



NVIDIA DRIVE OS 6.0.9 Linux

Release Notes



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Introduction

The NVIDIA DRIVE® OS 6.0 Linux Release Notes are for NVIDIA DRIVE AGX Orin™ Development Kits.

Note: This DRIVE OS release may only be used for test and development.

Note: DRIVE OS Linux for Safety and DRIVE OS Linux Yocto Components are only available for NVONLINE developers.

NVIDIA DRIVE OS is the reference operating system and associated software stack, which includes CUDA, TensorRT, NvMedia, NvStreams, and Developer Tools, designed specifically for developing and deploying autonomous applications on DRIVE AGX-based hardware. DRIVE OS includes the NVIDIA DriveWorks SDK as a foundation for autonomous vehicle (AV) software development. The DriveWorks SDK provides an automotive-grade middleware with accelerated algorithms and versatile tools.

DRIVE OS Development Kits

NVIDIA DRIVE OS Software Development Kit (SDK) is used to develop DRIVE OS applications for deployment on NVIDIA DRIVE AGX™ based hardware platforms.

Note: The NVIDIA DRIVE OS Platform Development Kit (PDK) is only available to NVONLINE users.

NVIDIA DRIVE OS Platform Development Kit (PDK) is used to adapt NVIDIA DRIVE OS to run on custom hardware based on NVIDIA Automotive SoC (i.e., Orin).

DRIVE OS Base Operating Systems

DRIVE OS Linux “Standard”

DRIVE OS Linux “Standard” is a reference platform based on Ubuntu 20.04 LTS Linux, which is intended for prototyping and development of autonomous vehicle platforms. DRIVE OS Linux is production ready but does not go through the same safety assessment as DRIVE OS QNX for Safety.

Release Highlights

Key Features in this Release

For a complete list of new features and enhancements in this release, see [New Features and Enhancements](#).

Deprecations in this Release

The following items are deprecated in this release:

Summary	Module	Impact
Linux kernel version 5.15.68.	Kernel	The Linux kernel version has changed from 5.15.68 in 6.0.8.x to 5.15.116 in 6.0.9. For more details, refer to Linux Kernel Minor Version Update under New Features and Enhancements .

Planned Upcoming Changes

The following sections describe planned, upcoming changes.

Summary	Module	Impact
<p>The following API will change in 6.0.9.1:</p> <ul style="list-style-type: none"><code>void Spi_Init(const Spi_ConfigType * const ConfigPtr)</code><code>Std_ReturnType Spi_AsyncTransmit(const Spi_SequenceType Sequence)</code><code>Std_ReturnType Spi_ReadIB(Spi_Ch</code>	FSI SPI	<p>The <code>const</code> keyword will be removed, which may lead to build warnings. There is no functional impact and closed box customers are not impacted. Use the new API</p> <ul style="list-style-type: none"><code>void Spi_Init(const Spi_ConfigType* ConfigPtr</code><code>Std_ReturnType Spi_AsyncTransmit(Spi_SequenceType Sequence</code><code>Std_ReturnType Spi_ReadIB(Spi_ChannelType Channel, Spi_DataBufferType* DataBufferPointer</code>

<pre> annelType Channel, const Spi_DataBu fferType * DataBufferPtr) • Std_ReturnType Spi_SetupEB (const Spi_Channe lType Channel, const Spi_DataBufferTyp e * SrcDataBufferPtr, Spi_DataBufferTyp e * DesDataBufferPtr, Spi_NumberOfDataT ype Length) Std_ReturnType Spi_SetAsyncMode(const Spi_AsyncModeType Mode) </pre>		<pre>) • Std_ReturnType Spi_SetupEB(Spi_ChannelType Channel, const Spi_DataBufferType* SrcDataBufferPtr, Spi_DataBufferType* DesDataBufferPtr, Spi_NumberOfData Type Length) • Std_ReturnType Spi_SetAsyncMode(Spi_AsyncModeTy pe Mode) </pre>
<p>The following API will change in 6.0.9.1:</p> <ul style="list-style-type: none"> void Port_GetVersionInfo(Std_VersionInfoType *const versioninfo) void Port_SetPinMode(const Port_PinType Pin, const Port_PinModeType Mode) <pre> void Port_SetPinDirection(const Port_PinType Pin, const Port_PinDirecti onType Direction) </pre>	FSI Port	<p>The const keyword will be removed, which may lead to build warnings. There is no functional impact and closed box customers are not impacted. Use the new API</p> <ul style="list-style-type: none"> void Port_GetVersionInfo(Std_VersionInfoType* versioninfo) void Port_SetPinMode(Port_PinType Pin, Port_PinModeType Mode) <pre> void Port_SetPinDirection(Port_PinType Pin, Port_PinDirectionType Direction) </pre>
<p>The following API will change in 6.0.9.1:</p> <ul style="list-style-type: none"> Dio_PortLevelType Dio_ReadChannelGroup(const 	FSI DIO	<p>The const keyword will be removed, which may lead to build warnings. There is no functional impact and closed box customers are not impacted. Use the new API</p> <ul style="list-style-type: none"> Dio_PortLevelType Dio_ReadChannelGroup(const

