TEGRA LINUX DRIVER PACKAGE R24.1

Release Notes

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1.0 ABOUT THIS RELEASE

The NVIDIA® Tegra® Linux Driver Package supports development of platforms running:

▶ NVIDIA® Tegra® X1 series computer-on-a-chip
▶ Linux kernel 3.10.96

> 💬 **Note: This release of Tegra Linux Driver Package R24.1 is a release for the NVIDIA® Jetson™ Developer Kit (P2371-2180).**

1.1 WHAT'S NEW

▶ Support for 64-bit user space and runtime libraries
▶ Vulkan support
▶ V4L2 media-controller driver support for camera sensors (bypassing ISP)

See "Software Features" in the *Tegra Linux Driver Package Development Guide* for more information about the features of this release.

For a complete list of kernel changes in this release see the following website:

http://nv-tegra.nvidia.com/gitweb/?p=linux-3.10.git;a=shortlog;h=refs/heads/l4t/l4t-r24.1

1.2 LOGIN CREDENTIALS

The default login credentials are:

▶ Username: ubuntu
▶ Password: ubuntu

1.3   SOURCES FOR INCLUDED LINUX DISTRIBUTION PACKAGES

Visit the Jetson Embedded Platform website for source code provided subject to the terms of open source licenses that require source code availability, such as the GNU General Public License.

1.4   TOP ISSUES FIXED SINCE LAST RELEASE

The following issues are resolved in this release.

- ▶ [1723265] Hard resetting the TX1 board while it is above 44°C will cause boot failure due to default system shut down value is set to 44°C. The system will boot up once cooled down to below 44°C. This issue does not occur upon warm reset.
- ▶ [1723265] Hard resetting the TX1 board while it is above 44°C will cause boot failure due to default system shut down value is set to 44°C.
- ▶ [200170514] OSidle power consumption is around 185mW higher when eth0 is disabled.
- ▶ [1708129] GStreamer unable to set FPS rate to rate supported by sensor.

2.0 IMPLEMENTATION NOTES

2.1 COMPILING CUDA SAMPLES

Use the following procedure to compile CUDA samples in this release (both in aarch64 and hardfp) on the target system.

To compile CUDA samples

1. In the Makefile, modify the FILTER_OUT line as follows:

```
FILTER_OUT := 0_Simple/cdpSimplePrint/Makefile
0_Simple/cdpSimpleQuicksort/Makefile 2_Graphics/bindlessTexture/Makefile
6_Advanced/cdpBezierTessellation/Makefile 6_Advanced/cdpQuadtree/Makefile
6_Advanced/cdpLUDecomposition/Makefile
6_Advanced/cdpAdvancedQuicksort/Makefile
7_CUDALibraries/simpleDevLibCUBLAS/Makefile
2_Graphics/simpleGLES_EGLOutput/Makefile 2_Graphics/simpleGLES/Makefile
5_Simulations/nbody_opengles/Makefile 5_Simulations/fluidsGLES/Makefile
0_Simple/simpleMPI/Makefile
```

2. Compile the samples with the following command:

```
GLLINK=-L/usr/lib/aarch64-linux-gnu/tegra make
```

2.2 GSTREAMER-0.10 DEPRECATED

Gstreamer version 0.10 support is deprecated in this release. Use of Gstreamer version 1.0 is recommended for development.

2.3 INSTALLING JETPACK ON NON-ENGLISH LANUGAGE HOST SYSTEMS

The Jetpack installer in this release does not correctly detect a 64-bit CPU (and operating system) on the host unless English is the default language.

