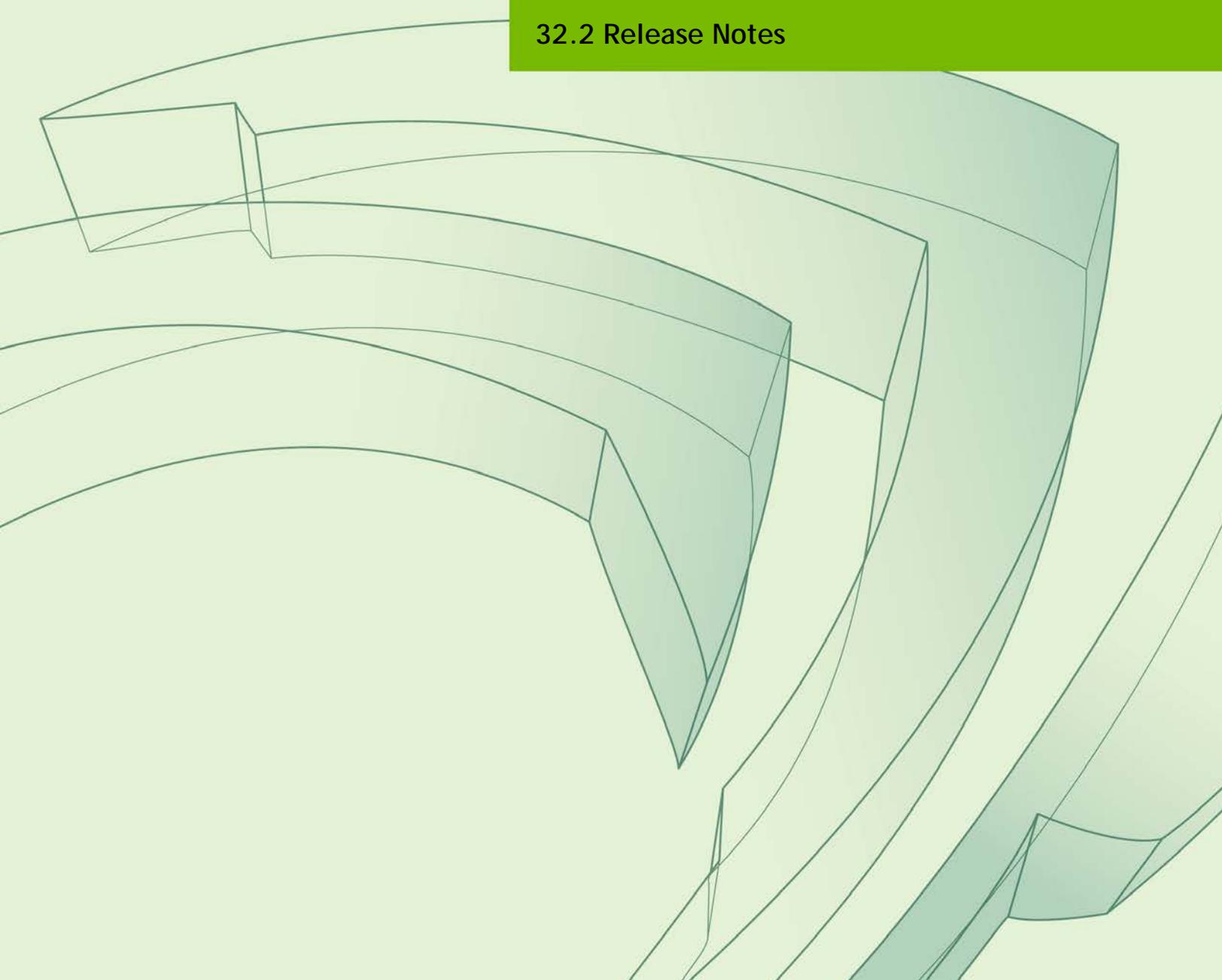




# TEGRA LINUX DRIVER PACKAGE

RN\_05071-R32 | July 17, 2019  
Subject to Change

## 32.2 Release Notes



# Table of Contents

<b>1.0</b>	<b>About this Release</b>	<b>4</b>
1.1	Login Credentials	5
<b>2.0</b>	<b>Known Issues</b>	<b>6</b>
2.1	General System Usability	6
2.2	Boot	7
2.3	Camera	8
2.4	Connectivity	9
2.5	CUDA	10
2.6	Jetson Developer Kit	10
2.7	Multimedia	10
2.8	SDK Manager	11
<b>3.0</b>	<b>Top Fixed Issues</b>	<b>12</b>
3.1	General System Usability	12
3.2	Boot	13
3.3	Camera	13
3.4	Multimedia	13
<b>4.0</b>	<b>Documentation Corrections</b>	<b>15</b>
4.1	Graphics Sample Application	15
<b>5.0</b>	<b>Implementation Details</b>	<b>17</b>
5.1	Video Decoder Instance Selection Planned Deprecation	17
5.2	Symlinks May be Overwritten by Installation of Third Party Libraries	17
5.3	New Users Must be Added to Video Group	18
5.4	Type-C Devices Unable to Drive DisplayPort	18
5.5	Instability after GDM Restart	18
5.6	OpenGL-ES 1.1 Support Not Available	18
5.7	Khronos Conformance Status	19
5.8	Visual Profiler Launch Failure Workaround	19
5.9	EMC Frequency Adjustment for CPU Workload	19
5.10	GPU Debug and Profiling Tools Must Be Run as Root	20
5.11	Beta Level Support for HBR3	20
5.12	GStreamer Plugin gst-omx Deprecated	20
5.13	Failure in Secureboot with PKC Keys	20
5.14	gst-omx Plugin Deprecated	21
5.15	Failure in Secureboot with PKC Keys	22
5.16	Suspending the System from the Command Line	22
5.17	OEM-config Option in Jetson Developer Kits	22
5.18	GNOME-Wayland Desktop Shell	22

5.19	Enabling LXDE and Compton .....	23
5.20	Increased Kernel Launch Latency on Denver 2 Cores .....	24
<b>6.0</b>	<b>About Earlier Releases .....</b>	<b>25</b>
	18 March 2019 — 32.1 .....	25
	8 November 2018 — 31.1 .....	29
	15 October 2018 — 31.0.2 .....	31

# 1.0 About this Release

The NVIDIA® Tegra® Linux Driver Package (L4T) 32.2 release supports development on the NVIDIA® Jetson Nano™, Jetson AGX Xavier™, Jetson™ TX2/TX2i, and Jetson™ TX1 Developer Kit.