<pre> Dio_ChannelGroupType * const ChannelGroupIdPtr) • void Dio_WriteChannelGroup (const Dio_ChannelGroupType * const ChannelGroupIdPtr, const Dio_PortLevelType Level) • void Dio_GetVersionInfo(Std_VersionInfoType * const VersionInfo) • Dio_LevelType Dio_FlipChannel(const Dio_ChannelType ChannelId) • void Dio_WritePort(const Dio_PortType PortId, const Dio_PortLevelType Level) • Dio_PortLevelType Dio_ReadPort(const Dio_PortType PortId) • void Dio_WriteChannel(const Dio_ChannelType ChannelId, const Dio_LevelType Level) • Dio_LevelType Dio_ReadChannel(const Dio_ChannelType ChannelId) </pre>		<pre> Dio_ChannelGroupType* ChannelGroupIdPtr) • void Dio_WriteChannelGroup(const Dio_ChannelGroupType* ChannelGroupIdPtr, Dio_PortLevelType Level) • void Dio_GetVersionInfo(Std_VersionInfoType* VersionInfo) • Dio_LevelType Dio_FlipChannel(Dio_ChannelType ChannelId) • void Dio_WritePort(Dio_PortType PortId, Dio_PortLevelType Level) • Dio_PortLevelType Dio_ReadPort(Dio_PortType PortId) • void Dio_WriteChannel(Dio_ChannelType ChannelId, Dio_LevelType Level) Dio_LevelType Dio_ReadChannel(Dio_ChannelType ChannelId) </pre>
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New Features and Enhancements

This release includes support for these new features and enhancements.

New Features for DRIVE OS

Linux Kernel Minor Version Update

The Linux kernel version has changed from 5.15.68 in 6.0.8.x to 5.15.116 in 6.0.9.0. You now see a newer Linux kernel minor version number compared to previous releases (e.g., when entering the `uname -a` command). This minor version update contains kernel fixes (including several CVE fixes) from the upstream Linux kernel project and from Canonical. The full change log for the updates is included in the OSS Sources included in the DRIVE OS Linux releases and can be found at `<top/>drive-linux/kernel/source/oss_src/kernel/debian.nvidia-tegra/changelog`.

Storage Priority Scheduling

In 6.0.8.1, Storage priority scheduling issues were reported as part of release notes.

In 6.0.9.0, Storage priority scheduling issues are fixed.

But for UFS storage access, if low priority virtual storage partition requests are already queued and after that if there are high priority virtual storage partition requests queued, then there can be delays in getting responses for the high priority virtual storage partition requests due to already existing low priority requests queued.

Worst case delays depend on the existing requests queued to the device and if there are BKOPS being done by device internally.

For example, if all the existing requests are of type write (each write request is 4MB), then in the worst case the delay can be (32 * 40) milli seconds (assuming 100MB/s of worst case write throughput).

This is also applicable between requests of the same priority.

Latencies for UFS case can be controller with DT parameter setting.

For details, refer to the Embedded Software Components / Virtualization Guide / Storage Server/Virtualized Storage chapter in the *NVIDIA DRIVE OS 6.0 PDK Developer Guide*.

SoC Logging to Persistent Storage

DRIVE OS now provides a unified framework to log system level events, UART prints, and error codes onto persistent storage.

Reference Count of init/deinit Calls

DRIVE OS supports NvScilpc tracking the reference count of init/deinit calls.

Safety Services Changes

Safety Services public header files have been moved to `${SDK_INCLUDE_DIR}` from `<top>/samples/ccplex_sf/`. In the 6.0.9 release, the header files are available at both the old and new locations, but they will be removed from the old location in 6.0.9.1. Update your build systems to include the new include paths.

NvMedia LDC Changes

NvMedia LDC no longer accepts source and destination rectangles that have any corner at non-multiple-of-2 coordinates.

NvMedia LDC no longer accepts destination rectangles smaller than 64x16 pixels.

NvMediaLdcProcess() fails with an error code if a rectangle violating these new restrictions is configured.

Non-multiple-of-2 rectangles were already rejected with subsampled YUV surface formats previously; the restriction is now extended to apply to all surface formats.

New NvMedia API

The following API changes were actually made in 6.0.7:

- New API Addition to IEP (encoder) APIs - NvMediaIEPCreateEx(), which can be used to replace the use of NvMediaIEPCreate (if the application design requires it).
- Difference between NvMediaIEPCreateEx and NvMediaIEPCreate: NvMediaIEPCreateEx does take a reconciled NvSciBufAttrList as an argument. Put in another way, the creation of NvSciBufObj compatible with IEP is not a pre-condition for the NvMediaIEPCreateEx API.

New Features for DriveWorks 5.16

This release includes support for these new features and enhancements.

Installation and Getting Started

- DriveWorks 5.16 is installed with DRIVE OS 6.0.9.0. No separate installation of DriveWorks libraries are needed.
- Please refer to the Getting Started section of the DriveWorks SDK Reference Documentation for information about how to verify the installation and get started developing with DriveWorks.
- DriveWorks samples and data are not installed on the target OOB RFS for DRIVE Linux, as they would occupy too much space. Refer to the Getting Started section of the DriveWorks SDK Reference Documentation for information about building and running samples on Orin.

