pipe.
 - SDM information 可以从dumpsys SurfaceFlinger中获取.

```
----- Snapdragon Display Manager -----  
-----  
device type: 0  
state: 1, vsync on: 1, max. mixer stages: 7  
num configs: 1, active config index: 0  
res:1600 x 2560, dpi:489.64 x 488.90, fps:1.25, vsync period: 60  
  
ROI(L T R B) : LEFT(0 0 1600 2560), RIGHT(0 0 0 0)
```

Idx	Comp Type	Split	WB	Pipe	W x H	Format	Src Rect (L T R B)	Dst Rect (L T R B)	Z	Flags	Deci (HxV)
0	SDE	Comp-L	-	0x040	1600 x 2560	RGBA_8888_UBWC	0 0 800 2560	0 0 800 2560	0	0x00000000	0 x 0
		Comp-R	-	0x080	1600 x 2560	RGBA_8888_UBWC	800 0 1600 2560	800 0 1600 2560	0	0x00000000	0 x 0
1	SDE	Comp-L	-	0x008	1600 x 80	RGBA_8888_UBWC	0 0 800 72	0 0 800 72	1	0x00000000	0 x 0
		Comp-R	-	0x010	1600 x 80	RGBA_8888_UBWC	800 0 1600 72	800 0 1600 72	1	0x00000000	0 x 0
2	SDE	Comp-L	-	0x020	1600 x 144	RGBA_8888_UBWC	0 0 800 144	0 2416 800 2560	2	0x00000000	0 x 0
		Comp-R	-	0x200	1600 x 144	RGBA_8888_UBWC	800 0 1600 144	800 2416 1600 2560	2	0x00000000	0 x 0
3	CURSOR	Comp-L	-	0x400	128 x 99	RGBA_8888	0 0 99 99	905 1691 1004 1790	6	0x0000000a	0 x 0

HW Cursor Common Issue on 8996 – cont2

- 当HW cursor layer 有旋转时，如landscape mode,
 - Have 90 rotation (tr is 04)
 - HW cursor pipe 没有被使用
 - Cursor layer 使用了MDP Pipe

```
h/w composer state:
h/w composer present and enabled
Hardware Composer state (version 01040000):
mDebugForceFakeVSync=0
Display[0] configurations (* current):
* 0: 1600x2560, xdpi=489.638000, ydpi=488.902008, refresh=16666666
numHwLayers=5, flags=00000000
```

type	handle	hint	flag	tr	blnd	format	source crop (l,t,r,b)	frame	name
HWC	7f88375a20	0002	0000	00	0100	RGBA_8888	0.0, 0.0, 1600.0, 2560.0	0, 0, 1600, 2560	com.google.android.gm/cor
HWC	7f883768c0	0002	0000	00	0105	RGBA_8888	0.0, 0.0, 72.0, 2560.0	1528, 0, 1600, 2560	StatusBar
HWC	7f88375000	0002	0000	00	0105	RGBA_8888	0.0, 0.0, 1600.0, 126.0	0, 2434, 1600, 2560	NavigationBar
HWC	7f8d6fe620	0002	0002	04	0105	RGBA_8888	0.0, 0.0, 99.0, 99.0	399, 1602, 498, 1701	Sprite
FB TARGET	7f8d71cf40	0000	0000	00	0105	RGBA_8888	0.0, 0.0, 1600.0, 2560.0	0, 0, 1600, 2560	HWC_FRAMEBUFFER_TARGET