**Note:**

This release is intended for use only with NVIDIA Jetson Nano, Jetson AGX Xavier, Jetson TX2/TX2i, and Jetson TX1. NVIDIA does not provide support for this release on other products.

## Platform and Release Information

Description	Supported Version
Host machine version for flashing software onto Jetson devices.	Ubuntu x64 16.04 or 18.04 (x64 distribution)
Sample rootfs derived from Ubuntu operating system to run on Jetson devices.	Ubuntu 18.04 (arm64 distribution)
Supported Linux kernel version.	4.9
Supported ARM architecture.	aarch64
The board/module name, used in flashing and paths in the software.	Jetson Nano development module (P3448) flashed to QSPI-NOR memory: <code>jetson-nano-qspi</code> Jetson Nano development module (P3448) flashed to both QSPI-NOR memory and micro SD card memory: <code>jetson-nano-qspi-sd</code> Jetson Nano production module (P3448-0020) flashed to eMMC memory: <code>jetson-nano-emmc</code> Jetson AGX Xavier (P2888): <code>jetson-xavier</code> Jetson AGX Xavier flashed to operate as Jetson AGX Xavier with 8 GB memory: <code>jetson-xavier-as-8gb</code>

Description	Supported Version
	Jetson AGX Xavier flashed with MAXN profile: <code>jetson-xavier-maxn</code> Jetson AGX Xavier flashed for SLVS-EC supported sensors: <code>jetson-xavier-slvx-ec</code> Original Jetson TX2 (P3310): <code>jetson-tx2</code> Jetson TX2i (P3489): <code>jetson-tx2i</code> Jetson TX2 4GB (P3489-0080): <code>jetson-tx2-4GB</code> Original Jetson TX2 flashed to operate as Jetson TX2 4GB: <code>jetson-tx2-as-4GB</code> Jetson TX1 (P2180): <code>jetson-tx1</code>
The board/module and revision number.	Jetson Nano: P3450-0000 (development module with SD Card memory) Jetson Nano: P3450-0020 (production module with QSPI-NOR memory) Jetson AGX Xavier: P2972-0000 Jetson TX2: P2771-0000 Jetson TX2i: P3489 Jetson TX2 4GB: P3489-0080 Jetson TX1: P2371-2180 See the following link for a detailed list of Jetson part numbers: <a href="https://developer.nvidia.com/embedded/faq#jetson-part-numbersJetson">https://developer.nvidia.com/embedded/faq#jetson-part-numbersJetson</a>
The release tag name. Consult the kernel source to identify the tag name at: <a href="http://nv-tegra.nvidia.com/gitweb/?p=linux-4.9.git">http://nv-tegra.nvidia.com/gitweb/?p=linux-4.9.git</a> Kernel source files are live across several repositories. Consult the topic Kernel Customization > Obtaining the Kernel Sources with Git in the <i>Development Guide</i> for details.	tegra-l4t-r32.2.0

## 1.1 Login Credentials

Starting with Release 32.1, NVIDIA no longer provides a default user name and password for log-in. Follow the system prompts at first boot to create your own user credentials.

## 2.0 Known Issues

This section provides details about issues discovered during development and QA but not resolved in this release.

### 2.1 General System Usability

The following general system usability related issues are noted in this release.

Issue	Description
2515130	On Jetson Nano, depending on the SD card speed, user may observe slow loading of certain applications such as a generic file editor and image viewer.
2398839	<b>Applies to:</b> Jetson AGX Xavier TF-TRT conversion sometimes crashes with no error message. This usually happens when Linux runs out of swap memory, in which case Linux may kill processes to reclaim space. Adding more swap memory may fix this problem.
200431304	On Jetson AGX Xavier, user cannot ping the IP address 0.0.0.0.
200498221	On Jetson Nano, when connecting to both HDMI and DP displays at bootup, login screen may only be visible on HDMI. Once logged in, the NVIDIA logo appears only on DP and is not centered, leaving the HDMI display blank.
200507252	Eclipse, installed through the software center, doesn't start on any Jetson platform running Ubuntu software distribution. This is an upstream issue, not an NVIDIA bug. As a workaround, use MSFT Code, or recompile.
200510775	<b>Applies to:</b> Jetson AGX Xavier ODMDATA passed from flashing command does not take effect. Only information in the <code>.conf.common</code> file is flashed. Do not attempt to modify ODMDATA at flash time with the command line option.

Issue	Description
200512675	<p><b>Applies to:</b> Jetson TX2-4GB</p> <p>Pressing the hardware reset button when the board is in SC7 state shuts off system power immediately.</p>
200525134	<p>SSH host keys may not be generated on first boot in headless mode (<code>oem-config</code>). This failure is reproducible less than 10% of the time.</p> <p>As a workaround, reconfigure the SSH server by entering the command:</p> <pre>\$ dpkg-reconfigure --frontend=noninteractive openssh-server</pre>
200526544	<p><b>Applies to:</b> Jetson AGX Xavier</p> <p>Docker command prompt (PS1) contains extra characters. The problem does not occur when connected through SSH. This is a cosmetic issue with no functional impact.</p>
200527728	<p>Starting with Release 32.2, you can run <code>oem-config</code> in headless mode (with no display connected). In headless mode <code>oem-config</code> displays a Network Configuration screen, which has no equivalent in GUI mode.</p> <p>Network Configuration calls an external tool, <code>netcfg</code>, to configure network settings. <code>netcfg</code> is included in the <code>ubiquity</code> package. If you choose the option "Do not configure network at this time," hotplug will not work because <code>eth0</code> is not configured. The link is present, but the interface must be configured manually.</p>
200529709	<p><b>Applies to:</b> Jetson AGX Xavier</p> <p>SError and CPU CBB Error may occur during hotplug of a UFS card.</p>

## 2.2 Boot

The following boot related issues are noted in this release.

Issue	Description
200480903	<p>On Jetson-Xavier, UFS card fails to automount on boot. User can mount UFS devices manually or through the GUI. This was tested with ext4 and vfat formats.</p>
200492423	<p>On all Jetson platforms, using the new OEM configuration, a minor glitch is observed during EULA screen presentation at first boot.</p>

## 2.3 Camera

The following camera related issues are noted in this release.

