TEGRA LINUX DRIVER PACKAGE

RN_05071-R32 | July 17, 2019
Subject to Change

32.2 Release Notes
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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

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

<table>
<thead>
<tr>
<th>Description</th>
<th>Supported Version</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Jetson AGX Xavier flashed with MAXN profile: jetson-xavier-maxn</td>
</tr>
<tr>
<td></td>
<td>Jetson AGX Xavier flashed for SLVS-EC supported sensors: jetson-xavier-slvx-ec</td>
</tr>
<tr>
<td></td>
<td>Original Jetson TX2 (P3310): jetson-tx2</td>
</tr>
<tr>
<td></td>
<td>Jetson TX2i (P3489): jetson-tx2i</td>
</tr>
<tr>
<td></td>
<td>Jetson TX2 4GB (P3489-0080): jetson-tx2-4GB</td>
</tr>
<tr>
<td></td>
<td>Original Jetson TX2 flashed to operate as Jetson TX2 4GB: jetson-tx2-as-4GB</td>
</tr>
<tr>
<td></td>
<td>Jetson TX1 (P2180): jetson-tx1</td>
</tr>
</tbody>
</table>

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: [https://developer.nvidia.com/embedded/faq#jetson-part-numbers](https://developer.nvidia.com/embedded/faq#jetson-part-numbers) |

The release tag name. Consult the kernel source to identify the tag name at: [http://nv-tegra.nvidia.com/gitweb/?p=linux-4.9.git](http://nv-tegra.nvidia.com/gitweb/?p=linux-4.9.git)

Kernel source files are live across several repositories.

Consult the topic Kernel Customization > Obtaining the Kernel Sources with Git in the Development Guide 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.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2515130</td>
<td>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.</td>
</tr>
</tbody>
</table>
| 2398839    | **Applies to:** 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  | **Applies to:** Jetson AGX Xavier  
ODMDATA passed from flashing command does not take effect. Only information in the `.conf.common` file is flashed.  
Do not attempt to modify ODMDATA at flash time with the command line option. |
### Issue 200512675

**Applies to:** Jetson TX2-4GB

Pressing the hardware reset button when the board is in SC7 state shuts off system power immediately.

### Issue 200525134

**Applies to:** Jetson TX2-4GB

SSH host keys may not be generated on first boot in headless mode (**oem-config**). This failure is reproducible less than 10% of the time.

As a workaround, reconfigure the SSH server by entering the command:

```bash
$ dpkg-reconfigure --frontend=noninteractive openssh-server
```

### Issue 200526544

**Applies to:** Jetson AGX Xavier

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.

### Issue 200527728

**Applies to:** Jetson AGX Xavier

Starting with Release 32.2, you can run **oem-config** in headless mode (with no display connected). In headless mode **oem-config** displays a Network Configuration screen, which has no equivalent in GUI mode.

Network Configuration calls an external tool, **netcfg**, to configure network settings. **netcfg** is included in the **ubiquity** package. If you choose the option “Do not configure network at this time,” hotplug will not work because **eth0** is not configured. The link is present, but the interface must be configured manually.

### Issue 200529709

**Applies to:** Jetson AGX Xavier

**SErr** or and CPU CBB Error may occur during hotplug of a UFS card.

## 2.2 Boot

The following boot related issues are noted in this release.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>200480903</td>
<td>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.</td>
</tr>
<tr>
<td>200492423</td>
<td>On all Jetson platforms, using the new OEM configuration, a minor glitch is observed during EULA screen presentation at first boot.</td>
</tr>
</tbody>
</table>
2.3 Camera