To workaround

3. On the host system, install (or verify installation of) the English language package with the following command:

```
sudo apt-get install language-pack-en
```

4. Open /etc/default/locale for editing with the following command:

```
sudo nano /etc/default/locale
```

5. Comment out the language specification in /etc/default/locale and add the following:

```
LANG="en_US.UTF-8"
```

6. Reboot the host.
7. Launch Jetpack with the following command:

```
sudo ./JetPack-L4T-2.1-linux-x64.run
```

2.4 MAXIMIZING TEGRA X1 PERFORMANCE

The commands in the following procedure disable DVFS, CPU Idle, and CPU Quit, to maximize performance. The commands in the procedure are also included in this release as a script, jetson_clocks_max.sh. See "Downloads" in the *Tegra Linux Driver Package Development Guide* for the script file.

For more information on power and performance management, see the following website:

```
http://elinux.org/Jetson/Performance
```

> 💬 **Note: Wait 1 minute after booting L4T to change the CPU frequency governor, to avoid settings being overridden by the Ubuntu initialization script.**

To maximize Tegra X1 performance

1. Set CPU and GPU frequencies to maximum and keep 4 Cortex A57 cores always on with the following commands (as root):

```
sudo su
echo userspace > /sys/devices/system/cpu/cpu0/cpufreq/scaling_governor
echo userspace > /sys/devices/system/cpu/cpu1/cpufreq/scaling_governor
echo userspace > /sys/devices/system/cpu/cpu2/cpufreq/scaling_governor
echo userspace > /sys/devices/system/cpu/cpu3/cpufreq/scaling_governor
cat /sys/devices/system/cpu/cpu0/cpufreq/scaling_max_freq > \
    /sys/devices/system/cpu/cpu0/cpufreq/scaling_min_freq
cat /sys/devices/system/cpu/cpu1/cpufreq/scaling_max_freq > \
    /sys/devices/system/cpu/cpu1/cpufreq/scaling_min_freq
cat /sys/devices/system/cpu/cpu2/cpufreq/scaling_max_freq > \
    /sys/devices/system/cpu/cpu2/cpufreq/scaling_min_freq
cat /sys/devices/system/cpu/cpu3/cpufreq/scaling_max_freq > \
    /sys/devices/system/cpu/cpu3/cpufreq/scaling_min_freq
echo 0 > /sys/devices/system/cpu/cpuquiet/tegra_cpuquiet/enable
for file in /sys/devices/system/cpu/cpu*/online; do
        if [ `cat $file` -eq 0 ]; then
            echo 1 > $file
        fi
done
echo runnable > /sys/devices/system/cpu/cpuquiet/current_governor

cat /sys/kernel/debug/clock/gpu_dvfs_t
cat /sys/kernel/debug/clock/dvfs_table
cat /sys/kernel/debug/clock/gbus/max >
/sys/kernel/debug/clock/override.gbus/rate
echo 1 > /sys/kernel/debug/clock/override.gbus/state
```

2. Disable CPU Idle with the following command:

```
for i in `ls /sys/devices/system/cpu/cpu*/cpuidle/state*/disable`; do echo 1
> $i; done
```

3. Set EMC frequency to maximum with the following command (as root):

```
cat /sys/kernel/debug/clock/override.emc/max > \
    /sys/kernel/debug/clock/override.emc/rate
echo 1 > /sys/kernel/debug/clock/override.emc/state
```

4. Turn on the fan with the following command:

```
echo 255 > /sys/kernel/debug/tegra_fan/target_pwm
```

2.5 32-BIT HARDFP SUPPORT DEPRECATED

Providing only aarch64 is planned for the next release of L4T, R24.2. The R24.1 release is the last release that the hardfp BSP for 32-bit user space support is provided.

The R24.1 release provides both 32-bit and 64-bit user space support, for the purposes of migration to 64-bit user space. Future releases are planned to support only 64-bit (aarch64) user space.

2.6 MEDIA CONTROLLER SUPPORT INCLUDED IN V4L2 FOR CSI CAMERA

Support for the `soc_camera` driver is deprecated, and is planned to be disabled in the R24.2 release. Both `soc_camera` and media-controller drivers are provided in this release for the purposes of migration to media-controller.