Issue	Description
2574909	<p><b>Applies to:</b> Jetson AGX Xavier, Jetson TX2</p> <p>Sensor pixel clock is not included in any GMSL context. Consequently the SerDes driver cannot update the input/output clock to fit sensor needs. This requirement is specific to MAX9296 DSER in the reference GMSL module, but it applies to any SerDes setup.</p> <p>Currently the MAX9296 DSER driver sets the PHY out clock rate to 1200 MHz (the maximum for a two-lane configuration), which is sufficient for reference module's needs (two streams at up to 4k at 60 fps).</p> <p>NVIDIA is evaluating a better implementation for a future release, which would set a PHY out clock rate calculated at runtime using the source sensor streams' pixel rates.</p>
2583989	<p><b>Applies to:</b> Jetson AGX Xavier</p> <p>When using an IMX290 with different pixel phases for different sensor modes in the device tree, ISP only considers the pixel phase of the first sensor mode. If the first sensor mode outputs GBRG format, the format remains the same for all modes.</p> <p>This issue may be resolved by configuring to the correct pixel format.</p>
200407802	<p><b>Applies to:</b> Jetson AGX Xavier and Jetson TX2</p> <p>On Jetson TX2 and Jetson AGX Xavier using the six-camera module (E3333), Memory leakage occurs in the <code>nvargus</code> daemon using the six-camera module (E3333).</p>
200459897	<p><b>Applies to:</b> Jetson AGX Xavier</p> <p>On Jetson AGX Xavier, Blur and corruption occur in the form of a vertical black stripe of pixels at one side of the image are observed with an SLVS-EC sensor.</p>
200461442	<p><b>Applies to:</b> Jetson AGX Xavier</p> <p>On Jetson AGX Xavier, The Multimedia API front end sample application exhibits a low frame rate when using the IMX185. This is a regression due to VIC frequency dependency.</p>
200476911	<p><b>Applies to:</b> Jetson AGX Xavier</p> <p>On Jetson AGX Xavier, users cannot use specific cameras that support the "wait until trigger" mechanism. This mechanism is intended to trigger the sensor using an external signal to capture a specified number of frames, then stop streaming until triggered again.</p>

Issue	Description
200487673	<p><b>Applies to:</b> Jetson AGX Xavier</p> <p>argus_bayeraveragemap and argus_denoise sample apps exhibit 96-byte memory leak.</p> <p>The source of the leak is <code>gtk_init(NULL, NULL)</code>, called during windows initialization.</p> <p>This is a known open-source leak. As per the second link there is no way to free data allocated using <code>gtk_init(NULL, NULL)</code>.</p> <p><a href="https://ubuntuforums.org/archive/index.php/t-1287827.html">https://ubuntuforums.org/archive/index.php/t-1287827.html</a></p> <p><a href="https://www.mail-archive.com/gtk-list@redhat.com/msg00414.html">https://www.mail-archive.com/gtk-list@redhat.com/msg00414.html</a></p>
200504723	<p><b>Applies to:</b> Jetson TX2</p> <p>argus_openglbox application may exhibit an intermittent crash.</p>
200512509	<p><b>Applies to:</b> Jetson AGX Xavier</p> <p>Analog gain is deliberately limited by using a different sensor register to override the manually set analog gain to avoid banding issues in low light conditions.</p> <p>Banding is due to hardware limitations of providing 5V power to the IMX185. This is a hardware issue seen only on Jetson AGX Xavier. The problem should be fixed with an updated IMX185 which doesn't depend on a 5V power supply.</p>
200517934	<p><b>Applies to:</b> Jetson TX2</p> <p>Noisy corruption is observed intermittently when using <code>sensormode1</code> (1920x1080@10bpp) with DualIMX274. The issue can be reproduced by toggling the sensor modes multiple times. It is only seen with <code>sensormode1</code>.</p>
200522461	<p><b>Applies to:</b> Jetson Nano</p> <p>IMX219 in full resolution mode incorrectly sensor reports width as 3296 instead of 3280. This leads to an invalid size error in the vi mode because the reported width does not match the real sensor output size.</p> <p>As a workaround, change full resolution mode width from 3280 to 3264. This works because the frame stride is a multiple of 64.</p>

## 2.4 Connectivity

The following connective related issues are noted in this release.

Issue	Description
200510929	<p><b>Applies to:</b> Jetson Nano, Jetson AGX Xavier</p> <p>Audio over Bluetooth using Intel 8265NGW M.2 key is not supported.</p>
200511165	<p><b>Applies to:</b> Jetson TX2</p> <p>Audio over Bluetooth using the on-board WiFi module is not supported.</p>

## 2.5 CUDA

The following CUDA related issues are noted in this release.

Issue	Description
200484129	<p><b>Applies to:</b> Jetson AGX Xavier, Jetson TX2</p> <p>CudaTools NVprof reports <code>l2_tex_read_hit_rate</code> is larger than 100%. This issue will not be fixed as the tool will be deprecated in a future release.</p>

## 2.6 Jetson Developer Kit

The following Jetson developer kit related issues are noted in this release.

Issue	Description
2544146	<p><b>Applies to:</b> Jetson Nano Developer Kit</p> <p>The Jetson Nano A02 version of the developer kit hardware cannot boot with Intel 8260 WiFi plugged in.</p> <p>This issue is fixed in the newer B01 version of the hardware.</p>
200525516	<p><b>Applies to:</b> Jetson Nano Developer Kit</p> <p>The UART can only handle up to 3.3V. Plugging 5V into the UART disables the USB HUB and may damage any devices on the carrier board's 3V3 rail. Damage is particularly likely if a WiFi or Bluetooth module is connected to the M.2E connector.</p>

## 2.7 Multimedia

The following multimedia related issues are noted in this release.

Issue	Description
2517881	<p>L4T currently does not support hardware acceleration for VLC Player. To work around this issue, enter this command to run VLC Player with software decoding:</p> <pre>\$ vlc --codec=avcodec &lt;filename&gt;</pre>
200532719	<p><b>Applies to:</b> Jetson TX2</p> <p><code>tegra-audio-amx-to-adx.sh</code> script fails to run.</p>

## 2.8 SDK Manager

The following SDK Manager related issues are noted in this release.

Issue	Description
200530642	<p>The open source bzip2 application, package version 1.0.6-8ubuntu0.1, may exhibit errors when extracting tar files. The package version was released recently for CVE-2019-12900.</p> <p>As a workaround for Ubuntu 18.04, enter this command:</p> <pre>\$ sudo apt install bzip2=1.0.6-8.1 libbz2-1.0=1.0.6-8.1</pre> <p>As a workaround for Ubuntu 16.04, enter this command:</p> <pre>\$ sudo apt install bzip2=1.0.6-8 libbz2-1.0=1.0.6-8</pre>

## 3.0 Top Fixed Issues

These issues are resolved in this release.

