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Android_9.0 系统新特性说明

Android_9.0_System_New_Feature_Instruction

（技术部，第二系统产品部）

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V1.0	卞金晨 Bian Jinchen	2018.11.16	创建初始版本 Initial version release	
V1.1	卞金晨 Bian Jinchen	2018.12.05	添加屏幕旋转支持 Add panel rotation support	
V1.2	卞金晨 Bian Jinchen	2019.01.09	添加 root 及弹框处理 Add root and prompt processing	
V1.3	卞金晨 Bian Jinchen	2019.03.08	增加 DTBO 编译方法 Add DTBO compiling method	

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1 概述 Overview

本文档对 Android 9.0 系统的新特性进行简要说明，主要针对于开发和调试方面。功能方面的更新请查看 AOSP 官网。

This document simply describes the new features of Android9.0, mainly from development and debugging point of view. For features update, please refer to AOSP official release.

在 Android 9.0 中，Google 要求必须支持的，影响开发和调试的主要有以下几个功能，详细内容请查看各个小节。

In Android9.0, the following features which will affect development and debugging must be supported as Google requires. Please refer to each section for more details.

2 新特性说明 New feature instruction

2.1 System As Root

在 Android 9.0 系统中，Ram-disk 不再位于 boot 分区，而是移动至 System 分区，这样方便进行各个分区的 OTA 升级，这也是静默升级(A/B 升级) 的前提条件。

In Android9.0 system, Ram-disk is no longer in boot partition, and it is transferred to System partition, which is convenient for each partition to do OTA upgrade and also the pre-condition of silent upgrade (A/B upgrade).

注：RK SDK 现已支持 A/B 升级，如有需要请联系 FAE 获取相应文档。

Note: RK SDK already supports A/B upgrade. Please contact FAE to obtain the corresponding document if needed.

对于各个分区，Recovery 未做改动(Ram-Disk + Kernel + Resource + Recovery)，其余分区具体区别如表 1：

For each partition, Recovery doesn't change (Ram-Disk + Kernel + Resource + Recovery). The differences of other partitions are shown in Table 1:

System As Root	Boot Partition	Kernel/Resource Partition	System Partition
Support	Kernel + Resource	----	Ram-Disk + System
Nonsupport	Ram-Disk	Kernel/Resource	System
Nonsupport (OTA)	Ram-Disk + Kernel + Resource	Kernel/Resource	System

表 1：是否支持 System As Root 功能中各个分区的内容对比

Table 1: Content comparison among partitions supporting/non-supporting System As Root function

由上表可见，在支持 SystemAsRoot 的情况下，开发及调试过程中，kernel 部分的修改生效，需要：

As seen from above table, when SystemAsRoot is supported, during development and debugging, to make kernel modification take effect, it needs:

- boot

通常修改编译 kernel 后，kernel 目录下会生成 boot.img，此时的 boot.img 已经满足了系统启动的最低要求，所以烧写这个 boot 即可使系统的 resource/kernel 生效，后续的全部编译(或 make bootimage)实际是为 boot 进行签名和添加其他命令行参数。

Generally after modify and compile kernel, it will generate boot.img in kernel directory. Current boot.img already meets the lowest requirement to boot up the system, so flashing this boot is enough to make resource/kernel of system take effect. The whole compiling later (or make bootimage) is actually to sign boot and add other command line parameter.

- recovery

recovery 需要依赖 Android 部分，所以需要全部编译(或 make recoveryimage)打包才可以生效。

Recovery is dependent on Android part, so it needs whole compiling (or make recoveryimage) and package to make it take effect.

Device/rockchip/common 更新包含以下点后，关闭 avb 时能够直接使用打包脚本(./mkimage.sh)生成 boot 及 recovery，不再需要全部编译：

After Device/rockchip/common update includes the following commit, and avb is disabled, you can directly use package script (./mkimage.sh) to generate boot and recovery, instead of whole compiling:

commit 6a893082791219d11b57d64d1d362e4b3cda30bc

Author: Bian Jin chen <kenjc.bian@rock-chips.com>

Date: Thu Dec 27 15:31:09 2018 +0800

mkimage.sh: support update boot & recovery from kernel when avb-disable.

Change-Id: I1ae86b13eebb918e2bb955767f8806b652dd72fe

Signed-off-by: Bian Jin chen <kenjc.bian@rock-chips.com>

2.2 Android Verified Boot (avb)

在 RK 的 Android 9.0 系统中，Android Verified Boot 默认使用 2.0 (AVB)进行固件的完整性校验，修改其中任意一个系统镜像后校验会失败导致无法开机，需要调试可以关闭该功能：

In RK Android9.0 system, Android Verified Boot uses 2.0 (AVB) to do the image complete verification by default. After modifying any of the system images, the verification will fail and it will lead to boot up failure. You can disable this function if required for debugging:

1. 编译时关闭：

Disable when compiling:

device/rockchip/rkxxxx/BoardConfig.mk：BOARD_AVB_ENABLE := false

2. 编译后关闭：

Disable after compiling:

详情请查看 RKDocs/android/Android 验证启动功能说明 V1.0 20181112.pdf

For more details, please refer to RKDocs/android/Android 验证启动功能说明 V1.0 20181112.pdf.