HW Cursor Common Issue on 8996 – cont3

- SDM info:
 - ViG0 is used for cursor layer(0x001 表示 MDP ViG0 Pipe).

```
----- Snapdragon Display Manager -----
-----
device type: 0
state: 1, vsync on: 1, max. mixer stages: 7
num configs: 1, active config index: 0
res:1600 x 2560, dpi:489.64 x 488.90, fps:1.25,vsync period: 60

ROI(L T R B) : LEFT(0 0 1600 2560), RIGHT(0 0 0 0)

|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Idx | Comp Type | Split | WB | Pipe | W x H | Format | Src Rect (L T R B) | Dst Rect (L T R B) | Z | Flags | Deci (HxV) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | SDE | Comp-L | - | 0x020 | 1600 x 2560 | RGBA_8888_UBWC | 0 0 800 2560 | 0 0 800 2560 | 0 | 0x00000000 | 0 x 0 |
| | | Comp-R | - | 0x080 | 1600 x 2560 | RGBA_8888_UBWC | 800 0 1600 2560 | 800 0 1600 2560 | 0 | 0x00000000 | 0 x 0 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1 | SDE | Comp-L | - | 0x008 | 128 x 2560 | RGBA_8888_UBWC | 0 0 72 2560 | 1528 0 1600 2560 | 1 | 0x00000000 | 0 x 0 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2 | SDE | Comp-L | - | 0x010 | 1600 x 128 | RGBA_8888_UBWC | 0 0 800 126 | 0 2434 800 2560 | 2 | 0x00000000 | 0 x 0 |
| | | Comp-R | - | 0x200 | 1600 x 128 | RGBA_8888_UBWC | 800 0 1600 126 | 800 2434 1600 2560 | 2 | 0x00000000 | 0 x 0 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 3 | SDE | Rot-L | 0 | 0x000 | 128 x 99 | RGBA_8888 | 0 0 99 99 | 0 0 99 99 | - | - | - |
| | | Comp-L | - | 0x001 | 99 x 99 | RGBA_8888 | 0 0 99 99 | 399 1602 498 1701 | 3 | 0x0000000a | 0 x 0 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
```

- Fix solution:
 - CR为923081，如果有此问题，可以联系高通。

HW Cursor Common Issue on 8976

- Issue description:
 - 当使能HW Cursor后，在移动鼠标过程中，背景颜色会显示异常。
- Analysis:
 - 从dump SurfaceFlinger信息来看，在display HAL 层，Cursor的配置没问题。此问题是由于driver 层引起的。

```
Display[0] configurations (* current):

* 0: 1080x1920, xdpi=397.565002, ydpi=399.737000, secure=1 refresh=16666667

numHwLayers=4, flags=00000000

type | handle | hint | flag | tx | blnd | format | source crop(l,t,r,b) | frame | dirtyRect | name
-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----
HWC | b8db2e10 | 0002 | 0000 | 00 | 0100 | RGBA_8888 | 0.0, 0.0, 1080.0, 1920.0 | 0, 0, 1080, 1920 | [ 0, 0, 1080, 1920] | com.android.settings/com.and
HWC | b8db06f0 | 0002 | 0000 | 00 | 0105 | RGBA_8888 | 0.0, 0.0, 1080.0, 75.0 | 0, 0, 1080, 75 | [ 0, 0, 1080, 75] | StatusBar
HWC_CURSOR | b8dabf48 | 0000 | 0002 | 00 | 0105 | RGBA_8888 | 0.0, 0.0, 50.0, 50.0 | 700, 1218, 750, 1268 | [ 0, 0, 50, 50] | Sprite
FB TARGET | b8d59828 | 0000 | 0000 | 00 | 0105 | RGBA_8888 | 0.0, 0.0, 1080.0, 1920.0 | 0, 0, 1080, 1920 | [ 0, 0, 0, 0] | HWC_FRAMEBUFFER_TARGET

Qualcomm HWC state:

MDPVersion=500

DisplayPanel=9

DynRefreshRate=60
```

HW Cursor Common Issue on 8976 – cont1

- Fix solution:

1. Display HAL changes:

- hwc/overlay: Pass handle w/h and crop w/h through fb_image field
- https://www.codeaurora.org/cgit/quic/la/platform/hardware/qcom/display/commit/?h=LA.BR.1.3.1_rb3&id=6a26635eb14c41fac755b7231497e7c51cdd3e3d

2. Kernel changes:

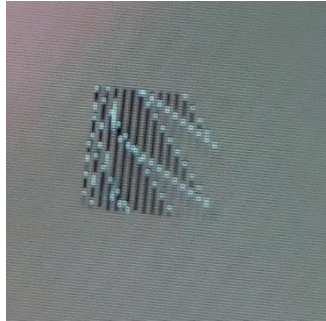
- msm: mdss: use hw cursor on LM for 8976 and 8952
- https://www.codeaurora.org/cgit/quic/la/kernel/msm-3.10/commit/?h=LA.BR.1.3.1_rb3&id=7a721a6a6da351ca9adc584334e324227559b1cb

HW Cursor Common Issue on 8952

- Issue description:

- 在8952平台上，HW cursor 支持的size为64x64.

a) 当cursor layer size 小于 64x64时，会出现显示问题，如图所示



b) 当cursor layer size 大于 64x64时，返回使用GPU合成。

- Analysis:

- 对于此问题，由于stride align不正确引起的。

HW Cursor Common Issue on 8952 – cont1

- Dump SurfaceFlinger log: (adb shell dumpsys SurfaceFlinger)

```
Display[0] configurations (* current):
```

```
* 0: 1200x1920, xdpi=225.776993, ydpi=225.776993, refresh=16666667
```

```
numHwLayers=6, flags=00000000
```

type	handle	hint	flag	tr	blnd	format	source crop (l,t,r,b)	frame	name
HWC	55a9d10630	0002	0000	00	0100	RGB_888	200.0, 48.0, 1400.0, 1824.0	0, 48, 1200, 1824	com.android.systemui.ImageWallpaper
HWC	55a9d58cc0	0002	0000	00	0105	RGBA_8888	0.0, 48.0, 1200.0, 1824.0	0, 48, 1200, 1824	com.android.launcher/com.android.la
GL ES	55a9d18ba0	0000	0000	00	0105	RGBA_8888	0.0, 0.0, 1200.0, 48.0	0, 0, 1200, 48	StatusBar
GL ES	55a9d5d380	0000	0000	00	0105	RGBA_8888	0.0, 0.0, 1200.0, 96.0	0, 1824, 1200, 1920	NavigationBar
HWC_CURSOR	55a9d21a80	0000	0002	00	0105	RGBA_8888	0.0, 0.0, 44.0, 56.0	776, 620, 820, 676	Sprite
FB TARGET	55a9d17330	0000	0000	00	0105	RGBA_8888	0.0, 0.0, 1200.0, 1920.0	0, 0, 1200, 1920	HWC_FRAMEBUFFER_TARGET

```
Qualcomm HWC state:
```

```
MDPVersion=500
```

```
DisplayPanel=8
```

```
DynRefreshRate=60
```

- Fix solution:
 - CR为**932865**，如果有此问题可以联系高通。



Android Stock Chromium

Support for WAP website

- 中国运营商都要求浏览器能访问wap网站，wap网站主要有wml网页和xhtmlmp网页。目前系统stock chromium内核不支持该功能，需要重新实现：

step one :

路径/android/external/chromium_org/third_party/WebKit加上patch

<https://www.codeaurora.org/cgit/quic/chrome4sdp/chromium/blink/commit/?h=2125&id=d3a5bb05830137b34e83c74e240240cdd447316a>

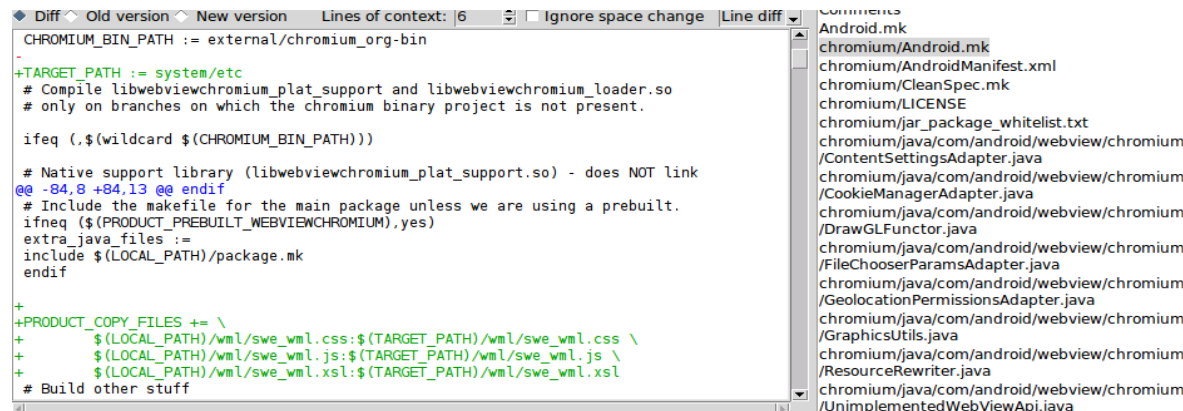
step two :

路径/android/external/chromium_org加上patch

<https://www.codeaurora.org/cgit/quic/chrome4sdp/chromium/src/commit/?h=2125&id=7733f0cf39a3ca20f8808c15914146605fde7270>

step three :