Fixed Issues

The following DRIVE OS and DriveWorks issues from the previous release are resolved in this release:

Reference ID	Module	Description
3866554	Bootburn	What was the issue? In 6.0.8.0, the flashing kernel transitioned to K5.15 (from K5.10), but kernel tarball and build scripts were missing in the 6.0.8.1 release packages. How did it impact the customer? You were not able to build your own 5.15 flashing kernel and modules using the flashing kernel build scripts. Was it for SDK/PDK? Both
4229331	Camera	What was the issue? IMX623/IMX728 sensor sent image metadata called embedded metadata per frame along with image data. This metadata was sent before the image (top embedded data) and after the image (bottom embedded data). The API called ParseCustomEmbeddedData exposed to the DRIVE OS user mentioned the ability to parse both top and embedded data by taking in the top and bottom embedded data buffer, whereas the API only supported parsing top embedded data. The API could only parse top embedded data. How did it impact the customer? You could not get parse information from the bottom embedded data using DRIVE OS API. Was this Standard/Safety? Both Was it for SDK/PDK? Both
4250694	FSI	What was the issue? KAT tests were not enabled for all algorithms. How did it impact the customer? <ul style="list-style-type: none">Impact was low.KAT already ran for GCM, CMAC, SHA, and RSA algorithms at startup. If any KAT tests failed, FSISW boot was not done.KAT tests were not run for these algorithms, but the job was triggered when requested: ED25519, CBC, GMAC.Ephemeral tests and startup tests were present as verification, which checked

		<p>the responses to all these algorithms and made sure that the response was received in time (both failure or pass cases).</p> <p>Was it for SDK/PDK? Applied to FSISW open and closed box customers.</p>
3983073	Display	<p>What was the issue? SOR and RG FMON Violation - You might have seen errors with ReporterId-0xe04c, such as "MCU_FOH: ErrReport: ErrorCode-0x28da ReporterId-0xe04c Error_Attribute-0x0 Timestamp-0x13a51bd" on the MCU console during boot. These were violations reported by FMON function due to setting of SOR and RG clocks without notifying BPMP module about the clock change. devg-modeset module must disable monitoring clocks for SOR and RG while updating SOR and RG clocks. It was not able to do so, causing these FMON violations.</p> <p>Was it for SDK/PDK? Both</p>
4184332	System Software	<p>What was the issue? Yocto build failed intermittently with compilation failure in Vulkan-samples reporting out of memory error.</p> <p>How did it impact the customer? Customers building Yocto with bitbake might have hit this failure intermittently when several other bitbake tasks were running.</p> <p>Was it for SDK/PDK? Both</p>
4195508	DRIVE Update	<p>What was the issue? Starting from 6.0.8.0, security mandated that one DRIVE Update deployment must include PVIT update if the system had PVIT enabled.</p> <p>How did it impact the customer? When constructing the metadata manually in cases like delta update, PVIT partition must have been included as part of the deployment; otherwise, install_unlock failed.</p> <p>Was it for SDK/PDK? Both</p>
4184657	SAL	<p>What was the issue? sample_camera could not replay multi RAW/LRAW videos that were recorded from cameras connected to the same link index.</p> <p>How did it impact the customer? Could not replay multi videos with same input, RAW/LRAW include link index information, could not replay same index video at the same time.</p> <p>Was it for SDK/PDK? SDK</p>
4180423		<p>What was the issue? Could not detect some USB cameras.</p> <p>How did it impact the customer? Some USB cameras were free driver in DRIVE OS 6.0.7 and before. Camera samples could not open some USB cameras directly due to a missing driver.</p> <p>Was it for SDK/PDK?</p>

		SDK
4203303	System Software	What was the issue? Calibration recorder tool failed with input lraw/raw videos. How did it impact the customer? Calibration recorder tool could not work with input lraw/raw videos. Was it for SDK/PDK? SDK
4203115		What was the issue? sample_connected_components showed black rendering screen for both raw/lraw video How did it impact the customer? sample_connected_components could not work with input raw/lraw videos. Was it for SDK/PDK? SDK

NVIDIA Software Security Updates

This release of NVIDIA DRIVE OS 6.0 QNX includes updates that address the following issue[s]:

CVE ID	NVIDIA Issue Number	Description
Not assigned	4333676	NVIDIA DRIVE OS contains a vulnerability in the Security Engine where a user may leak information about a cryptographic key. A successful exploit of this vulnerability may lead to information disclosure about the cryptographic key.

For more information about NVIDIA's vulnerability management, refer to the [NVIDIA Product Security](#) page.