The following camera related issues are noted in this release.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
</tr>
</thead>
</table>
| 2574909  | **Applies to**: Jetson AGX Xavier, Jetson TX2
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.
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 the reference module’s needs (two streams at up to 4k at 60 fps).
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. |
| 2583989  | **Applies to**: Jetson AGX Xavier
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.
This issue may be resolved by configuring to the correct pixel format. |
| 200407802| **Applies to**: Jetson AGX Xavier and Jetson TX2
On Jetson TX2 and Jetson AGX Xavier using the six-camera module (E3333), Memory leakage occurs in the nvgpus daemon using the six-camera module (E3333). |
| 200459897| **Applies to**: Jetson AGX Xavier
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. |
| 200461442| **Applies to**: Jetson AGX Xavier
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| **Applies to**: Jetson AGX Xavier
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. |
<table>
<thead>
<tr>
<th>Issue</th>
<th>Applies to: Jetson AGX Xavier</th>
<th>Description</th>
</tr>
</thead>
</table>
| 200487673   |                               | argus_bayeraveragemap and argus_denoise sample apps exhibit 96-byte memory leak. The source of the leak is gtk_init(NULL, NULL), called during windows initialization. This is a known open-source leak. As per the second link there is no way to free data allocated using gtk_init(NULL, NULL). | ![Link](https://ubuntuforums.org/archive/index.php/t-1287827.html)
|             |                               | ![Link](https://www.mail-archive.com/gtk-list@redhat.com/msg00414.html)                                                                 |
| 200504723   | Applies to: Jetson TX2        | argus_openglbox application may exhibit an intermittent crash.                                                                                                                                         |
| 200512509   | Applies to: Jetson AGX Xavier | 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. 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. |
| 200517934   | Applies to: Jetson TX2        | Noisy corruption is observed intermittently when using sensormode (1920x1080@10bpp) with DualIMX274. The issue can be reproduced by toggling the sensor modes multiple times. It is only seen with sensormode. |
| 200522461   | Applies to: Jetson Nano       | 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. As a workaround, change full resolution mode width from 3280 to 3264. This works because the frame stride is a multiple of 64. |

### 2.4 Connectivity

The following connective related issues are noted in this release.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Applies to: Jetson Nano, Jetson AGX Xavier</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>200510929</td>
<td></td>
<td>Audio over Bluetooth using Intel 8265NGW M.2 key is not supported.</td>
</tr>
<tr>
<td>200511165</td>
<td>Applies to: Jetson TX2</td>
<td>Audio over Bluetooth using the on-board WiFi module is not supported.</td>
</tr>
</tbody>
</table>
2.5 CUDA

The following CUDA related issues are noted in this release.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
</tr>
</thead>
</table>
| 200484129 | Applies to: Jetson AGX Xavier, Jetson TX2  
CudaTools NVprof reports `l2 tex_read_hit_rate` is larger than 100%. This issue will not be fixed as the tool will be deprecated in a future release. |

2.6 Jetson Developer Kit

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

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
</tr>
</thead>
</table>
| 2544146 | Applies to: Jetson Nano Developer Kit  
The Jetson Nano A02 version of the developer kit hardware cannot boot with Intel 8260 WiFi plugged in.  
This issue is fixed in the newer B01 version of the hardware. |
| 200525516 | Applies to: Jetson Nano Developer Kit  
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. |

2.7 Multimedia

The following multimedia related issues are noted in this release.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
</tr>
</thead>
</table>
| 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:  
$ vlc --codec=avcodec <filename> |
| 200532719 | Applies to: Jetson TX2  
tegra-audio-amx-to-adx.sh script fails to run. |
## 2.8 SDK Manager

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

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
</tr>
</thead>
</table>
| 200530642 | 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.  
As a workaround for Ubuntu 18.04, enter this command:  
   ```bash
   $ sudo apt install bzip2=1.0.6-8.1 libbz2-1.0=1.0.6-8.1
   ```  
As a workaround for Ubuntu 16.04, enter this command:  
   ```bash
   $ sudo apt install bzip2=1.0.6-8 libbz2=1.0.6-8
   ``` |
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:

<table>
<thead>
<tr>
<th>Issue Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2496962</td>
<td>Low-latency audio decode requires customer to set memory and CPU speeds accordingly.</td>
</tr>
<tr>
<td>2521704</td>
<td>On Jetson Nano, when a GPIO is released (e.g. using the <code>sysfs</code> unexport file, the <code>cleanup()</code> function in the Jetson.GPIO 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.</td>
</tr>
<tr>
<td>200495497</td>
<td>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.</td>
</tr>
<tr>
<td>200497890</td>
<td>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.</td>
</tr>
<tr>
<td>200499128</td>
<td>On Jetson TX2, OSidle power consumption is comparatively higher than in public release 28.3.</td>
</tr>
</tbody>
</table>
3.2 Boot