修改或新建android.mk，实现把wml.zip拷贝到能访问的目录，示例把文件拷贝到system/etc目录下。



```
Diff Old version New version Lines of context: 6 Ignore space change Line diff
CHROMIUM_BIN_PATH := external/chromium_org-bin
+TARGET_PATH := system/etc
# Compile libwebviewchromium_plat_support and libwebviewchromium_loader.so
# only on branches on which the chromium binary project is not present.

ifeq (,$(wildcard $(CHROMIUM_BIN_PATH)))

# Native support library (libwebviewchromium_plat_support.so) - does NOT link
@@ -84,8 +84,13 @@ endif
# Include the makefile for the main package unless we are using a prebuilt.
ifneq ($(PRODUCT_PREBUILT_WEBVIEWCHROMIUM),yes)
extra_java_files :=
include $(LOCAL_PATH)/package.mk
endif

+PRODUCT_COPY_FILES += \
+ $(LOCAL_PATH)/wml/swe_wml.css:$(TARGET_PATH)/wml/swe_wml.css \
+ $(LOCAL_PATH)/wml/swe_wml.js:$(TARGET_PATH)/wml/swe_wml.js \
+ $(LOCAL_PATH)/wml/swe_wml.xsl:$(TARGET_PATH)/wml/swe_wml.xsl
# Build other stuff
```

Support for WAP website

step four :

修改第一步patch中关于swe_wml.xml的路径，如示例应该修改为file:///system/etc/wml/swe_wml.xml

```
diff --git a/Source/core/xml/parser/XMLDocumentParser.cpp b/Source/core/xml/parser/XMLDocumentParser.cpp
index ba3ccf5..c85f6b4 100644
--- a/Source/core/xml/parser/XMLDocumentParser.cpp
+++ b/Source/core/xml/parser/XMLDocumentParser.cpp
@@ -348,7 +348,24 @@ void XMLDocumentParser::insert(const SegmentedString&)
{
    SegmentedString source(inputSource);
    String data(inputSource);
    if (document()->isWMLDocument() && !m_parsedFirstWMLFragment) {
        m_parsedFirstWMLFragment = true;
        document()->securityOrigin()->grantUniversalAccess();
        document()->securityOrigin()->grantAccessInsecureContent();
        DEFINE_STATIC_LOCAL(String, xmlDecl, ("<?xml"));
        DEFINE_STATIC_LOCAL(String, wmlTag, ("<wml"));
        DEFINE_STATIC_LOCAL(String, xslInsertion, ("<?xml-stylesheet type='text/xsl' href='file:///android_asset/wml/swe_wml.xml'>\n"));
        size_t xmlDeclStart = data.findIgnoringCase(xmlDecl);
        // Remove all the junk before the xml declaration
        if (xmlDeclStart > 0)
            data.remove(0, xmlDeclStart);
        // Insert WML XSL sheet before <wml> tag.
        size_t wmlStart = data.findIgnoringCase(wmlTag);
        if (wmlStart > 0)
            data.insert(xslInsertion, wmlStart);
    }
    SegmentedString source(data);
    if (m_sawXSLTransform || !m_sawFirstElement)
        m_originalSourceForTransform.append(source);
}
```

step five :

修改第一步patch中关于swe_wml.xml的路径，如示例应该修改为file:///system/etc/wml/swe_wml.xml

```
<xsl:template match="wml">
<html>
<head>
<meta name="viewport" content="width=device-width,initial-scale=1,maximum-scale=1,user-scalable=no"/></meta>
<link rel="stylesheet" href="file:///android_asset/wml/swe_wml.css" type="text/css"/></link>
<script src="file:///android_asset/wml/swe_wml.js" type="text/javascript"/></script>
</head>
<body class="wml_body">
<xsl:choose><xsl:when test="@id"><xsl:attribute name="id"><xsl:value-of select="@id"/></xsl:attribute></xsl:when></xsl:choose>
<xsl:choose><xsl:when test="@class"><xsl:attribute name="class"><xsl:value-of select="@class"/></xsl:attribute></xsl:when></xsl:choose>
<xsl:choose><xsl:when test="@lang"><xsl:attribute name="lang"><xsl:value-of select="@lang"/></xsl:attribute></xsl:when></xsl:choose>
<xsl:apply-templates />
</body>
</html>
</xsl:template>
```