Third-Party Software Security Updates

This release of NVIDIA DRIVE OS 6.0 Linux includes updates that address the following issue(s):

CVE ID	Description
CVE-2023-27535	An authentication bypass vulnerability exists in libcurl <8.0.0 in the FTP connection reuse feature that can result in wrong credentials being used during subsequent transfers. Previously created connections are kept in a connection pool for reuse if they match the current setup. However, certain FTP settings such as CURLOPT_FTP_ACCOUNT, CURLOPT_FTP_ALTERNATIVE_TO_USER, CURLOPT_FTP_SSL_CCC, and CURLOPT_USE_SSL were

	not included in the configuration match checks, causing them to match too easily. This could lead to libcurl using the wrong credentials when performing a transfer, potentially allowing unauthorized access to sensitive information.
CVE-2023-4863	Heap buffer overflow in libwebp in Google Chrome prior to 116.0.5845.187 and libwebp 1.3.2 allowed a remote attacker to perform an out of bounds memory write via a crafted HTML page. (Chromium security severity: Critical)
CVE-2023-5217	Heap buffer overflow in vp8 encoding in libvpx in Google Chrome prior to 117.0.5938.132 and libvpx 1.13.1 allowed a remote attacker to potentially exploit heap corruption via a crafted HTML page. (Chromium security severity: High)
CVE-2023-3863	A use-after-free flaw was found in nfc_llcp_find_local in net/nfc/llcp_core.c in NFC in the Linux kernel. This flaw allows a local user with special privileges to impact a kernel information leak issue.
CVE-2023-3863	A use-after-free flaw was found in net/sched/cls_fw.c in classifiers (cls_fw, cls_u32, and cls_route) in the Linux Kernel. This flaw allows a local attacker to perform a local privilege escalation due to incorrect handling of the existing filter, leading to a kernel information leak issue.
CVE-2023-40283	An issue was discovered in l2cap_sock_release in net/bluetooth/l2cap_sock.c in the Linux kernel before 6.4.10. There is a use-after-free because the children of an sk are mishandled.

Known Limitations

The following sections describe known limitations in 6.0.9.0.

Feature	Module	Description
4285401	Camera	<p>Camera software does not support configuration of CSI tuning values per board. Instead, the tuning values are hard-coded per SoC generation in RCE firmware code.</p> <p>How does it impact the customer?</p> <p>You cannot modify CSI tuning values on their own to apply their characterized board specific tuning values when the generic SoC generation specific values are not suitable. Untuned values may lead to loss of signal and failure to capture sensor data.</p> <p>If there is a workaround, what is it?</p> <p>If you have TSE support established:</p> <p>Request a custom RCE FW binary from your TSE to apply your characterized board specific tuning values when the generic SoC generation specific values are not suitable.</p> <p>Another possible workaround:</p> <p>Stick to reference board design on CSI parts and line layout from NVIDIA.</p> <p>When do we expect a resolution?</p> <p>6.5</p>
3599251	Storage	<p>Linux Guest VM Virtual Storage Client Driver (VSCD) I/O thread is pinned to LCPU2 for fixing Storage priority scheduling issues. In VSCD, all requests and responses are processed on LCPU2.</p> <p>With the above change, Storage throughput</p>

		<p>(MB/s) impact is evaluated by running FIO tool with various request sizes (bs): 4M, 2M, 1M, 512KB, 256KB, 128KB, 64KB, 4KB.</p> <p>As per the test run results, compared to previous release, NVIDIA is seeing the 4K perf drop mentioned below, but for other BS sizes, not much throughput drop is observed.</p> <ul style="list-style-type: none"> • For sequential write 4K operation on UFS, we are seeing drop of 15% • For random write 4K operation on UFS, we are seeing drop of 10% • For random read 4K operation on UFS, we are seeing drop of 15% • For sequential read 4K operation on eMMC, we are seeing drop of 13% • For random write 4K operation on eMMC, we are seeing drop of 23% • For sequential read 4K operation on eMMC, we are seeing drop of 12% <p>If the request sizes are of 4K, then throughput drop is expected.</p> <p>Use cases that send smaller request sizes in range 4K and that expect high throughput may get impacted.</p>
DriveWorks	DriveWorks	Building the NVIDIA DriveWorks SDK as a Yocto Project® based component is not supported.
Docker	DriveWorks	Sample execution within Docker containers on host is not supported for camera-related samples.

Known Issues

Note:

Due to the introduction of enhanced persistent partition workflow, if you are upgrading from DRIVE OS 6.0.4 to the current DRIVE OS version and using `-init` persistent partitions, follow all the steps mentioned under the Data Migration for Persistent Partitions chapter in the *DRIVE OS 6.0 Linux SDK Developer Guide*.

These are issues discovered during development and QA and are scheduled to be resolved in a future release.

Reference ID	Module	Description
4256558	Bootburn	What is the issue? Logic error prevents storage resize operation at device physical offset zero from working correctly. How does it impact the customer? There should be no impact as the start of physical storage devices use NVIDIA partitions, which do not use resize. If there is a workaround, what is it? Don't use partition that need resize at the physical offset 0 of the storage device. When can we expect the fix? 6.0.9.1 Is it for SDK/PDK? SDK
4373142	Kernel	What is the issue? The numbers collected for the benchmark were incorrect in the previous release. The command executed to the run the test was incorrect. How does it impact the customer? As there is no fix in code, there should not be any impact to the customer. If there is a workaround, what is it? No workaround is needed. When can we expect the fix? There is no fix in code. The command to run the test has been corrected. Is it for SDK/PDK? SDK
4399182	DRIVE Update	What is the issue? Update Service VM needs time to initialize after the system is booted up. There is a chance that suspend fails if triggered immediately after INIT_DONE is reported as Update Service VM is not yet fully initialized. How does it impact the customer?