### 3.1 General System Usability

General system usability related resolved issues are as follows:

Issue Number	Description
2496962	Low-latency audio decode requires customer to set memory and CPU speeds accordingly.
2521704	On Jetson Nano, when a GPIO is released (e.g. using the <code>sysfs</code> unexport file, the <code>cleanup()</code> function in the <code>Jetson.GPIO</code> Python module, or the <code>gpio_free()</code> function in the Linux kernel), the kernel configures the pin as a special function (SFIO) rather than as a GPIO input. In some cases, this causes Jetson to drive a signal onto the pin. If another device is also connected to that pin, and is also driving a signal, this causes an electrical conflict, which may damage the hardware. This issue is particularly relevant for the pins on the 40-pin GPIO expansion header.
200495497	Launching a graphics application from Nsight Graphics may fail due to a bug in <code>libglvnd</code> (see <a href="https://bugs.launchpad.net/ubuntu/+source/libglvnd/+bug/1816004">https://bugs.launchpad.net/ubuntu/+source/libglvnd/+bug/1816004</a> ). When this bug has been fixed by Ubuntu, you can update the library and use Nsight Graphics.
200497890	USB device mode network feature always reports that it is active, even when the USB cable is not plugged in. This causes Jetson's graphical interface to claim that a network connection is active at all times.
200499128	On Jetson TX2, OSidle power consumption is comparatively higher than in public release 28.3.

## 3.2 Boot

Boot related resolved issues are as follows:

Issue Number	Description
2510850	For Jetson AGX Xavier, Secureboot with PKC keys works only if flashing follows immediately after signing. This is due to missing files located inside a temp directory that is cleared if the two actions are not performed back-to-back. To work around the problem, apply the patches described in "Failure in Secureboot with PKC Keys."

## 3.3 Camera

Camera related resolved issues are as follows:

Issue Number	Description
200490661	On TX2, the IMX390 dual sensor camera fails to capture simultaneously with both sensors when running two separate applications to capture from CSI/GMSL. Simultaneous capture from a single application is successful.
200502605	With Jetson AGX Xavier and an IMX274 sensor, preview and capture are blurred if one of these modes is configured: <ul style="list-style-type: none"> <li>• 3840×2160 at 30 frames/second</li> <li>• 1920×1080 at 60 frames/second</li> </ul>

## 3.4 Multimedia

Multimedia related resolved issues are as follows:

Issue Number	Description
2524344, 200498151	Jetson Nano currently does not implement power-based throttling. The system may shut down if adapter power capacity is exceeded. This will not happen if the system is used with a validated power adapter that provides adequate power.
200297610	If the user launches an Argus camera with Piecewise Linear WDR sensor mode enabled and changes the AWB mode from Auto to another setting (Incandescent, Fluorescent, etc.), then changes AWB mode back to Auto, preview hangs.  This is a corner case and is not handled in this release.
200427796	The new gst-v4l2 decoder has an issue with 10/12-bit HEVC decode. Blueish video observed due to interchanged U and V planes getting read for 8-bit transform. This type of decode works correctly with the legacy OMX-based decoder.
200489184	When using DRM for display, display modes using YUV format are not supported, and are not properly filtered out by the DRM subsystem. To avoid this issue, select RGB modes only, or use X11, which filters out YUV modes correctly.

Issue Number	Description
200490095	On Jetson Nano, raw capture at 4K resolutions using an IMX219 camera exhibits corruption. Capture at 4K resolutions using Argus ("cooked" instead of raw) is functional.
200502065	GST pipeline using camera capture with scaling/color conversion may affect performance. NVIDIA recommends setting the <code>nvarguscamerasrc</code> property <code>maxperf=1</code> for better performance. For more details, see the "Camera Capture" section of <i>Accelerated GStreamer User Guide</i> .
200502136	<p><code>nvgstcapture-1.0</code> has an image encoding issue using the <code>nvjpegenc</code> plugin for default YUY2 video capture format for a USB camera.</p> <p>To work around the issue, use the OSS <code>jpegenc</code> plugin instead of <code>nvgstcapture-1.0</code> for image encoding with a USB camera. To do this, add the command line switch <code>--image-enc=0</code> to the <code>nvgstcapture-1.0</code> capture command, for example:</p> <pre>\$ nvgstcapture-1.0 --camsrc=0 --image-enc=0</pre>
200516907	When using the Multimedia API (MMAPI), certain front-end multicamera samples may fail to run with a "host1x error message." Image corruption or a greenish cast on the preview may occur. This bug may affect all Jetson platforms.

# 4.0 Documentation Corrections

This section describes errors in documentation that were discovered too late to be corrected.

## 4.1 Graphics Sample Application

In the “Graphics Sample Application” topic of *NVIDIA Tegra Linux Driver Package*, make the changes described below.

### Building the Samples

In the paragraph that begins “The sample source files are available...” change the pathname from `$HOME/graphics_demos` to `/usr/src/nvidia/graphics_demos`.

In the paragraph that begins “The sample applications may be built...” change the pathname from `$HOME/graphics_demos/README` to `/usr/src/nvidia/graphics_demos/README`.

After the paragraph that begins “L4T also provides...” change the pathname from:

```
$HOME/graphics_demos/bin
```

To:

```
/usr/src/nvidia/graphics_demos/prebuilts/bin
```

### Running the Sample applications

After the paragraph that begins “For example, to run...” change the command:

```
$ cd /home/nvidia/graphics_demos/prebuilts/bin/<graphics>
```

To:

```
$ cd /usr/src/nvidia/graphics_demos/prebuilts/bin/<graphics>
```

## To install and run the Gears application

Change the following command line:

```
# deb http://ports.ubuntu.com/ubuntu-ports/ xenial universe
```

To:

```
# deb http://ports.ubuntu.com/ubuntu-ports/ bionic universe
```

## Wayland

Delete the paragraph that begins “Before you can run Wayland graphics sample applications...”

Insert the following text in its place:

Before you can run the Wayland graphics sample applications, you must first stop the X server (which is running by default) and then launch Weston either by running the Weston binary (`/usr/bin/weston`) from the root user or by running the `weston-launch` binary (`/usr/bin/weston-launch`).

### To run the Wayland graphics sample applications

1. Enter these commands to stop the X server:

```
$ sudo systemctl stop gdm
$ sudo loginctl terminate-seat seat0
$ sudo pkill -9 X
```

2. Enter these commands to run Weston from the root user:

```
$ sudo su
$ unset DISPLAY
$ mkdir /tmp/xdg
$ chmod 700 /tmp/xdg
$ export XDG_RUNTIME_DIR=/tmp/xdg
$ weston --idle-time=0 &
```

3. Enter these commands to run Weston using `weston-launch` as a non-root user. These commands need be entered only once after booting:

```
$ sudo groupadd weston-launch
$ sudo usermod -a -G weston-launch $USER
$ sudo chown root /usr/bin/weston-launch
$ sudo chmod +s /usr/bin/weston-launch
$ weston-launch
```

# 5.0 Implementation Details

## 5.1 Video Decoder Instance Selection Planned Deprecation

NVIDIA® Tegra® Linux Driver Package (L4T) 32.1 release supports workload scaling across available decoder instances.

