DRIVE AGX Orin Development Platform

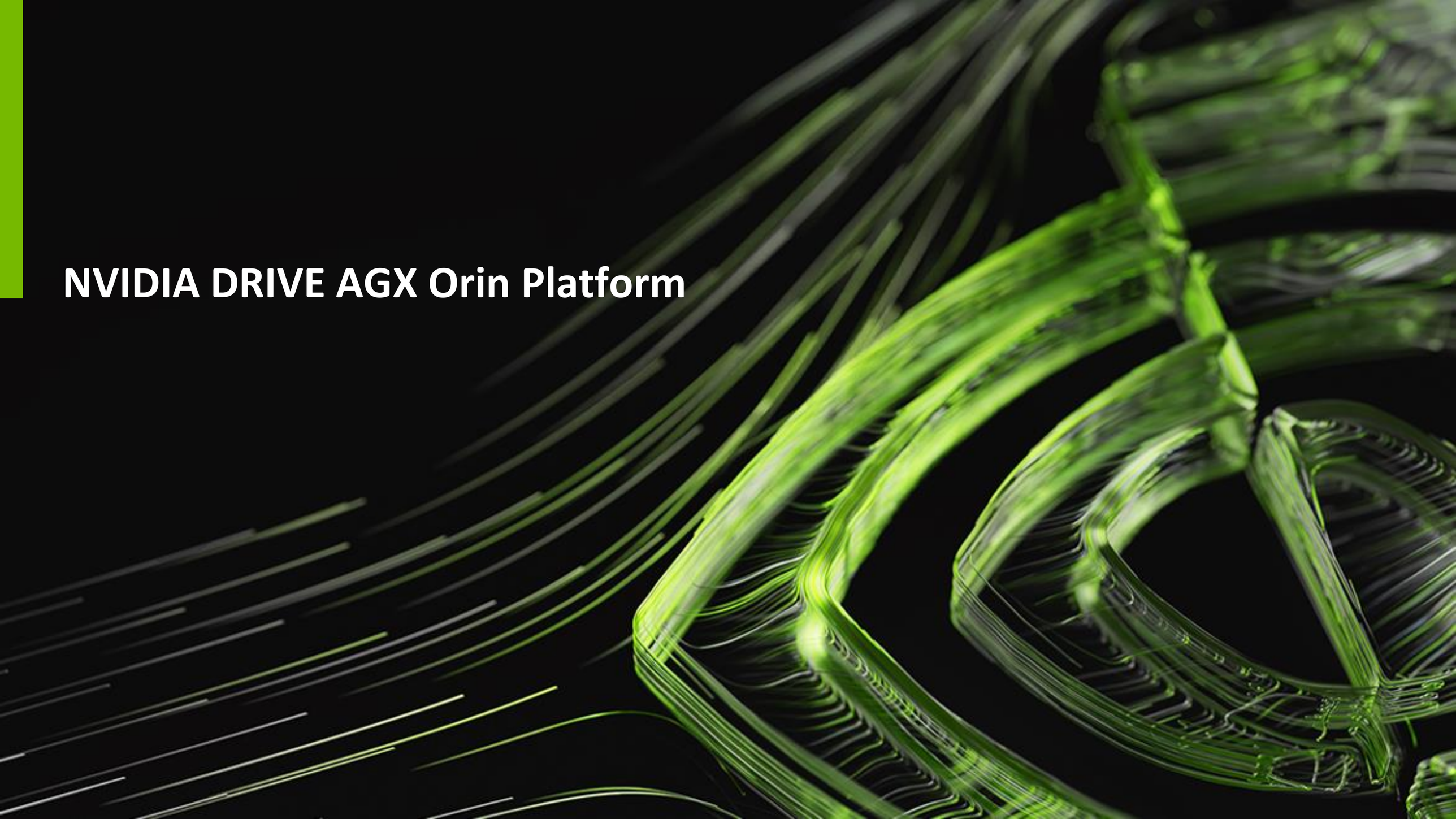
October 2025

Overview

- NVIDIA DRIVE Platform
- NVIDIA DriveOS

Link to Latest Online PDF Version

NVIDIA DRIVE AGX Orin Platform



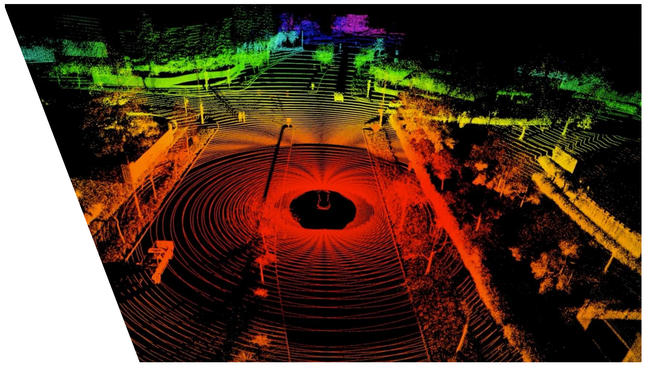
NVIDIA DRIVE End-to-End Solutions for Autonomous Vehicles

DRIVE AGX Orin-X SoC

Software-Defined Platform

DRIVE AGX Orin DevKit

High-Performance
Development Platform



DriveOS (previously DRIVE OS)

AV Software Foundation
OS, CUDA, and DriveWorks

DevKits are available for purchase at
DRIVE AGX Autonomous Vehicle Development Platform