SWE M42 Customizing

Support for thirdparty jar

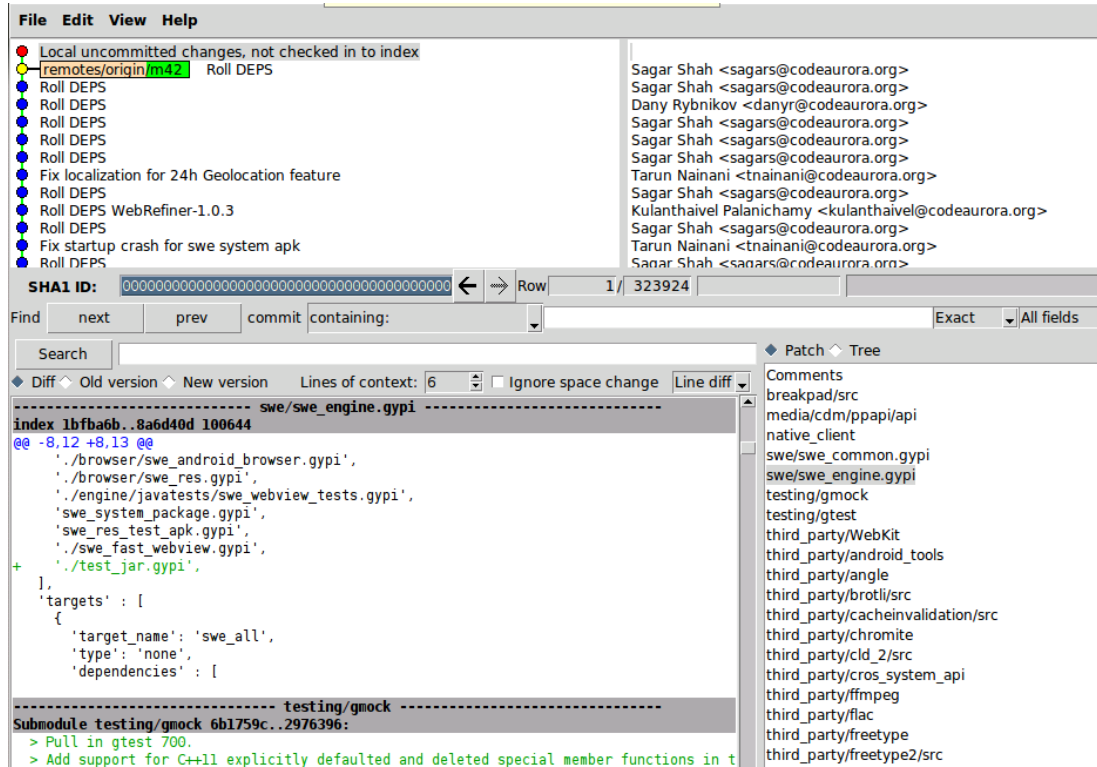
- SWE42 add jar process

1.put jar to SWE project, like the sample jar which is placed in this path:./src/swe/fast-webview/target/