To ensure portability of code across product generations, the interfaces for specification of the NVIDIA Video Decoder instance are deprecated in this release.

The interfaces deprecated include:

- ▶ V4L2 external control ID `V4L2_CID_MPEG_VIDEO_DECODE_INSTANCE`
- ▶ GStreamer decoder property `dec-instanceId`

## 5.2 Symlinks May be Overwritten by Installation of Third Party Libraries

Installing third party libraries on the target device may overwrite the accelerated library provided by Linux for Tegra.

For example, installing Mesa EGL may create a `/usr/lib/<arch>/libEGL.so` symlink, overwriting the symlink to the implementation library that should be used instead, `/usr/lib/<arch>/tegra-egl/libEGL.so`.

Linux for Tegra installs a boot-time initialization script `/etc/init/nv.conf`, that corrects typical occurrences, such as with OpenGL, EGL, and X11 GLX libraries. This script runs at boot and corrects typical occurrences.

### To workaround

- ▶ Reboot after installation of packages that install conflicting library symlinks.

## 5.3 New Users Must be Added to Video Group

When adding users to the system you must add them to the `video` group for the Linux desktop to appear and function correctly.

## 5.4 Type-C Devices Unable to Drive DisplayPort

This is Known Issue 2183567.

For DP, Bootloader display polls for at most 1 msec. by default when trying to detect whether HPD has been asserted by the sink. Different Type-C downstream devices connected to the Type-C ports on Jetson AGX Xavier (cables, adapters, hubs, etc) may incur different amounts of latency before they trigger the handshake process needed to drive DP over Type-C.

*Workaround:* If a seamless display does not come up with the Type-C device you are using, try increasing the `HPD_TIMEOUT_MS` value in `tegrabl_display_dtb.c`. We recommend increasing the timeout value in 500 msec. increments. Increasing the timeout value guarantees interoperability with a larger variety of devices, but also increases the boot time.

## 5.5 Instability after GDM Restart

After GDM restart, multiple issues may appear like desktop not coming back (device entering infinite loop of `tegradc blank/unblank`) or unable to log in.

*Workaround:* Add this line to `/lib/systemd/system/gdm.service`:

```
ExecStopPost=/bin/loginctl terminate-seat seat0
```

## 5.6 OpenGL-ES 1.1 Support Not Available

OpenGLES 1.1 support is not present in this release because Canonical did not provide the `libGLESv1_CM.so` library as part of GLVND libraries in Ubuntu 18.04. Any app that is linked with this library cannot run.

Canonical is working on the issue via bug <https://bugs.launchpad.net/ubuntu/+source/libglvnd/+bug/1780039>.

After the bug is fixed, an updated GLVND package will be available for Ubuntu 18.04 (Bionic). After the update is applied, `libGLv1_CM.so` will be available and OpenGL ES 1.1 support will work as expected without requiring any changes to the BSP.

## 5.7 Khronos Conformance Status

This release supports the following Khronos APIs:

- ▶ OpenGL-ES 3.2
- ▶ OpenGL 4.6
- ▶ Vulkan 1.1

The product is based on a published Khronos specification. It has been submitted to, and is expected to pass, the Khronos Conformance Process. Current conformance status can be found at <http://www.khronos.org/conformance>.

The CTS test version used to run conformance for each of the APIs is:

- ▶ OpenGL-ES: 3.2.5.0
- ▶ OpenGL: 4.6.0.0
- ▶ Vulkan: 1.1.1.2

## 5.8 Visual Profiler Launch Failure Workaround

This is Known Issue 200436049.

To run Visual Profiler on Ubuntu 18.04:

Install the package `openjdk-8-jre`, and

Invoke Visual Profiler with the `-vm` command line option included:

```
nvvp -vm /usr/lib/jvm/java-8-openjdk-amd64/jre/bin/java
```

The `-vm` option is only required if JRE is not included in CUDA Toolkit package and JRE 1.8 is not in the default path.

## 5.9 EMC Frequency Adjustment for CPU Workload

This note addresses the potential performance drop identified in Known Issue 2419317.

On Jetson AGX Xavier, the EMC frequency for CPU workload is decided by the static CPU-EMC mapping table and the `mc_all` activity monitor (`actmon`) driver. The CPU-EMC

mapping table decides base minimum EMC frequency based on CPU frequency. The `mc_all` actmon is responsible for scaling EMC frequency from the base minimum to a higher value proportional to memory bandwidth utilization.

In this release the CPU-EMC mapping table is tuned, that is, the EMC base frequency mapped to CPU frequency has been reduced to optimize power consumption. The tuned CPU-EMC table does not affect performance of the GPU, NVDEC, and NVENC workloads, as each has its own EMC scaling algorithm, but it may affect CPU workload performance, especially when CPU load is high and bandwidth utilization is low. If any such performance drop is observed, the CPU-EMC mapping table can be tuned in this location, based on performance/power requirements:

```
<source>/hardware/nvidia/soc/t19x/kernel-dts/tegra194-soc/tegra194-soc-base.dtsi
```

## 5.10 GPU Debug and Profiling Tools Must Be Run as Root

By default GPU debug and profiling tools now require running as root, or launching with the `sudo` command, to function correctly.

The system administrator can grant privileges to general users if preferred.

## 5.11 Beta Level Support for HBR3

This release provides beta level support for HBR3 with DisplayPort version 1.4a.

## 5.12 GStreamer Plugin `gst-omx` Deprecated

The GStreamer plugin `gst-omx` is deprecated in this release. NVIDIA recommends using the `gst-v4l2` plugin instead. For more information, see the *Accelerated GStreamer User Guide*.

## 5.13 Failure in Secureboot with PKC Keys

For Jetson AGX Xavier, Secureboot with PKC keys works only if flashing immediately follows signing. This is because flashing loses files located in a temporary directory that is cleared if the two actions are not performed back-to-back.

Secureboot with PKC *and* SBK works as expected.