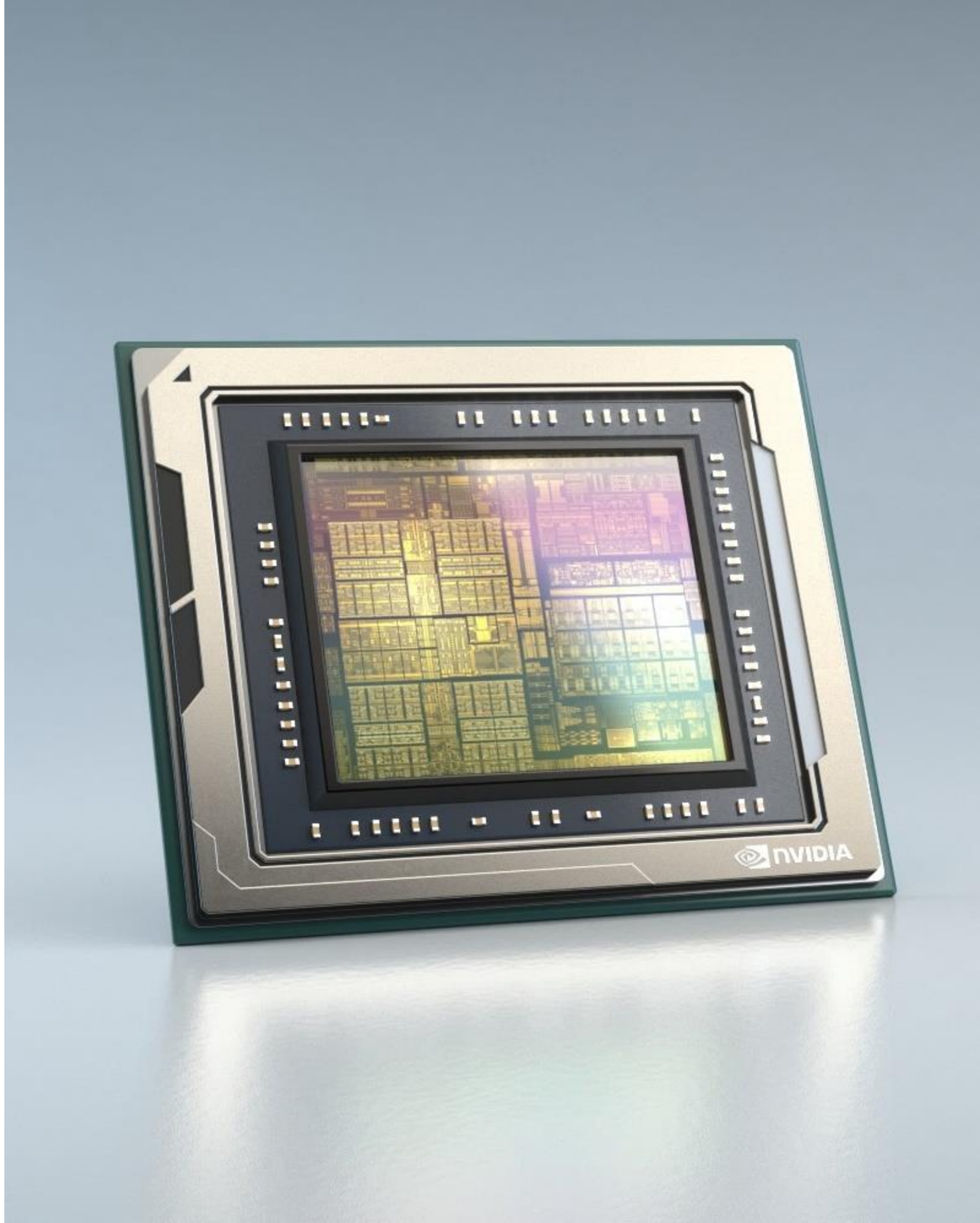
Download the DriveOS SDK by joining the
DRIVE AGX SDK Developer Program

DRIVE AGX Orin-X SoC

Advanced, software-defined platform
for autonomous vehicles.

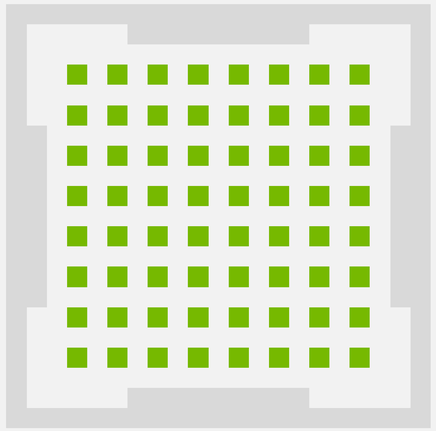
- **254 INT8 TOPS—CUDA Tensor Core GPU + DLA**
- 12 Cortex®-A78A (Hercules) ARM64 CPU
- Up to 200 GB/s memory bandwidth
- 4 R52 Lock-step Pairs Integrated Safety Island ASIL-D
- ISO 26262 (FUSA) ASIL-B Chip | ASIL-D Systematic

- Hardware Accelerators:
  - Deep Learning Accelerators (DLA)
  - Programmable Vision Accelerator (PVA)
  - Optical Flow Accelerator (OFA)



DRIVE Orin Hardware Accelerators

Optimal efficiency for diverse workloads.