2.create a gypi file like

3.modify swe_engine.gypi

test_jar.gypi

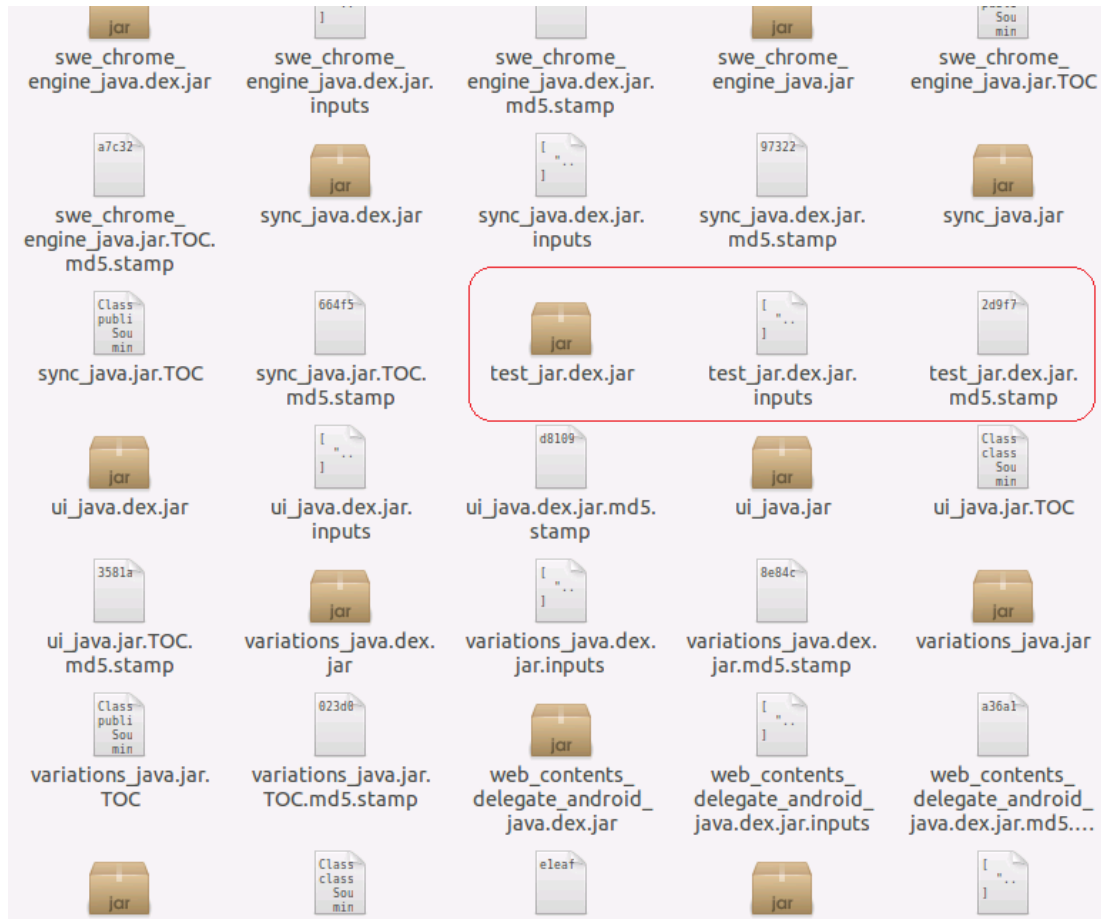


4.modify swe_common.gypi file



Support for thirdparty jar

5.remove the out directory and rebuild



Add new resource in SWE

- Add new resource in swe

- Add a new directory and files such as yourdirectory/yourfile

1. Create your directory and file under the directory src/swe/browser/assets/
such as: yourdirectory/yourfile, then modify swe_common.gypi and swe_system_package.gypi

```
--- a/swe/swe_common.gypi
+++ b/swe/swe_common.gypi
@@ -22,6 +22,9 @@
     '<(assets_dir)/wml/swe_wml.js',
     '<(assets_dir)/wml/swe_wml.css',
   ],
+   'swe_assets_yourdirectory': [
+     '<(assets_dir)/yourdirectory/yourfile',
+   ],
   'swe_dependencies': [
     'swe_chrome_engine_java',
     '<@(libnetxt_dependencies)',
  ]

--- a/swe/swe_system_package.gypi
+++ b/swe/swe_system_package.gypi
@@ -63,6 +63,12 @@
     '<@(swe_assets_wml)',
   ],
 },
+ {
+   'destination': '<(PRODUCT_DIR)/swe_android_system_browser_apk/assers/yourdirectory',
+   'files': [
+     '<@(swe_assets_yourdirectory)',
+   ],
+ },
 ],
 'includes': [ '..',/build/java_apk.gypi' ],
 },
```

Add new resource in SWE

2. modify swe/browser/swe_android_browser.gypi file

```
--- a/swe_android_browser.gypi
+++ b/swe_android_browser.gypi
@@ -55,6 +55,12 @@
     '<@(swe_assets_wml)',
   ],
 },
+ {
+   'destination': '<(PRODUCT_DIR)/swe_android_browser_apk/assets/yourdirectory',
+   'files': [
+     '<@(swe_assets_yourdirectory)',
+   ],
+ },
 ],
 'includes': [ '../build/java_apk.gypi' ],
 },
```

3. modify swe/browser/swe_res.gypi file

```
--- a/swe_res.gypi
+++ b/swe_res.gypi
@@ -43,6 +43,12 @@
     '<(PRODUCT_DIR)/swe_android_browser_apk/assets/wml/swe_wml.css',
   ],
 },
+ {
+   'destination': '<(PRODUCT_DIR)/swe_android_browser_apk/swe_res/assets/yourdirectory',
+   'files': [
+     '<(PRODUCT_DIR)/swe_android_browser_apk/assets/yourdirectory/yourfile',
+   ],
+ },
```


Add new resource in SWE

- Add new icon for SWE browser

Under this directory:swe/browser/channels/beta/res/

mipmap-hdpi:

ic_launcher_browser.png

mipmap-mdpi:

ic_launcher_browser.png

mipmap-xhdpi:

ic_launcher_browser.png

mipmap-xxhdpi:

ic_launcher_browser1.png ic_launcher_browser.png

Questions?

<https://support.cdmatech.com>