To work around the problem, apply the following patches:

### 1. Patch 1:

```

--- a/bootloader/tegraflash_internal.py
+++ b/bootloader/tegraflash_internal.py
@@ -3184,7 +3184,8 @@ def
tegraflash_generate_mem_bct(is_cold_boot_mbl_bct):
    tegrabct_values['--membct_rcm'] =
tegraflash_oem_encrypt_and_sign_file('mem_rcm.bct' ,True, 'MEMB')
    tegrabct_values['--membct_rcm'] =
tegraflash_oem_encrypt_and_sign_file(tegrabct_values['--membct_rcm']
,False, 'MEMB')
    else:
-    tegrabct_values['--membct_rcm'] =
tegraflash_oem_sign_file(mem_bcts[ramcode], 'MEMB')
+    shutil.copyfile(mem_bcts[ramcode], 'mem_rcm.bct')
+    tegrabct_values['--membct_rcm'] =
tegraflash_oem_sign_file('mem_rcm.bct', 'MEMB')

def tegraflash_generate_mbl_bct(is_cold_boot_mbl_bct):
    if bool(is_cold_boot_mbl_bct) == True:

```

### 2. Patch 2:

```

--- a/bootloader/odmsign.func
+++ b/bootloader/odmsign.func
@@ -714,6 +714,7 @@ odmsign_sbks_and_pkcs_flashing ()
    BCTARGS+="--mbl_cold_boot_bct
mbl_cold_boot_bct_MBl.bct_sigheader.encrypt.signed ";
    else
        BCTARGS="--mbl_bct mbl_bct_MBl_sigheader.bct.signed
";
+    BCTARGS+="--mem_bct mem_rcm_sigheader.bct.signed ";
    BCTARGS+="--mbl_cold_boot_bct
mbl_cold_boot_bct_MBl_sigheader.bct.signed ";
    fi;
    BCTARGS+="--mem_bct_cold_boot
mem_coldboot_sigheader.bct.signed ";

```

## 5.14 gst-omx Plugin Deprecated

The `gst-omx` plugin is deprecated in Linux for Tegra (L4T) release 32.1, and will be removed in a future release (issue 200420440).

NVIDIA recommends using the `gst-v4l2` plugin for development instead. See the *Accelerated GStreamer User Guide* for usage information.

## 5.15 Failure in Secureboot with PKC Keys

For Jetson AGX Xavier, Secureboot with PKC keys works only if flashing immediately follows signing. This is because flashing loses files located in a temporary directory that is cleared if the two actions are not performed back-to-back.

Secureboot with PKC *and* SBK works as expected.

## 5.16 Suspending the System from the Command Line

L4T's sample root filesystem contains and uses systemd. To suspend the system from the command line, enter the command:

```
systemctl suspend
```

In earlier L4T releases, you could also use the command `echo mem > /sys/power/state` for this purpose. Do not use this command in Release 32.2 or later. It suspends the system without coordinating with systemd, which confuses systemd, and can cause systemd to power off the system when the power button is used to resume operation.

## 5.17 OEM-config Option in Jetson Developer Kits

This note applies to the developer kits for all Jetson modules.

SDK Manager presents the OEM-config option on either the display or the serial console. You must use one of these devices to complete the oem-config setup.

“Display hotplug” does not appear as a setting for the OEM-config option if OEM-config is started on the serial console.

## 5.18 GNOME-Wayland Desktop Shell

In this release L4T includes experimental support for the GNOME-Wayland Desktop Shell. To enable this feature:

1. In `/etc/systemd/nvuser.sh`, change:

```
GNOME_WAYLAND="0"
```

To:

```
GNOME_WAYLAND="1"
```

2. In `/etc/modprobe.d/tegra-udrm.conf`, uncomment the following line (remove “#” from the start of the line):

```
#options tegra-udrm modeset=1
```

3. In `/etc/systemd/nv.sh`, change:

```
DISABLE_MESA_EGL="1"
```

To:

```
DISABLE_MESA_EGL="0"
```

4. In `/etc/systemd/system/nvargus-daemon.service`, stop the `nvargus` daemon from being launched at boot time by putting “;” at the beginning of the line:

```
ExecStart=/usr/sbin/nvargus-daemon
```

5. Reboot the device. If auto-login is enabled, Linux logs you in to a Wayland session.

## 5.19 Enabling LXDE and Compton

You can use the lightweight desktop environment LXDE to improve memory consumption and CPU utilization when browsing through windows and applications. For tear-free compositing on LXDE, use the Compton compositing manager.

To install and enable LXDE and Compton:

1. Enter the commands:

```
sudo apt-get update
sudo apt-get install lxde compton
```

2. Create the configuration file `/etc/xdg/autostart/lxde-compton.desktop`, containing these commands:

```
[Desktop Entry]
Type=Application
Name=Compton (X Compositor)
GenericName=X compositor
Comment=A X compositor
```

```
TryExec=compton  
Exec=compton --backend glx -b  
OnlyShowIn=LXDE
```

## 5.20 Increased Kernel Launch Latency on Denver 2 Cores

On the NVIDIA® Jetson™ TX2 series of products, the Denver 2 CPU cores have different performance characteristics than the ARM® Cortex-A57 cores. This may result in workload-dependent performance differences. Consequently launching CUDA kernels from the Denver 2 cores may result in increased kernel launch latency.

If your applications are impacted by increased CUDA launch latency, you may use standard Linux functionality to isolate these CPUs from default use by the Linux kernel process scheduler. See the Linux documentation regarding the use of Isolated CPUs ("isolcpus") and CPUsets/CGroups.

# 6.0 About Earlier Releases

18 March 2019 – 32.1

## Known Issues

### General System Usability

The following general system usability related issues are noted in this release.

Issue	Description
2515130, 258714	On Jetson Nano, depending on the SD card speed, user may observe slow loading of certain applications such as a generic file editor and image viewer.
2524344, 200498151	Jetson Nano currently does not implement power-based throttling. The system may shut down if adapter power capacity is exceeded. This will not happen if the system is used with a validated power adapter that provides adequate power.
2496962	Low-latency audio decode requires customer to set memory and CPU speeds accordingly.
2521704	On Jetson Nano, when a GPIO is released (e.g. using the <code>sysfs</code> <code>unexport</code> file, the <code>cleanup()</code> function in the <code>Jetson.GPIO</code> Python module, or the <code>gpio_free()</code> function in the Linux kernel), the kernel configures the pin as a special function (SFIO) rather than as a GPIO input. In some cases, this causes Jetson to drive a signal onto the pin. If another device is also connected to that pin, and is also driving a signal, this causes an electrical conflict, which may damage the hardware. This issue is particularly relevant for the pins on the 40-pin GPIO expansion header.
200431304	On Jetson AGX Xavier, user cannot ping the IP address 0.0.0.0.
200488963	Nano <code>/dev/root</code> device size is restricted to 14 GB when using <code>flash.sh</code> to write to an SD card. User cannot create additional partitions on the root device, so any excess space is unavailable.
200492517	On Jetson Nano, system error occurs at <code>gether_connect+0x80/0x1d8</code> during SC7 stress. The issue's reproducibility is very low.