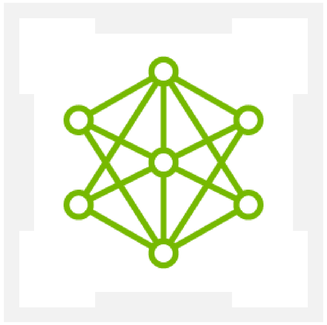
NVIDIA Ampere Architecture GPU

Accelerates All Parallelizable Workloads

Maximum Performance and Flexibility

Improvements for Orin:
Increased Performance and Enhanced Tensor Cores

Up to 167 INT8 DL TOPS



2x Gen2 DLA

Accelerates Deep Neural Networks

Optimal Performance/Watt for DNNs

Improvements for Orin:
Depthwise Convolution and Hardware Scheduler

Up to 87 INT8 DLA TOPS

Gen2 PVA*

Accelerates Computer Vision Algorithms

Highly Specialized, Minimal Power Consumption

Improvements for Orin:
Optical Flow Accelerator and More Performance

Up to 2048 INT8 GMAC/s

*Accessible via DriveWorks Image Processing Library

Self-Driving Hardware and Software Development Kit

Open and scalable platform purpose-built for automotive.

DRIVE AGX Orin DevKit

DriveOS—AV SW Foundation
Automotive Silicon and IO
Up to 254 INT8 TOPS | 200 W

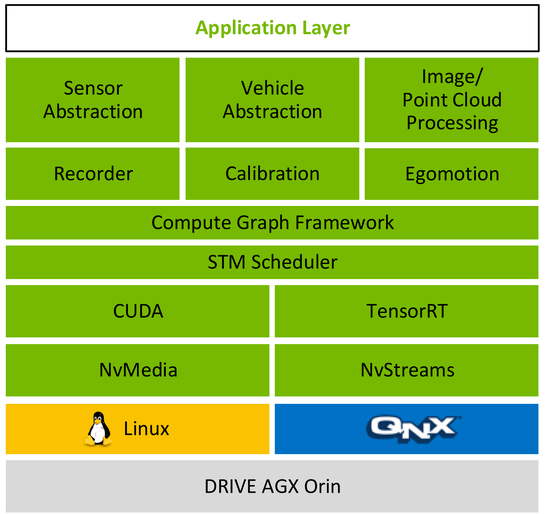
Available from
Authorized Distributors

Rich IO for Development, Sensors, and Vehicle Bus

- Vehicle Bus, GMSL, Ethernet, PCIe, USB, DisplayPort, Wi-Fi, Bluetooth
- ISO 26262-compliant sensors supported through partners

Software Included

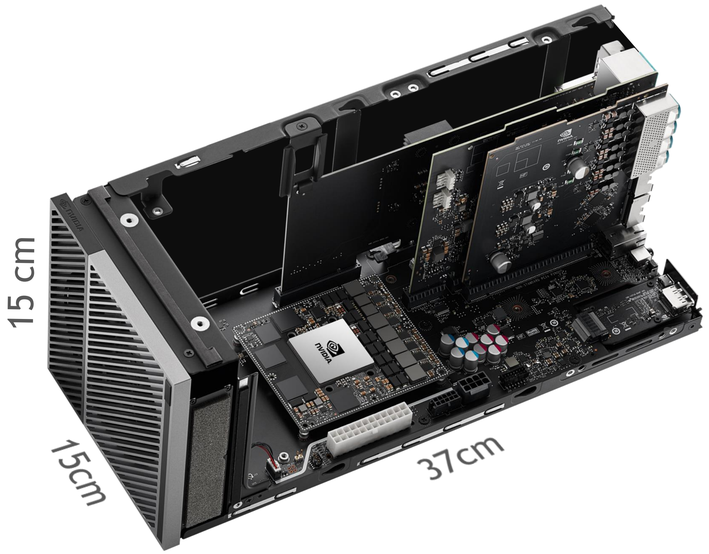
- DriveOS with DriveWorks
- Middleware, tools, and algorithms
- ISO 26262 safety certifiable DriveOS
  QNX, drivers, and platform APIs



Safe and Performant Compute Platform

- Orin-X SoC with CUDA Tensor Core GPU and ARM® Cortex-A78A CPU
- Architected for safety, production boards available through Tier1s

Spec Overview



Components		
Orin-X SoC	GPU	Integrated CUDA Tensor Core GPU
	Accelerators	Deep Learning Accelerators (DLA) Programmable Vision Accelerator (PVA) Optical Flow Accelerator (OFA)
	CPU	12 Cortex®-A78A (Hercules) ARM64 CPU
Safety MCU		Infineon Aurix TC397
Storage		256 GB UFS
Power Supply		Built-in
Vehicle Harnesses		Additional Accessories

Performance	
DL Inference TOPS (INT8)	Up to 254 TOPS
Memory Bandwidth	Up to 200 GB/s
System RAM	32 GB LPDDR5 at 3200 MHz

Operating Parameters	
Temperature	0 to 45°C
System Power	200 W

Automotive and Development Interfaces

Convenient bench development | Reliable in-vehicle operation

Ethernet ~30 Gb/s total	2x 10x 6x	10GbE 1GbE 100MbE	1 H-MTD*, 1 RJ45 9 H-MTD*, 1 RJ45 MATEnet*	
Camera	16x	GMSL	MATE-AX GMSL 1/2*	
USB	2x 2x	USB 3.2 USB 2.0	Type C Type A	
PCIe**	1x	PCIe x8	Mini-SAS	
Video Out	1x		DisplayPort 1.4	
Vehicle Harnesses (Opt. Accessory)	6x	CAN*	Vehicle Harness Connector DB9	
	1x	LIN*		
	1x	FlexRay*		
	12x	USS*		