		<p>Suspend may fail if you trigger suspend immediately after DVMS state becomes INIT_DONE.</p> <p>If there is a workaround, what is it?</p> <p>Add a delay of 2 seconds from user-space init or ensure suspend is triggered 10 seconds after boot.</p> <p>When can we expect the fix?</p> <p>Late Q1 2024.</p> <p>Is it for SDK/PDK?</p> <p>Both</p>
4384503	MCU Firmware	<p>What is the issue?</p> <p>During poweroff- poweron stress test on the P3710 board, VRS10 init fails during MCU bootup, which in turn stops the release of Orin from the reset state. The occurrence and reproducibility rate is very low, about once per 700+ cycles on multiple retries of those many cycles.</p> <p>How does it impact the customer?</p> <p>Bootup of Orin occasionally fails on a stress test.</p> <p>If there is a workaround, what is it?</p> <p>Power switch-off and switch-on help to recover from VRS init failure.</p> <p>When can we expect the fix?</p> <p>Late Q1 2024.</p> <p>Is it for SDK/PDK?</p> <p>Both</p>
4404632	System Software	<p>What is the issue?</p> <p>Support of default power profile for p3710-10-a01-ct04 platform under Linux and PCT is missing.</p> <p>How does it impact the customer?</p> <p>Unsupported power and thermal profile is selected when power profile is not passed as part of bind command on p3710-10-a01-ct04 platform, resulting in failure to boot the system.</p> <p>If there is a workaround, what is it?</p> <p>Use bind command argument -w for p3710-10-a01-ct04 platform: <code>./make/bind_partitions -b p3710-10-a01-ct04 linux -w "MAXP-A-977-D-02"</code></p> <p>When can we expect the fix?</p> <p>Late Q1 2024.</p> <p>Is it for SDK/PDK?</p> <p>Both</p>
4370056	DRIVE Update	<p>What is the issue?</p> <p>In DUPKG generation, if the input images path contains an argument's name (e.g., TEGRA_A_SRC, CHAIN etc.), the generation fails to parse the input's value.</p> <p>To view all arguments for DUPKG generation with individual template, execute the <code>dupkg lsin --template \$TEMPLATE</code> command. For example:</p> <pre>~\$ dupkg lsin --template dupkg_single_tegra_template</pre> <p>How does it impact the customer?</p> <p>DUPKG generation may fail.</p>

		<p>If there is a workaround, what is it? Avoid including any argument's name in the input images path.</p> <p>When can we expect the fix? Late Q1 2024.</p> <p>Is it for SDK/PDK? Both; it is a tool on the host side.</p>
4190302	System Software	<p>What is the issue? Although SC7_DRAM_AUTHENTICATION is not enabled by default for DRIVE OS Linux builds, DRAM_Authentication disabled causes SC7 entry failure on P3898.</p> <p>How does it impact the customer? Customers using P3898 are unable to enter SC7.</p> <p>If there is a workaround, what is it? SC7_DRAM_AUTHENTICATION has been kept enabled for P3898 platform. Although this increases boot time, this still meets the committed resume KPIs of 2 seconds for P3898.</p> <p>When can we expect the fix? Late Q1 2024.</p> <p>Is it for SDK/PDK? Both</p>
3928416	HSI	<p>What is the issue? You may see error spews on MCU console during boot, with the following error code. This indicates an HSI EQOS RX FMON error while enabling FMON clock: MCU_FOH: ErrReport: ErrorCode-0x28de ReporterId-0xe04c Error_Attribute-0x0 Timestamp-0xa4fc08e.</p> <p>How does it impact the customer? There is no impact on the data transfers. T EQOS FMON monitoring for RX CLK may not work.</p> <p>If there is a workaround, what is it? No workaround.</p> <p>When can we expect the fix? Late Q1 2024.</p> <p>Is it for SDK/PDK? SDK</p>
4169204	Camera Core	<p>What is the issue? Sample camera application crashes when running with Test Pattern Generator (TPG) from DS90UB971 FPD-Link serializer.</p> <p>How does it impact the customer? The impact is minimal since the issue is only observed with TPG, not actual FPD-Link sensors.</p> <p>If there is a workaround, what is it? No workaround.</p> <p>When can we expect the fix? TBD</p> <p>Is it for SDK/PDK? PDK</p>