Issue	Description
200497890	USB device mode network feature always reports that it is active, even when the USB cable is not plugged in. This causes Jetson's graphical interface to claim that a network connection is active at all times.
200498221	On Jetson Nano, when connecting to both HDMI and DP displays at bootup, login screen may only be visible on HDMI. Once logged in, the NVIDIA logo appears only on DP and is not centered, leaving the HDMI display blank.
200499128	On Jetson TX2, OSIdle power consumption is comparatively higher than in public release 28.3.

## Boot

The following boot related issues are noted in this release.

Issue	Description
2510850	For Jetson AGX Xavier, Secureboot with PKC keys works only if flashing follows immediately after signing. This is due to missing files located inside a temp directory that is cleared if the two actions are not performed back-to-back. To work around the problem, apply the patches described in "Failure in Secureboot with PKC Keys."
200471553	On Jetson AGX Xavier, changing boot device order requires reflash. The user cannot change boot order from the command line.
200480903	On Jetson-Xavier, UFS card fails to automount on boot. User can mount UFS devices manually or through the GUI. This was tested with ext4 and vfat formats.
200492423	On all Jetson platforms, using the new OEM configuration, a minor glitch is observed during EULA screen presentation at first boot.

## Camera

The following camera related issues are noted in this release.

Issue	Description
200407802	On Jetson TX2 and Jetson AGX Xavier using the six-camera module (E3333), memory leakage occurs in the nvargus daemon.
200459897	On Jetson AGX Xavier, blur and corruption in the form of a vertical black stripe of pixels at one side of the image are observed with an SLVS-EC sensor.
200461442	On Jetson AGX Xavier, the Multimedia API front end sample application exhibits a low frame rate when using the IMX185. This is a regression due to VIC frequency dependency.
200476911	On Jetson AGX Xavier, users cannot use specific cameras that support the "wait until trigger" mechanism. This mechanism is intended to trigger the sensor using an external signal to capture a specified number of frames, then stop streaming until triggered again.

Issue	Description
200490050	On Jetson Nano, the hardware de-noise switch <code>denosiestrength</code> has less impact than expected.
200490661	On TX2, the IMX390 dual sensor camera fails to capture simultaneously with both sensors when running two separate applications to capture from CSI/GMSL. Simultaneous capture from a single application is successful.

## CUDA Samples

The following CUDA samples related issues are noted in this release.

Issue	Description
200500995	If the system date and time are not set correctly after boot, be sure the configured NTP server is accessible from your network.

## Multimedia

The following multimedia related issues are noted in this release.

Issue	Description
2517881	L4T currently does not support hardware acceleration for VLC Player. To work around this issue, enter this command to run VLC Player with software decoding: <pre>vlc --codec=avcodec &lt;filename&gt;</pre>
200297610	If the user launches an Argus camera with Piecewise Linear WDR sensor mode enabled and changes the AWB mode from Auto to another setting (Incandescent, Fluorescent, etc.), then changes AWB mode back to Auto, preview hangs.  This is a corner case and is not handled in this release.
200427796	The new <code>gst-v4l2</code> decoder has an issue with 10/12-bit HEVC decode. Blueish video observed due to interchanged U and V planes getting read for 8-bit transform. This type of decode works correctly with the legacy OMX-based decoder.
200489184	When using DRM for display, display modes using YUV format are not supported, and are not properly filtered out by the DRM subsystem. To avoid this issue, select RGB modes only, or use X11, which filters out YUV modes correctly.
200490095	On Jetson Nano, raw capture at 4K resolutions using an IMX219 camera exhibits corruption. Capture at 4K resolutions using Argus ("cooked" instead of raw) is functional.
200502065	GST pipeline using camera capture with scaling/color conversion may affect performance. NVIDIA recommends setting the <code>nvarguscameraSrc</code> property <code>maxperf=1</code> for better performance. For more details, see the "Camera Capture" section of <i>Accelerated GStreamer User Guide</i> .
200502136	<code>nvgstcapture-1.0</code> has an image encoding issue using the <code>nvjpegenc</code> plugin for default YUY2 video capture format for a USB camera.

Issue	Description
	To work around the issue, use the OSS <code>jpegenc</code> plugin instead of <code>nvgstcapture-1.0</code> for image encoding with a USB camera. To do this, add the command line switch <code>--image-enc=0</code> to the <code>nvgstcapture-1.0</code> capture command, for example: <pre>nvgstcapture-1.0 --camsrc=0 --image-enc=0</pre>

## Top Fixed Issues

### General System Usability

General system usability related resolved issues are as follows:

Issue Number	Description
200437318	Tegrastats does not save information to a file.
200454955	Kernel PWM fan driver overrides fan setting applied by <code>jetson_clocks.sh</code> .

### Camera

Camera related resolved issues are as follows:

Issue Number	Description
200422466	IMX185 sensor not supported in this release.

## 8 November 2018 — 31.1

### Known Issues

#### General System Usability

The following general system usability related issues are noted in this release.

Issue	Description
2419317	Performance drop due to EMC frequency not set correctly for CPU workload. (See <a href="#">EMC the Implementation Note Frequency Adjustment for CPU Workload.</a> )
200461808	When connecting the Intel IGB PCIE card, CPU errors may occur during system idle.
200436049	Failure to launch NVVP after installing <code>cuda-repo-ubuntu1804-10-0-local-10.0.96-410.27_1.0-1_amd64.deb</code> .
200464272	System may fail to enter SC7 state when certain PCIe Network Interface Cards are connected. (Issue was seen with two different NICs, neither of which uses the <code>igb</code> driver). This issue is under investigation.

#### Camera

The following camera related issues are noted in this release.

Issue	Description
2032213	The maximum value that <code>getExposureTimeRange()</code> may return is 400000000.000 (400,000,000 nanoseconds, 400 msec).
200297610	Preview freeze with WDR mode when AWB lock is set and user attempts to change AWB mode to Auto.
200455493	Defog feature of <code>argus_camera</code> app is not supported in this release. The following options of <code>argus_camera</code> app do not work: <ul style="list-style-type: none"> <li><code>--defog=ENABLE</code></li> <li><code>--defogamount=AMOUNT</code></li> <li><code>--defogquality=QUALITY</code></li> </ul>
200455200	<code>argus_userautoexposure</code> app failed to run the sample in DOL WDR modes.
200455287	<code>argus_userautowhitebalance</code> app gives greenish preview on high exposure scenes.
200459897	Blur and corruption observed with SLVS-EC sensor.
200443798	VisionWorks <code>nvx_sample_nvgstcamera_capture</code> sample application fails to run.