*Automotive connectors **Can be used to connect Orin DevKits

DRIVE AGX Orin SKU10 Developer Kit

Bench Development
SKU10

In-Vehicle Development
SKU10 + Vehicle Accessory Kit

DRIVE AGX Orin DevKits are available for order:

- For bench development: SKU10
- For in-vehicle development: SKU10 + Vehicle Accessory Kit

The vehicle accessory kit includes:
- Vehicle Harness H1B
- Vehicle Harness H2A
- Vehicle Mounting Tray

For more information on in-vehicle usage, see the DRIVE AGX Orin Mechanical and Installation Guide.

Accessories listed in the table to the right are included in the accessory kit. The table provides the manufacturers' part numbers in case additional accessories need to be purchased.

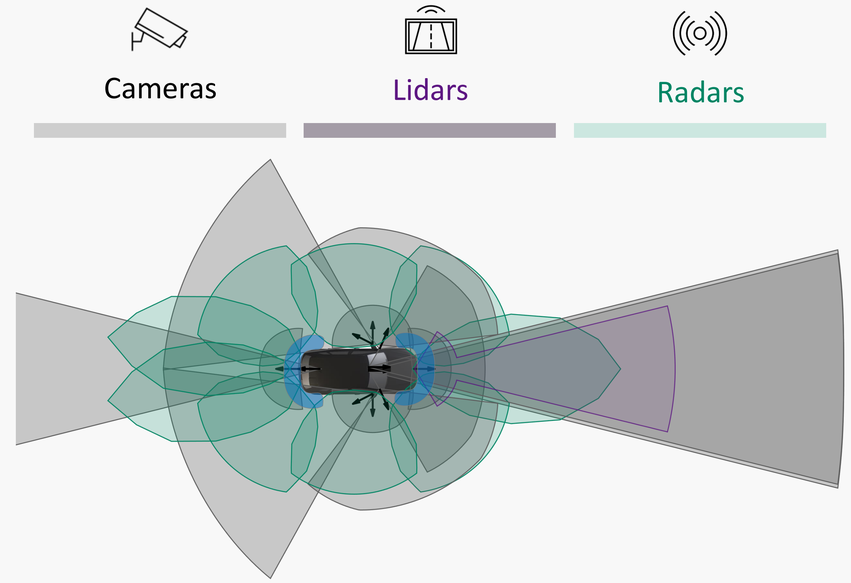
Accessory Manufacturers and Part Numbers		
Label	Manufacturer	Mfg P/N
Micro USB	Simula Technology, Inc	CB842A-8000-10F
Type A-to-C USB Cable	Simula Technology, Inc	CB8A5E-6200-10F
Type C-to-C USB Cable	Wieson America Inc.	AB9932-0011-001-HH
MATE-AX Camera Splitter Cable	TE Connectivity Ltd.	1-120091-2
Dual H-MTD Splitter	Rosenberger of North America, LLC.	LCA-115-1000-Z-ZZ
Quad H-MTD Splitter	Rosenberger of North America, LLC.	LCA-114-1000-Z-ZZZZ

To learn more, see DRIVE AGX Autonomous Vehicle Development Platform

Supported Sensors

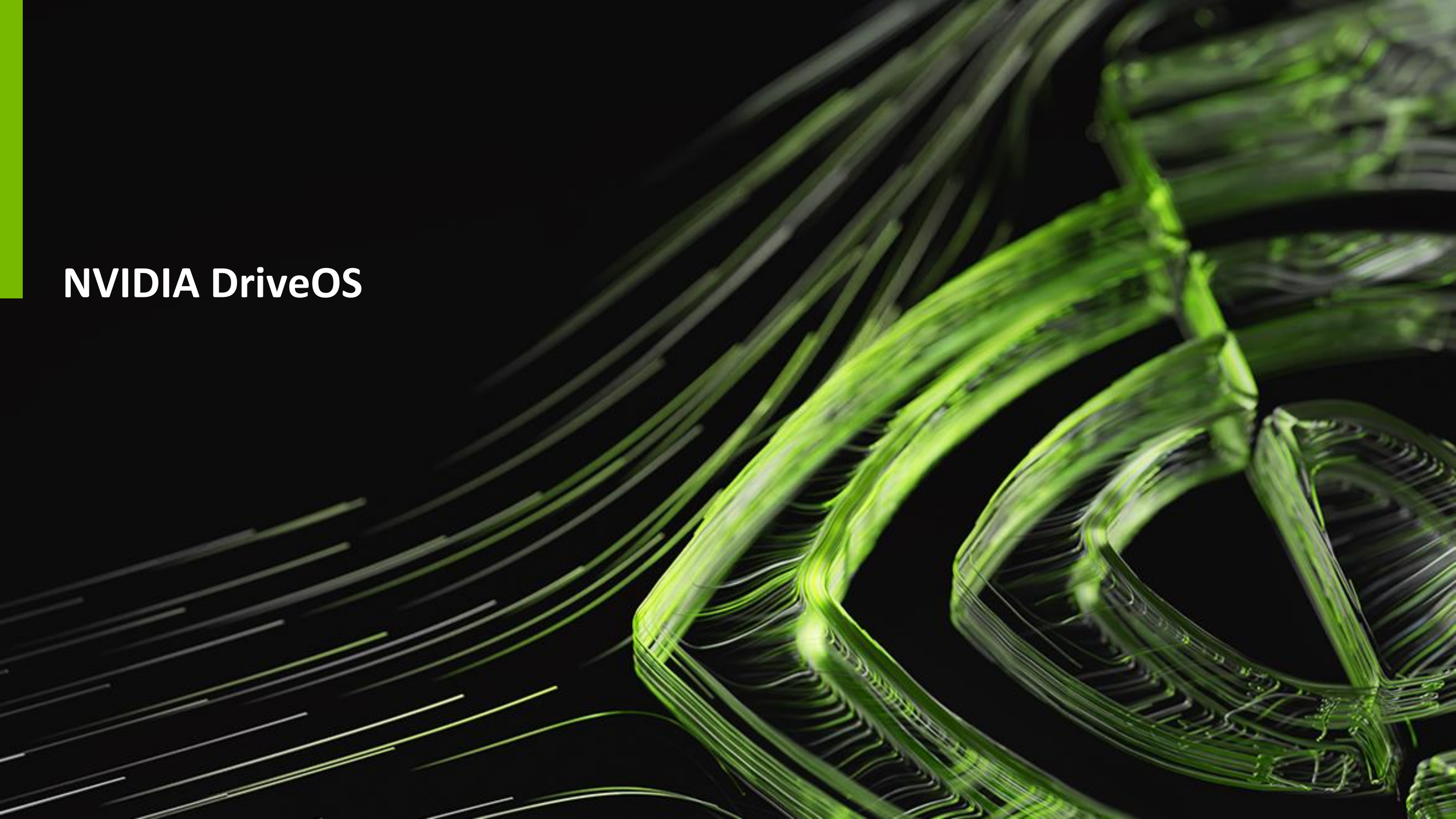
- These sensors are supported for ecosystem developers.
- See DRIVE AGX Orin Sensors and Accessories for details.