4174916	Nsight	Accelerator workload events for VIC, OFA, NVENC and NVDEC are missing (missing job_timestamps ftrace events).
4174916	Nsight	Clicking on accelerator workload events for VI will not reveal the corresponding API call that launched the job (missing vi_task_submit ftrace event).
4184360	Nsight	When remote profiling from the host x86_64, accelerator workload events are not collected.
4115578	Nsight	When localhost profiling on the target arm64 using nsys-ui GUI, accelerator workload events are not collected.
4190938	Nsight	Accelerator workload events for PVA in specific scenarios might not be displayed correctly.
4193687	Nsight	Tegra accelerator workload events in specific scenarios might disappear when zooming in on the timeline.
3961157	Camera Core	<p>What is the issue? Demosaic of RGB-IR sensors in nvsipl_camera is not supported. When <code>--enableRawOutput</code> is used with Display in nvsipl_camera, the app fails.</p> <p>How does it impact the customer? You cannot display raw output of RGB-IR sensors.</p> <p>If there is a workaround, what is it? N/A</p> <p>When can we expect the fix? Late Q1 2024.</p> <p>Note: A demosaic'd image will not be displayed; a monochrome image created using G and IR components will be displayed.</p> <p>Is it for SDK/PDK? Both</p>
4087839	System Software	<p>What is the issue? In bind phase of the build, storage configuration may throw the warning message: "WARNING: Uniqueness failure: Reuse of SID value:".</p> <p>How does it impact the customer? The Warning "WARNING: Uniqueness failure: Reuse of SID value:" can be ignored for Linux and boot chain C builds.</p> <p>If there is a workaround, what is it? N/A</p> <p>When can we expect the fix? Late Q1 2024.</p> <p>Is it for SDK/PDK? Both</p>
4079771	NvDisplay	<p>What is the issue? HDMI is not enabled by default in AV+L build for any of devkit reference boards.</p> <p>How does it impact the customer? Platforms with HDMI connector output do not work by default.</p> <p>If there is a workaround, what is it? Follow the steps in the Enabling HDMI chapter under NvDisplay to enable HDMI on your board.</p>

		<p>When can we expect the fix? Late Q1 2024.</p> <p>Is it for SDK/PDK? Both</p>
4070042	Kernel	<p>What is the issue? sestatus tool is not available in the Linux RFSes for Linux K5.15 while it is still available in RFSes for Linux K5.10.</p> <p>How does it impact the customer? You are not able to use sestatus in K5.15 DRIVE OS package.</p> <p>If there is a workaround, what is it? The same information can be extracted from other source such as /sys/fs/selinux/status. You can also <code>apt install polycycoreutils</code> to get the command installed/supported on the target system.</p> <p>When can we expect the fix? Late Q1 2024.</p> <p>Is it for SDK/PDK? Both</p>
3950134	Safety MCU Firmware	<p>What is the issue? On the P3663-TS3 board, SAFETY_NIRQ is low during SC7 exit, which leads to the error print "ERROR: MCU_PLTFPWRMGR: Request Orin SC7 Exit failed!". As this is a safety check, it has no functional impact.</p> <p>How does it impact the customer? You see error print "ERROR: MCU_PLTFPWRMGR: Request Orin SC7 Exit failed!" though SC7 exit is successful. As this is a safety check, it has no functional impact.</p> <p>If there is a workaround, what is it? N/A</p> <p>When can we expect the fix? As the issue is seen on only a particular board, analysis/fix will take more time and it is planned to be completed by 6.0.10.</p> <p>Is it for Standard/Safety, SDK/PDK All</p>
3644537	Virtualization	<p>What is the issue? Host initiated Refresh (HIR) operation on Micron eMMC device takes around 7 seconds to complete</p> <p>How does it impact the customer? If initiated refresh on Micron eMMC from SW, then EMMC becomes busy and no other requests (such as read/write/erase etc.,) are sent to EMMC for that busy period.</p> <p>If there is a workaround, what is it? There is no workaround available. Micron is going to provide the eMMC firmware update to reduce the HIR time to 400ms (projected time from Micron). Please check with Micron for more details on this.</p> <p>When can we expect the fix? This fix is expected from Micron as an eMMC firmware update. After the new eMMC firmware provided from Micron, it must be flashed to eMMC.</p>

		<p>For more details, check with Micron.</p> <p>Is it for SDK/PDK? All</p>
3793667	DriveWorks Camera	<p>What is the issue? When isGroupInitProg flag in DeviceBlockInfo structure is set, the links must be initialized in incremental order.</p> <p>How does it impact the customer? If the link order is not incremental, some cameras are not initialized correctly so the application cannot receive the frames from the uninitialized cameras.</p> <p>If there is a workaround, what is it? The user initializes the cameras in the incremental link order when isGroupInitProg flag is set.</p> <p>When can we expect the fix? Late Q1 2024.</p> <p>Is it for SDK/PDK? Both</p>
200775377	DriveWorks System Software	<p>What is the issue? PTP client connected to DRIVE Orin AGX Developer Kit 88Q6113 (Spruce) ethernet switch port P7 fails to sync with PTP server due to known bug from Marvell switch firmware.</p> <p>How does it impact the customer? Any sensor/device connected to spruce port P7 is not able to sync with PTP server.</p> <p>If there is a workaround, what is it? N/A</p> <p>When can we expect the fix? The issue is being addressed with the vendor; resolution date is TBD.</p> <p>Is it for SDK/PDK? All.</p>
	DriveWorks Image and Point Cloud Processing	<p>The following algorithms are not supported on Orin's OFA and/or PVA engines in this release:</p> <ul style="list-style-type: none"> • ImageFilter (Recursive Gaussian Filter, BoxFilter, 2Dconv). • FAST9 Feature Detector, Standard Harris Corner Detector. • IC and fastIC Feature Tracker. • DenseOpticalFlow. • Stereo. • Template Tracker.
3496936		<p>What is the issue? Sample_stereo_disparity dumps "Error calling GL deleter" on console</p> <p>How does it impact the customer? The same error log may occur during DriveWorks release. But it won't impact functionality.</p> <p>If there is a workaround, what is it? N/A</p> <p>When can we expect the fix?</p>