3.0 KNOWN ISSUES

This section provides details about issues that were discovered during development and QA but not resolved prior to this release.

In the following Known Issues tables, a check mark (✓) appearing in either the New or Past columns means:

New	Indicates issues found in this release.
Past	Indicates issues present in (and continuing to be present in) the last release.

Issue	New	Past
1. CUDA sample compilation on device is unsuccessful. The issue occurs in both aarch64 and hardfp. [200199690] **To workaround** 1. In the Makefile, modify the FILTER_OUT line as follows: ``` FILTER_OUT := 0_Simple/cdpSimplePrint/Makefile 0_Simple/cdpSimpleQuicksort/Makefile 2_Graphics/bindlessTexture/Makefile 6_Advanced/cdpBezierTessellation/Makefile 6_Advanced/cdpQuadtree/Makefile 6_Advanced/cdpLUDecomposition/Makefile 6_Advanced/cdpAdvancedQuicksort/Makefile 7_CUDALibraries/simpleDevLibCUBLAS/Makefile 2_Graphics/simpleGLES_EGLOutput/Makefile 2_Graphics/simpleGLES/Makefile 5_Simulations/nbody_opengles/Makefile 5_Simulations/fluidsGLES/Makefile 0_Simple/simpleMPI/Makefile ``` 2. Compile the samples with the following command: ``` GLLINK=-L/usr/lib/aarch64-linux-gnu/tegra make ```	✓	

Issue	New	Past
2. Multimedia playback and camera preview corruption may occur when using the Gstreamer eglimagesink component on 64-bit X11. [1762118, 200196931, 200197045, 200197818]	✓	
3. Video files received via RTSP streaming from CSI camera sources display slight corruption and stutter. [200197840]	✓	
4. Device occasionally fails to send or receive files over Bluetooth. [200198405]	✓	
5. Register dumps and data CRC errors are displayed on mmc2/mmcblklp1 during LP switching. [200159844]	✓	
6. The first run of the nvgscapture 1.0 test application causes errors to be displayed similar to the following: `GStreamer-WARNING **: Failed to load plugin '/usr/lib/aarch64-linux-gnu/gstreamer-1.0/libgsteglglessink.so'` The OSS version of EGL sink does not function correctly in this case. [1751872]	✓	
7. LP switching is unsuccessful when SATA is connected to the Jetson TX1 target (firmware version 50.11). [1691314]	✓	
8. The CPU hangs when using Bluetooth and an NFS file system. [200157186]	✓	
9. Errors display when using rfkill to unblock Bluetooth, when also using an NFS file system. [200153200]	✓	
10. Unhandled level 3 translation fault occurs during Bluetooth data transfer. [200152749]	✓	
11. Camera preview becomes non-responsive during stress testing of video/image recording. [1736102]	✓	
12. Connected Bluetooth headset incorrectly displays "mono" mode. [200194792]	✓	
13. Continuous "max77620_clear_syswdt clearing watchdog" messages display in the UART console log if the device is idle more than 30 seconds after placing the device in reset-recovery mode. [200196228]	✓	
14. Logging in to GNOME desktop (gnome-shell) is unsuccessful, accompanied by display corruption. [200196882]	✓	
15. Disabled (DSI-0) Primary HDMI display causes the following error to display in logs: `vgaarb: this pci device is not a vga device"` [200122163]		✓

Issue	New	Past
16. System intermittently becomes non-responsive during reboot stress testing with `reboot` or `init 6`. [200134773]		✓
17. The Camera app (NvGstPlayer-1.0) invokes an out of memory killer because of memory leak when playing multiple images in a loop. [200151236]		✓
18. Corrupted pixels occur after the image shows up on the preview for a few minutes. [200174822]		✓
19. Resolution goes to 1440 x 576 at 52.1 Hz with warnings from tegra_dc upon idle timeout resume. [200175128]		✓

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