Ecosystem Sensor Vendors



Hyperion 8.1 L3 Reference Architecture Sensor Set
for illustration purposes only

NVIDIA DriveOS

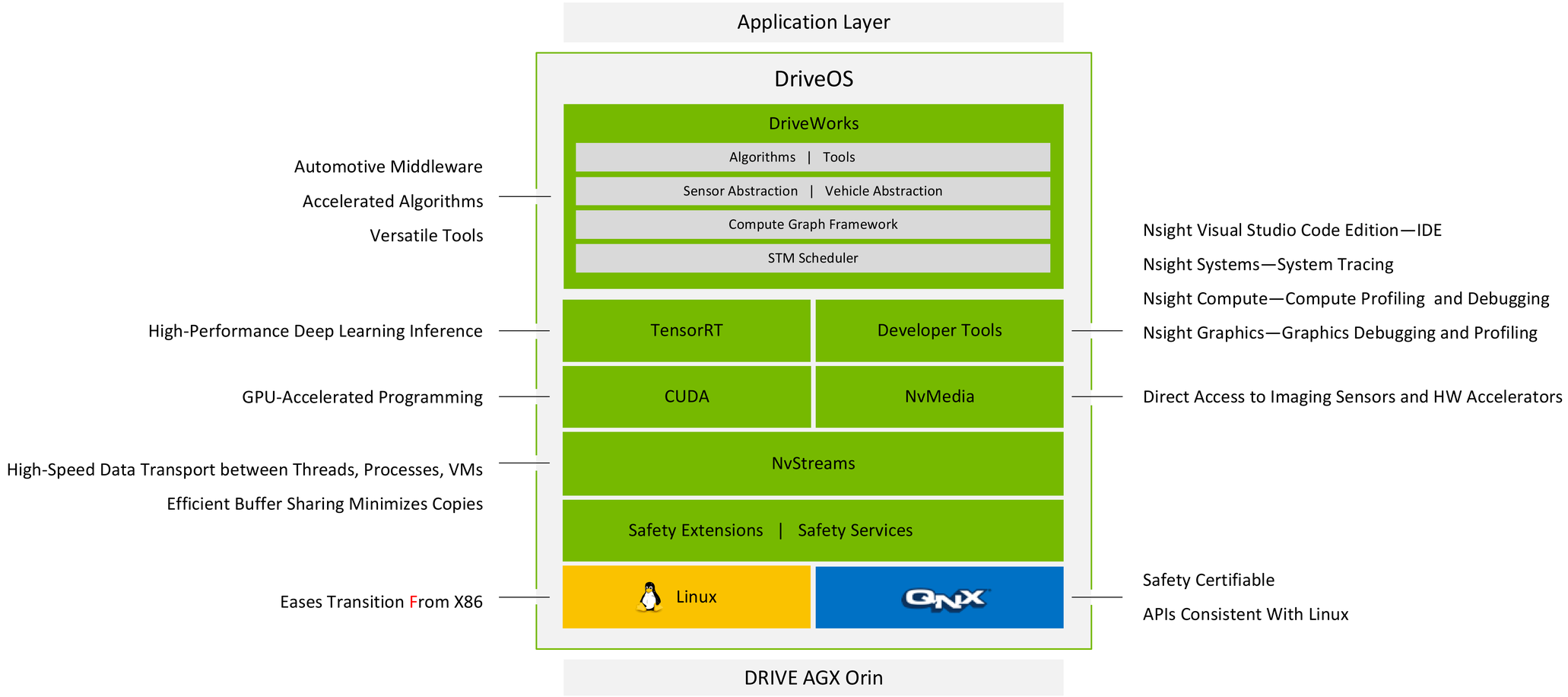


DriveOS—The NVIDIA AV Software Foundation

Operating system, foundational libraries, and tools for cutting-edge automotive applications.