		<p>N/A</p> <p>Is it for SDK/PDK?</p> <p>SDK</p>
4350235		<p>What is the issue?</p> <p>Sample_feature_tracker cannot obtain perf data.</p> <p>How does it impact the customer?</p> <p>Cannot obtain perf data with sample_feature_tracker.</p> <p>If there is a workaround, what is it?</p> <p>N/A</p> <p>When can we expect the fix?</p> <p>Late Q1 2024.</p> <p>Is it for SDK/PDK?</p> <p>SDK</p>
200782352	DriveWorks SAL	LRAW Preview Extraction Tool fails.
3494734		<p>What is the issue?</p> <p>Some networks may suffer accuracy degradation when run on DLA with large batch sizes.</p> <p>How does it impact the customer?</p> <p>When running networks on DLA with batch sizes larger than 32, accuracy may degrade.</p> <p>If there is a workaround, what is it?</p> <p>To work around this issue, use a smaller batch size.</p> <p>When can we expect the fix?</p> <p>The issue will be fixed in a future DLA release.</p> <p>Is it for SDK/PDK?</p> <p>SDK</p>
3498326		<p>What is the issue?</p> <p>There is a known issue with DLA clocks that requires users to reboot the system after changing the nvpmode power mode or otherwise experience a performance drop.</p> <p>How does it impact the customer?</p> <p>Performance may drop significantly after changing the nvpmode power mode.</p> <p>If there is a workaround, what is it?</p> <p>Reboot the system after changing the nvpmode power mode.</p> <p>When can we expect the fix?</p> <p>Late Q1 2024.</p> <p>Is it for SDK/PDK?</p> <p>SDK</p>
200618961		<p>What is the issue?</p> <p>Low fps observed while replaying sf3324/820 lraw/raw camera recordings with sample_camera_replay</p> <p>How does it impact the customer?</p> <p>Cannot replay sf3324/820 lraw/raw camera recordings smoothly via the Camera Replay Sample.</p> <p>If there is a workaround, what is it?</p> <p>N/A</p> <p>When can we expect the fix?</p>

	<p>N/A</p> <p>Is it for SDK/PDK?</p> <p>SDK</p>
3925474	<p>What is the issue?</p> <p>Header dump tool failed for lidar and radar with error: Could not cast to virtual sensor. [TC ID: 41643, 41645]</p> <p>How does it impact the customer?</p> <p>Cannot dump lidar/radar header by using header-dump</p> <p>If there is a workaround, what is it?</p> <p>N/A</p> <p>When can we expect the fix?</p> <p>Late Q1 2024.</p> <p>Is it for SDK/PDK?</p> <p>SDK</p>
4064878	<p>What is the issue?</p> <p>Recorder tool record lraw file that is not encoded as lossless.</p> <p>How does it impact the customer?</p> <p>Cannot use recorder tool to record lossless lraw data.</p> <p>If there is a workaround, what is it?</p> <p>N/A</p> <p>When can we expect the fix?</p> <p>Late Q1 2024.</p> <p>Is it for SDK/PDK?</p> <p>SDK</p>
4370396	<p>What is the issue?</p> <p>Recorder tools failed to record more than 2 cameras on one GMSL port.</p> <p>How does it impact the customer?</p> <p>Cannot use recorder tool to record more than 3 or 4 cameras on one GMSL port.</p> <p>If there is a workaround, what is it?</p> <p>N/A</p> <p>When can we expect the fix?</p> <p>Late Q1 2024.</p> <p>Is it for SDK/PDK?</p> <p>SDK</p>
4064784	<p>What is the issue?</p> <p>sample_feature_descriptor fails with raw video input, Driveworks exception thrown: Bad access of safety result (underflow error)</p> <p>How does it impact the customer?</p> <p>Cannot run sample_feature_descriptor with raw video</p> <p>If there is a workaround, what is it?</p> <p>N/A</p> <p>When can we expect the fix?</p> <p>Late Q1 2024.</p> <p>Is it for SDK/PDK?</p>

		SDK
4379000	DriveWorks CGF	<p>What is the issue? drive-linux OS will hang when we run the cfg demo after starting x11vnc.</p> <p>How does it impact the customer? Cannot run CGF demo with x11vnc</p> <p>If there is a workaround, what is it? N/A</p> <p>When can we expect the fix? Next release</p> <p>Is it for SDK/PDK? PDK</p>
4377247		<p>What is the issue? sample_cfg_dwchannel consumer goes to hang state after first instants of data transfer.</p> <p>How does it impact the customer? sample_cfg_dwchannel sample 1 producer and 2 consumer function does not work.</p> <p>If there is a workaround, what is it? N/A</p> <p>When can we expect the fix? Late Q1 2024.</p> <p>Is it for SDK/PDK? SDK</p>
4348905		<p>What is the issue? sample_cfg_dwchannel crashes when exiting.</p> <p>How does it impact the customer? sample_cfg_dwchannel sample 1 producer and 2 consumer function does not work.</p> <p>If there is a workaround, what is it? N/A</p> <p>When can we expect the fix? Late Q1 2024.</p> <p>Is it for SDK/PDK? SDK</p>

Release Properties

The following table describes the release properties and software versions.