## CUDA Samples

The following CUDA samples related issues are noted in this release.

Issue	Description
200448615	Argus CUDA samples crash or hang for CPHY sensor IMX318, possibly due to very high resolution of the sensor. If the resolution is set to less than 4K in EGL stream settings, the sample passes successfully.

## Multimedia

The following multimedia related issues are noted in this release.

Issue	Description
200387512	GStreamer based video playback using Wayland not working when Weston is started as an NVIDIA user.

## Top Fixed Issues

These issues are resolved in this release.

### General System Usability

General system usability related resolved issues are as follows:

Issue Number	Description
200437318	Tegrastats does not save information to a file.
200454955	Kernel PWM fan driver overrides fan setting applied by jetson_clocks.sh.

### Camera

Camera related resolved issues are as follows:

Issue Number	Description
200422466	IMX185 sensor not supported in this release.

## 15 October 2018 — 31.0.2

### Known Issues

#### General System Usability

The following general system usability related issues are noted in this release.

Issue	Description
2183567	Type-C devices unable to drive DP due to length of delay before handshake begins. <i>Workaround:</i> see <a href="#">Type-C Devices Unable to Drive DisplayPort</a> .
200441525	An application to be debugged NVIDIA Developer Tools (CUDA tools, NVIDIA Nsight Systems/Graphics) must be run as the root user, or with root permissions.
2218290	Thermal shutdown reboots system instead of powering off.
200436049	nvvp (Visual Profiler) launch fails after installing <code>cuda-repo-ubuntu1804-10-0-local-10.0.96-410.27_1.0-1_amd64.deb</code> .
200442461	VisionWorks SFM sample fails to run; shows black image when launching <code>nvx_sample_sfm sample</code> .
200447045	SC7 system suspend/resume may have intermittent resume failures in this release.

#### Boot

The following boot related issues are noted in this release.

Issue	Description
2305640	CBoot bootloader cannot access USB mass storage devices connected via a USB hub.

## Camera

The following camera related issues are noted in this release.

Issue	Description
2258817	Incorrect ISP settings may be applied if camera module is replaced with a module that does not support a unique identifier (fuse ID). (Workaround: manually remove the cached .bin files in /var/nvidia/nvcam/settings.)
200422466	IMX185 sensor not supported in this release.
200445964	Greenish image capture with <code>argus_onshot</code> .
2199266	Temporal noise reduction may cause a slight green tint to images.
200407738	Greenish tint on displayed preview image when running the sample software <code>argus_userautowhitebalance</code> .

## CUDA

The following CUDA related issues are noted in this release.

Issue	Description
200431121	If a CUDA application calls <code>malloc()</code> within a CUDA kernel (device-side <code>malloc</code> ) while running concurrently with another CUDA or GPU-accelerated graphics application, the application may fail.

## Display

The following display related issues are noted in this release.

Issue	Description
2284878	Cannot operate GeChic 1101 display connected through USB-C to USB-A when auto-search mode is enabled.
200404683	Display Port (DP) monitors do not show a bootloader splash screen at boot, and may require a hotplug after boot to display content properly.
200434425	Display driver may produce "Failed to write DPCD data" errors after a display hotplug with certain monitors including Dell U2413 and Dell U2713.

## JetPack Installer

The following JetPack Installer related issues are noted in this release.

Issue	Description
2340186	After installation of CUDA 10.0 host packages, the apt package management system may produce "Failed to fetch" messages due to the addition of the arm64 architecture to the apt package repository configuration.

## Kernel

The following kernel related issues are noted in this release.

Issue	Description
200443630	Hotplugging a UFS card may cause the Linux kernel to report a CPU SError.
200399574	Using USB devices that are not fully compatible with the USB Gen2 specification may cause kernel error messages like "tegra-xusb 3610000.xhci: Cannot set link state."
2211831	UART serial console using USB to TTL serial cable does not work.

## Notice

ALL NVIDIA DESIGN SPECIFICATIONS, REFERENCE BOARDS, FILES, DRAWINGS, DIAGNOSTICS, LISTS, AND OTHER DOCUMENTS (TOGETHER AND SEPARATELY, "MATERIALS") ARE BEING PROVIDED "AS IS." NVIDIA MAKES NO WARRANTIES, EXPRESS, IMPLIED, STATUTORY, OR OTHERWISE WITH RESPECT TO THE MATERIALS, AND ALL EXPRESS OR IMPLIED CONDITIONS, REPRESENTATIONS AND WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OR CONDITION OF TITLE, MERCHANTABILITY, SATISFACTORY QUALITY, FITNESS FOR A PARTICULAR PURPOSE AND NON-INFRINGEMENT, ARE HEREBY EXCLUDED TO THE MAXIMUM EXTENT PERMITTED BY LAW.

Information furnished is believed to be accurate and reliable. However, NVIDIA Corporation assumes no responsibility for the consequences of use of such information or for any infringement of patents or other rights of third parties that may result from its use. No license is granted by implication or otherwise under any patent or patent rights of NVIDIA Corporation. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. NVIDIA Corporation products are not authorized for use as critical components in life support devices or systems without express written approval of NVIDIA Corporation.

## Trademarks

NVIDIA and the NVIDIA logo, CUDA, Jetson, AGX Xavier, Nano, Tegra, and VisionWorks are trademarks or registered trademarks of NVIDIA Corporation in the United States and other countries. Other company and product names may be trademarks of the respective companies with which they are associated.

HDMI, the HDMI logo, and High-Definition Multimedia Interface are trademarks or registered trademarks of HDMI Licensing LLC.

ARM, AMBA, and ARM Powered are registered trademarks of ARM Limited. Cortex, MPCore and Mali are trademarks of ARM Limited. All other brands or product names are the property of their respective holders. "ARM" is used to represent ARM Holdings plc; its operating company ARM Limited; and the regional subsidiaries ARM Inc.; ARM KK; ARM Korea Limited.; ARM Taiwan Limited; ARM France SAS; ARM Consulting (Shanghai) Co. Ltd.; ARM Germany GmbH; ARM Embedded Technologies Pvt. Ltd.; ARM Norway, AS and ARM Sweden AB.

## Copyright

© 2018-2019 NVIDIA Corporation. All rights reserved.