Automotive Standards Compliance		ISO 26262 & ASPICE Compliant (QNX) ISO/SAE 21434 Compliant
Support for Complex, High-performance AV Software Stacks		Optimal Utilization of Orin's HW Accelerators Minimal Data Copies via NvStreams
Ease of Programming		Smooth Transition from X86 to DriveOS Linux Safety-Compliant CUDA and TensorRT

DriveOS Components



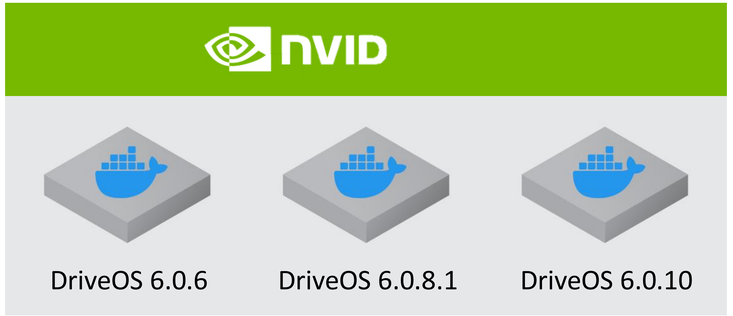
[1] For development only

New with DriveOS 6 for Orin

Smoother development experience | All-new middleware features

DriveOS 6 Features

- Host and target Docker support
- Linux safety extensions
- Chip-to-chip communication via NvStreams

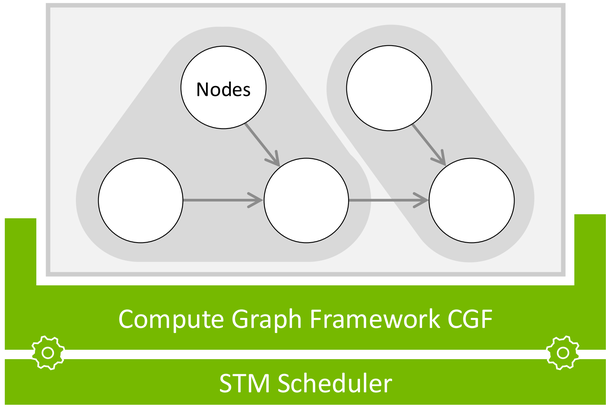


NGC is NVIDIA's Portal of Enterprise Services, Software, and Support for AI, Digital Twins, and High-Performance Computing

DriveWorks 5 Features

DriveWorks becomes a full-fledged automotive middleware:

- With Compute Graph Framework (CGF), applications can be expressed as graphs and nodes
- System Task Manager (STM) is a static, non-pre-emptive scheduler compiling an optimal schedule for CGF graphs



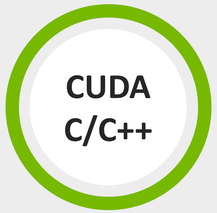
Why QNX for Safety?

Safety OS key selection criteria.

- ISO 26262
  - ASIL D certified RTOS
  - TCL3 qualified toolchain
- POSIX PSE52 standards certification
  - Requirement for CUDA support
- Common Unix heritage with Linux
  - Rich dependent library support

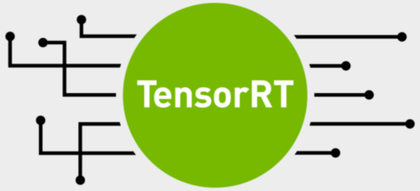
Hardware-Accelerated Compute Engines

Open | Scalable | Seamless | End-to-End



CUDA

Parallel computing model for compute intensive applications

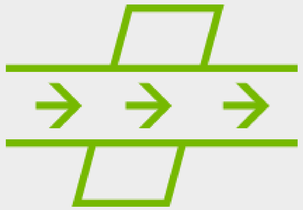


TensorRT

SDK for high-performance deep learning inference

NvMedia

Optimized API providing direct access to hardware-accelerated compute engines and sensors, supporting the new Optical Flow Accelerator, DLA, and AV1 encode and decode on Orin

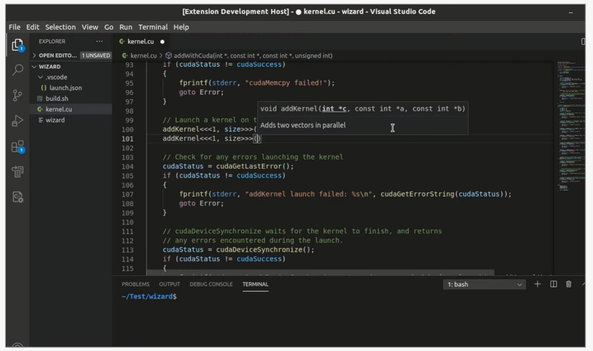


NvStreams

Highly efficient API enabling access to high-speed data transports, support over PCIe
and Mellanox-accelerated support across inter-ECU boundaries

NVIDIA Nsight Developer Tools

For GPU and CPU software debugging and profiling.