Boot related resolved issues are as follows:

<table>
<thead>
<tr>
<th>Issue Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2510850</td>
<td>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.”</td>
</tr>
</tbody>
</table>

3.3 Camera

Camera related resolved issues are as follows:

<table>
<thead>
<tr>
<th>Issue Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>200490661</td>
<td>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.</td>
</tr>
</tbody>
</table>
| 200502605     | With Jetson AGX Xavier and an IMX274 sensor, preview and capture are blurred if one of these modes is configured:  
  - 3840×2160 at 30 frames/second  
  - 1920×1080 at 60 frames/second |

3.4 Multimedia

Multimedia related resolved issues are as follows:

<table>
<thead>
<tr>
<th>Issue Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2524344, 200498151</td>
<td>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.</td>
</tr>
</tbody>
</table>
| 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. |
<p>| 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. |</p>
<table>
<thead>
<tr>
<th>Issue Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>200502065</td>
<td>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 <a href="#">Accelerated GStreamer User Guide</a>.</td>
</tr>
<tr>
<td>200502136</td>
<td><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. 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:</td>
</tr>
<tr>
<td></td>
<td>$ nvgstcapture-1.0 --camsrc=0 --image-enc=0</td>
</tr>
<tr>
<td>200516907</td>
<td>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.</td>
</tr>
</tbody>
</table>
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:
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, `libGLESv1_CM.so` will be available and OpenGLES 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](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:

1. Install the package `openjdk-8-jre`
2. 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-
basedtsi

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:**

   ```python
   --- a/bootloader/tegraflash_internal.py
   +++ b/bootloader/tegraflash_internal.py
   @@ -3184,7 +3184,8 @@ def
tegraflash_generate_mem_bct(is_cold_boot_mb1_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'] =
teugas_oem_sign_file(mem_bcts[ramcode], 'MEMB')
     + shutil.copyfile(mem_bcts[ramcode], 'mem_rcm.bct')
     + tegrabct_values['--membct_rcm'] =
teugas_oem_sign_file('mem_rcm.bct', 'MEMB')
   
   def tegraflash_generate_mb1_bct(is_cold_boot_mb1_bct):
     if bool(is_cold_boot_mb1_bct) == True:
   ```

2. **Patch 2:**

   ```python
   --- a/bootloader/odmsign.func
   +++ b/bootloader/odmsign.func
   @@ -714,6 +714,7 @@ odmsign_sbk_and_pkc_flashing ()
   BCTARGS="--mb1_cold_boot_bct
   mb1_cold_boot_bct_MB1.bct_sigheader.encrypt.signed ";
   else
     BCTARGS="--mb1_bct mb1_bct_MB1_sigheader.bct.signed ";
   + BCTARGS="--mem_bct mem_rcm_sigheader.bct.signed ";
   + BCTARGS="--mb1_cold_boot_bct
   mb1_cold_boot_bct_MB1_sigheader.bct.signed ";
   fi;
   BCTARGS="--mem_bct_mem_bct
   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-v412` 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:
2. In `/etc/modprobe.d/tegra-udrm.conf`, uncomment the following line (remove "#" from the start of the line):

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

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

```shell
DISABLE_MESA_EGL="1"
```

To:

```shell
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:

```shell
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:

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

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

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

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2515130, 258714</td>
<td>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.</td>
</tr>
<tr>
<td>2524344, 200498151</td>
<td>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.</td>
</tr>
<tr>
<td>2496962</td>
<td>Low-latency audio decode requires customer to set memory and CPU speeds accordingly.</td>
</tr>
<tr>
<td>2521704</td>
<td>On Jetson Nano, when a GPIO is released (e.g. using the sysfs unexport file, the cleanup() function in the Jetson.GPIO Python module, or the gpio_free() 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.</td>
</tr>
<tr>
<td>200431304</td>
<td>On Jetson AGX Xavier, user cannot ping the IP address 0.0.0.0.</td>
</tr>
<tr>
<td>200488963</td>
<td>Nano /dev/root device size is restricted to 14 GB when using flash.sh to write to an SD card. User cannot create additional partitions on the root device, so any excess space is unavailable.</td>
</tr>
<tr>
<td>200492517</td>
<td>On Jetson Nano, system error occurs at gether_connect+0x80/0x1d8 during SC7 stress. The issue’s reproducibility is very low.</td>
</tr>
</tbody>
</table>
## Issue Description

### USB

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>200497890</td>
<td>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.</td>
</tr>
<tr>
<td>200498221</td>
<td>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.</td>
</tr>
<tr>
<td>200499128</td>
<td>On Jetson TX2, OSidle power consumption is comparatively higher than in public release 28.3.</td>
</tr>
</tbody>
</table>

### Boot

The following boot related issues are noted in this release.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2510850</td>
<td>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.”</td>
</tr>
<tr>
<td>200471553</td>
<td>On Jetson AGX Xavier, changing boot device order requires reflash. The user cannot change boot order from the command line.</td>
</tr>
<tr>
<td>200480903</td>
<td>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.</td>
</tr>
<tr>
<td>200492423</td>
<td>On all Jetson platforms, using the new OEM configuration, a minor glitch is observed during EULA screen presentation at first boot.</td>
</tr>
</tbody>
</table>

### Camera

The following camera related issues are noted in this release.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>200407802</td>
<td>On Jetson TX2 and Jetson AGX Xavier using the six-camera module (E3333), memory leakage occurs in the nvargus daemon.</td>
</tr>
<tr>
<td>200459897</td>
<td>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.</td>
</tr>
<tr>
<td>200461442</td>
<td>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.</td>
</tr>
<tr>
<td>200476911</td>
<td>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.</td>
</tr>
</tbody>
</table>
### CUDA Samples

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

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>200500995</td>
<td>If the system date and time are not set correctly after boot, be sure the configured NTP server is accessible from your network.</td>
</tr>
</tbody>
</table>

### Multimedia

The following multimedia related issues are noted in this release.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
</tr>
</thead>
</table>
| 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:  
  vlc --codec=avcodec <filename>                                                                 |
| 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. |
| 200502065 | GST pipeline using camera capture with scaling/color conversion may affect performance. NVIDIA recommends setting the `nvarguscamerasrc` property `maxperf=1` for better performance. For more details, see the “Camera Capture” section of *Accelerated GStreamer User Guide*. |
| 200502136 | `nvgstcapture-1.0` has an image encoding issue using the `nvjpegenc` plugin for default YUY2 video capture format for a USB camera. |
To work around the issue, use the OSS jpegenc plugin instead of `nvgstcapture-1.0` for image encoding with a USB camera. To do this, add the command line switch `--image-enc=0` to the `nvgstcapture-1.0` capture command, for example:

```
nvgstcapture-1.0 --camsrc=0 --image-enc=0
```
8 November 2018 — 31.1

Known Issues

General System Usability

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

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2419317</td>
<td>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>.)</td>
</tr>
<tr>
<td>200461808</td>
<td>When connecting the Intel IGB PCIE card, CPU errors may occur during system idle.</td>
</tr>
<tr>
<td>200436049</td>
<td>Failure to launch NVVP after installing <code>cuda-repo-ubuntu1804-10-0-local-10.0.96-410.27_1.0-1_amd64.deb</code>.</td>
</tr>
<tr>
<td>200464272</td>
<td>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 igb driver). This issue is under investigation.</td>
</tr>
</tbody>
</table>

Camera

The following camera related issues are noted in this release.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2032213</td>
<td>The maximum value that <code>getExposureTimeRange()</code> may return is 40000000.000 (400,000,000 nanoseconds, 400 msec).</td>
</tr>
<tr>
<td>200297610</td>
<td>Preview freeze with WDR mode when AWB lock is set and user attempts to change AWB mode to Auto.</td>
</tr>
<tr>
<td>200455493</td>
<td>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:</td>
</tr>
<tr>
<td></td>
<td>--defog=ENABLE</td>
</tr>
<tr>
<td></td>
<td>--defogamount=AMOUNT</td>
</tr>
<tr>
<td></td>
<td>--defogquality=QUALITY</td>
</tr>
<tr>
<td>200455200</td>
<td><code>argus_userautoexposure</code> app failed to run the sample in DOL WDR modes.</td>
</tr>
<tr>
<td>200455287</td>
<td><code>argus_userautowhitebalance</code> app gives greenish preview on high exposure scenes.</td>
</tr>
<tr>
<td>200459897</td>
<td>Blur and corruption observed with SLVS-EC sensor.</td>
</tr>
<tr>
<td>200443798</td>
<td><code>VisionWorks nvx_sample_nvgstcamera_capture</code> sample application fails to run.</td>
</tr>
</tbody>
</table>
CUDA Samples

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

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>200448615</td>
<td>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.</td>
</tr>
</tbody>
</table>

Multimedia

The following multimedia related issues are noted in this release.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>200387512</td>
<td>GStreamer based video playback using Wayland not working when Weston is started as an NVIDIA user.</td>
</tr>
</tbody>
</table>

Top Fixed Issues

These issues are resolved in this release.

General System Usability

General system usability related resolved issues are as follows:

<table>
<thead>
<tr>
<th>Issue Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>200437318</td>
<td>Tegrastats does not save information to a file.</td>
</tr>
<tr>
<td>200454955</td>
<td>Kernel PWM fan driver overrides fan setting applied by jetson_clocks.sh.</td>
</tr>
</tbody>
</table>

Camera

Camera related resolved issues are as follows:

<table>
<thead>
<tr>
<th>Issue Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>200422466</td>
<td>IMX185 sensor not supported in this release.</td>
</tr>
</tbody>
</table>
15 October 2018 – 31.0.2

Known Issues

General System Usability

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

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2183567</td>
<td>Type-C devices unable to drive DP due to length of delay before handshake begins. Workaround: see Type-C Devices Unable to Drive DisplayPort.</td>
</tr>
<tr>
<td>200441525</td>
<td>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.</td>
</tr>
<tr>
<td>2218290</td>
<td>Thermal shutdown reboots system instead of powering off.</td>
</tr>
<tr>
<td>200436049</td>
<td><code>nvvp</code> (Visual Profiler) launch fails after installing <code>cuda-repo-ubuntu1804-10-0-local-10.0.96-410.27_1.0.1_amd64.deb</code>.</td>
</tr>
<tr>
<td>200442461</td>
<td>VisionWorks SFM sample fails to run; shows black image when launching <code>nvx_sample_sfm</code> sample.</td>
</tr>
<tr>
<td>200447045</td>
<td>SC7 system suspend/resume may have intermittent resume failures in this release.</td>
</tr>
</tbody>
</table>

Boot

The following boot related issues are noted in this release.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2305640</td>
<td>CBoot bootloader cannot access USB mass storage devices connected via a USB hub.</td>
</tr>
</tbody>
</table>
**Camera**

The following camera related issues are noted in this release.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2258817</td>
<td>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.)</td>
</tr>
<tr>
<td>200422466</td>
<td>IMX185 sensor not supported in this release.</td>
</tr>
<tr>
<td>200445964</td>
<td>Greenish image capture with argus_onshot.</td>
</tr>
<tr>
<td>2199266</td>
<td>Temporal noise reduction may cause a slight green tint to images.</td>
</tr>
<tr>
<td>200407738</td>
<td>Greenish tint on displayed preview image when running the sample software argus_userautowhitebalance.</td>
</tr>
</tbody>
</table>

**CUDA**

The following CUDA related issues are noted in this release.

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

**Display**

The following display related issues are noted in this release.

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

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

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2340186</td>
<td>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.</td>
</tr>
</tbody>
</table>

### Kernel

The following kernel related issues are noted in this release.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>200443630</td>
<td>Hotplugging a UFS card may cause the Linux kernel to report a CPU SError.</td>
</tr>
<tr>
<td>200399574</td>
<td>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.”</td>
</tr>
<tr>
<td>2211831</td>
<td>UART serial console using USB to TTL serial cable does not work.</td>
</tr>
</tbody>
</table>
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