Release Properties	
Property	Description
Linux	Specifies the operating system.
20.04	Specifies the host Ubuntu operating system version.
Focal Fossa	Specifies the codename for the host version of Ubuntu.
20.04	Specifies the target Ubuntu root filesystem version.
3.1	Specifies the Yocto Project version of tools to build customized target root filesystem.
6.0.9	Specifies the NVIDIA release branch number.
	Specifies the build ID for the Linux operating system.
drive-linux	Specifies the product name.
Linux	Specifies the platform.
234	Specifies the architecture version.
5.15	Specifies the supported kernel version.
Software Version	
Software	Version
GCC Cross-compiler Toolchain for user applications and libraries for Yocto root file system.	9.3
GCC Cross-compiler Toolchain for user applications and libraries for Ubuntu root file system.	9.3
OpenGL ES	3.2
OpenGL: Provided for development purposes. Production systems are expected to use OpenGL ES.	4.6
Wayland	1.18
Vulkan Provided for development purposes.	1.3

Safety systems are expected to use Vulkan SC.	
Vulkan SC	1.0
OpenWF Display	1.0
DriveWorks	5.16
DLA	3.14.1
CUDA Toolkit	11.4.28 – Reference 11.4.4 documentation
cuDNN	8.9.2
TensorRT	8.6.12
ONNX	1.9.0 and opset 13
TensorFlow	1.15.0
PyTorch	1.9.0
Elementwise	2.4.2

DRIVE OS Supported Sensors

For a list of supported sensors, see the Supported Sensors chapter under Setup and Configuration section in the *NVIDIA DRIVE OS Linux Developer Guide*. For more information, refer to the [DRIVE Hyperion 8.1 Sensors and Accessories](#) page.

CUDA

The following table describes CUDA support.

Host OS	Host OS Version	Target OS	Target OS Version	Compiler Support
Ubuntu	20.04 LTS	Ubuntu	Ubuntu 20.04	GCC 9.3

Standard

The current release label is 11.4.28. The various components in the toolkit are versioned independently. The following table shows each component and its version:

Component Name	Version Information	Supported Architectures
CUDA Runtime (cudart)	11.4. 460	Linux (aarch64), Linux (x86_64), qnx-standard_aarch64
cuobjdump	11.4. 460	Linux (aarch64), Linux (x86_64)
CUPTI	11.4. 460	Linux (aarch64), Linux (x86_64), qnx-standard_aarch64
CUDA cuxxfilt (demangler)	11.4. 460	Linux (aarch64), Linux (x86_64)
CUDA Demo Suite	11.4. 460	Linux (x86_64)
CUDA GDB	11.4. 460	Linux (aarch64), Linux (x86_64), qnx-

		standard_aarch64
CUDA NVCC	11.4. 460	Linux (aarch64), Linux (x86_64), qnx-standard_aarch64
CUDA nvdisasm	11.4. 460	Linux (aarch64), Linux (x86_64)
CUDA NVML Headers	11.4. 460	Linux (aarch64), Linux (x86_64)
CUDA nvprof	11.4. 460	Linux (aarch64), Linux (x86_64), qnx-standard_aarch64
CUDA nvprune	11.4. 460	Linux (aarch64), Linux (x86_64)
CUDA NVRTC	11.4. 460	Linux (aarch64), Linux (x86_64), qnx-standard_aarch64
CUDA NVTX	11.4. 460	Linux (aarch64), Linux (x86_64), qnx-standard_aarch64
CUDA NVVP	11.4. 460	Linux (x86_64)
CUDA Samples	11.4. 460	l4t_aarch64, Linux (aarch64), Linux (x86_64)
CUDA Compute Sanitizer API	11.4. 460	Linux (aarch64), Linux (x86_64)
CUDA Thrust	11.4. 460	Linux (aarch64), Linux (x86_64), qnx-standard_aarch64
CUDA cuBLAS	11.6.6.233	Linux (aarch64), Linux (x86_64), qnx-standard_aarch64
CUDA cuDLA	11.4. 460	Linux (aarch64), qnx-standard_aarch64
CUDA cuFFT	10.6.0.353	Linux (aarch64), Linux (x86_64), qnx-standard_aarch64
CUDA cuRAND	10.2.5.448	Linux (aarch64), Linux (x86_64), qnx-standard_aarch64
CUDA cuSOLVER	11.2.0.448	Linux (aarch64), Linux (x86_64), qnx-standard_aarch64
CUDA cuSPARSE	11.6.0.448	Linux (aarch64), Linux (x86_64), qnx-standard_aarch64
CUDA NPP	11.4.0.438	Linux (aarch64), Linux (x86_64), qnx-standard_aarch64
Nsight Compute	2021.2.10.1	Linux (x86_64), qnx-standard_aarch64
NVIDIA Linux Driver	535.104.12	Linux (x86_64)

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