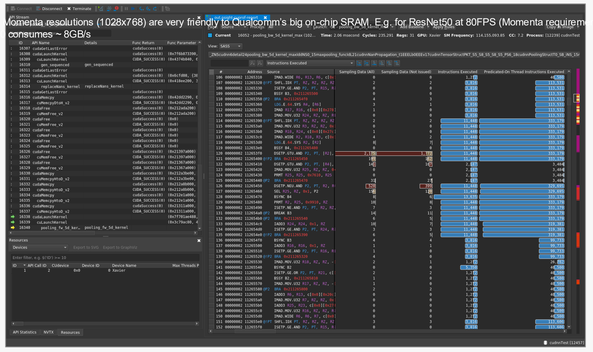


Nsight Visual Studio Code Edition

IDE GPU application development

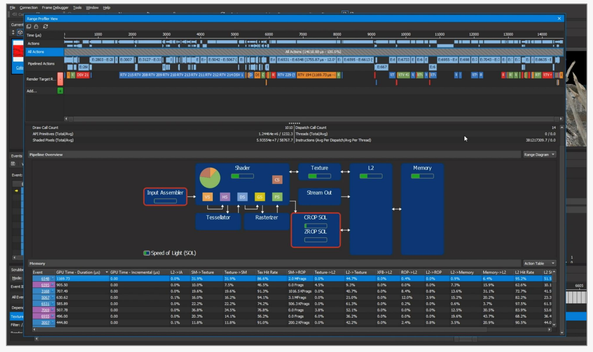
Nsight Systems

System trace



Nsight Compute

Compute profiling



Nsight Graphics

Graphics debugging and profiling

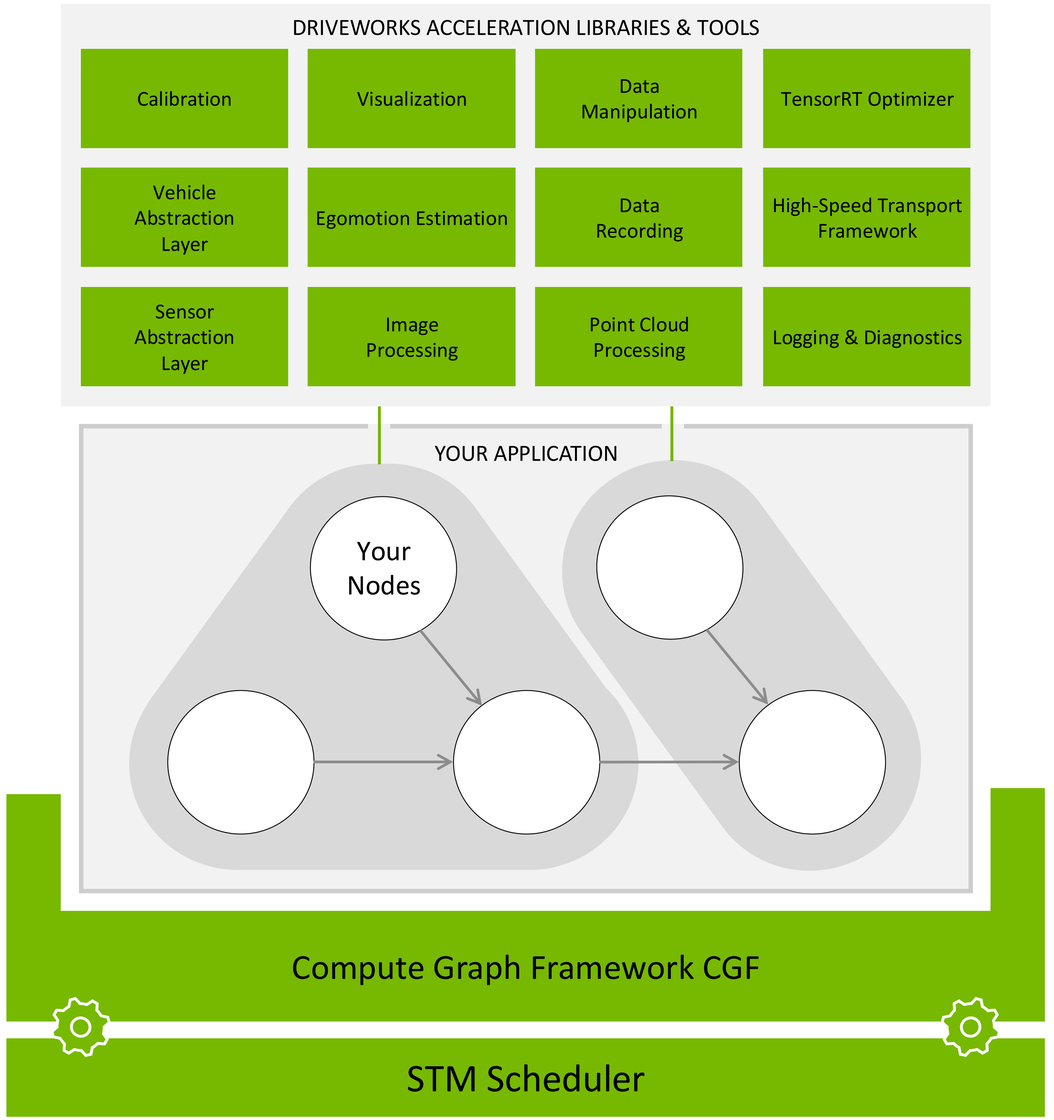
Maximized with NVTX source code instrumentation NVIDIA tools extension