2.3 Device Tree Blob Overlay (DTBO)

Android 9.0 支持 Device Tree Overlays 功能，开发过程体现在需要烧写 dtbo.img，用于多个产品间的兼容等。SDK 默认带了空的 dtbo.img(位于 device/rockchip/rkxxxx)，如有需要请自行生成。

Android9.0 supports Device Tree Overlays function, which requires to flash dtbo.img during development, and can be used for compatibility between multiple products, etc. SDK has blank btbo.img (in device/rockchip/rkxxxx) by default. Please generate by yourself if needed.

如果需要修改 dtbo.img，请参考如下地址修改：

If need to modify dtbo.img, please refer to below link:

https://source.android.google.cn/devices/architecture/dto

命令(参考):

Command (reference):

dtc -@ -O dtb -o temp.dtbo your_dts_overlay.dts

mkdtimg create dtbo.img temp.dtbo

2.4 默认横竖屏旋转 How to rotate the default panel direction

在 Android 9.0 中不再使用原先的属性“ro.sf.hwrotation=90”来进行默认横竖屏的旋转了，而是使用新的 ConfigstoreHAL，有关 ConfigStoreHAL 的说明可以参照 Android 官网，这里仅对如何旋转做说明。

Android9.0 doesn't use original property "ro.sf.hwrotation=90" to rotate the default panel direction any more. Instead, it uses new ConfigstoreHAL. You can refer to Android official website for the instruction of ConfigstoreHAL. Here we only introduce how to rotate.

修改方法：

Modification method:

device/rockchip/rkxxxx/BoardConfig.mk：

SF_PRIMARY_DISPLAY_ORIENTATION := 0/90/180/270

Sensor 和 TP 方向请根据手册到 dts 和驱动进行调整以保证兼容 AOSP System。

Please adjust sensor and TP directions in dts and driver according to the datasheet to ensure it compatible with AOSP System.

附: RKDocs/common/driver/Rockchip_Sensors_开发指南_V1.0_20180605.pdf

Attached: RKDocs/common/driver/Rockchip_Sensors_ 开 发 指 南 _V1.0_20180605.pdf

2.5 非 GMS 项目获取 root 权限 Acquire root access for non GMS project

在 Android 9.0 中支持编译时打开 root 权限，以供非 GMS 项目做 root 权限管理功能，打开方法：

Android9.0 supports to open root access when compiling, for non GMS project to manage root authority. Enable method:

device/rockchip/rkxxxx/BoardConfig.mk：

BOARD_ALLOW_ROOTSERVICE := true

附: device/rockchip/common/rootservice/readme.txt

Attached: device/rockchip/common/rootservice/readme.txt

2.6 开机弹出"Android 系统出现问题"警告 Warning "Android system problem occurs" pops up after boot up

出现警告框的原因有三种：

There are three reasons to pop up the warning:

1. 固件不匹配，system/boot/vendor 三个 fingerprint 不一致。

   Image mismatch, the fingerprints of system/boot/vendor are not consistent.

2. 机器处于解锁状态，如果是锁定状态，机器不会弹窗。

   The device is in unlock state, if it is locked, there will be no prompt.

3. 机器打开支持了 IO 功能的 config，关闭即可(GMS 项目直接合入 baseline 的 kernel patch 包)。

   The device enables config to support IO function, just close it (directly integrate kernel patch of baseline for GMS project).

4. 对于非 GMS 项目，可以直接不管上述三种原因，直接合入以下 patch 去掉弹窗：

   For non GMS project, regardless of the above three reasons, directly integrate below patch to remove the prompt:

   修改 frameworks/base：

   Modify frameworks/base:

services/core/java/com/android/server/am/ActivityManagerService.java

```
if (!Build.isBuildConsistent()
        && ("orange".equals(SystemProperties.get("ro.boot.verifiedbootstate",
"red")))) {
```

```
Slog.e(TAG, "Build fingerprint is not consistent, warning user");
-
mUiHandler.obtainMessage(SHOW_FINGERPRINT_ERROR_UI_MSG).sendToTarget()
;
+
//mUiHandler.obtainMessage(SHOW_FINGERPRINT_ERROR_UI_MSG).sendToTarget
();
```