NVIDIA

DriveWorks—Comprehensive Middleware Solution

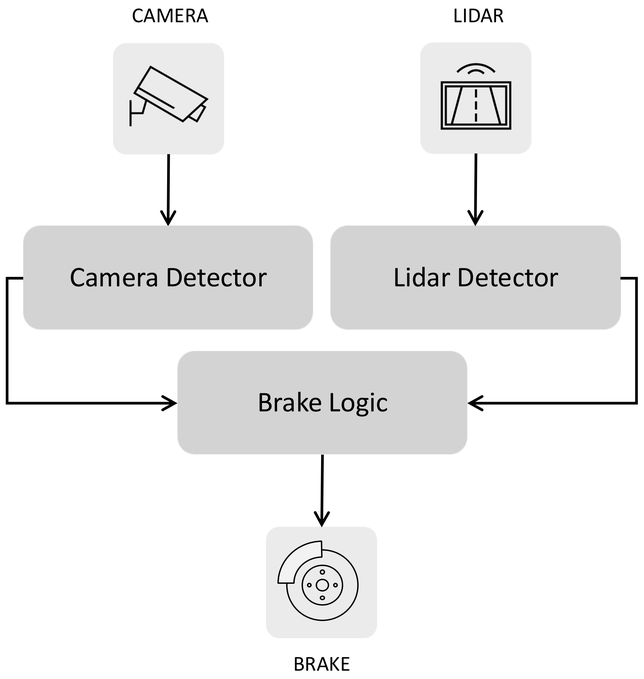
Rich Library of Algorithms and Tools
to accelerate your applications

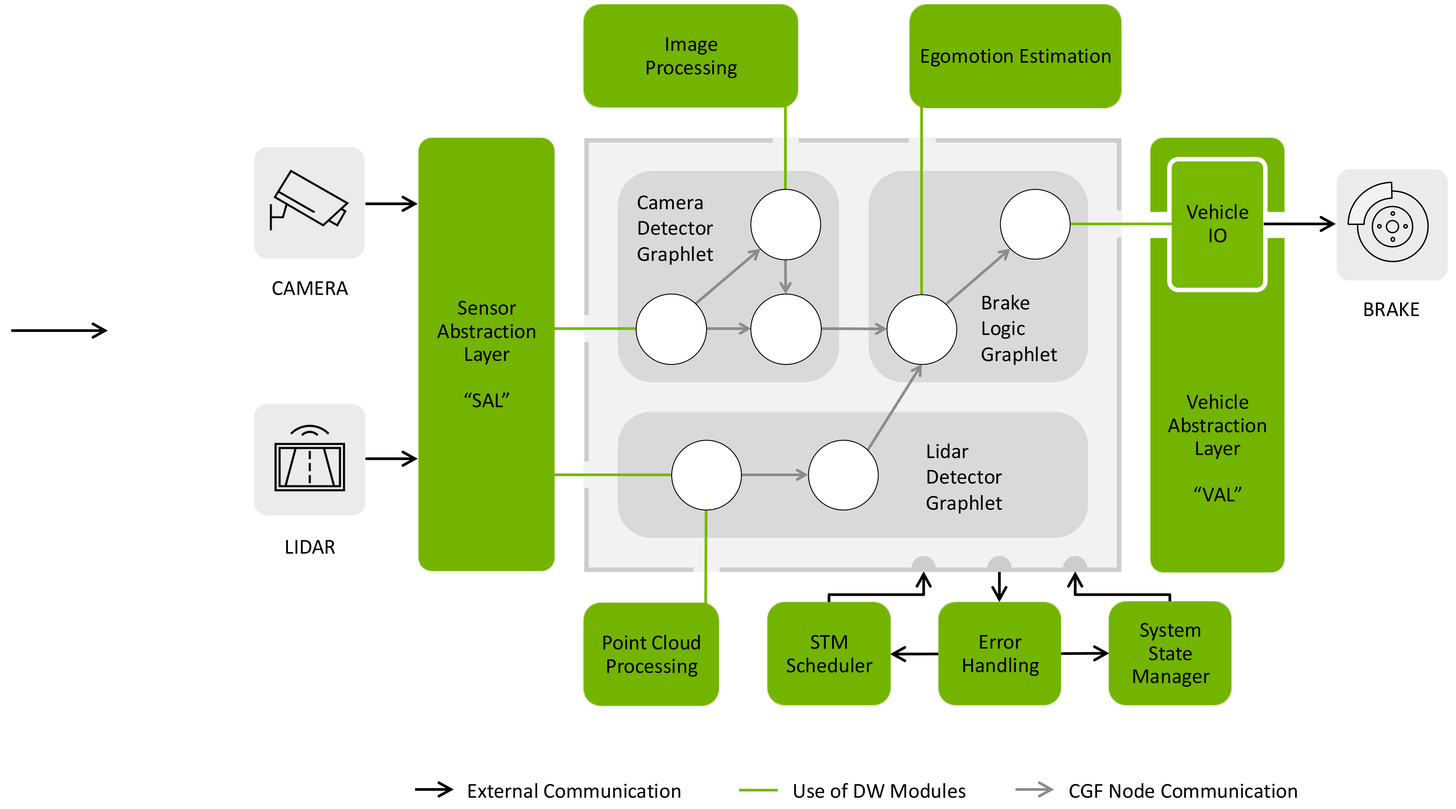
Compute Graph Framework
to leverage deterministic scheduling



Exemplary Application as a Compute Graph

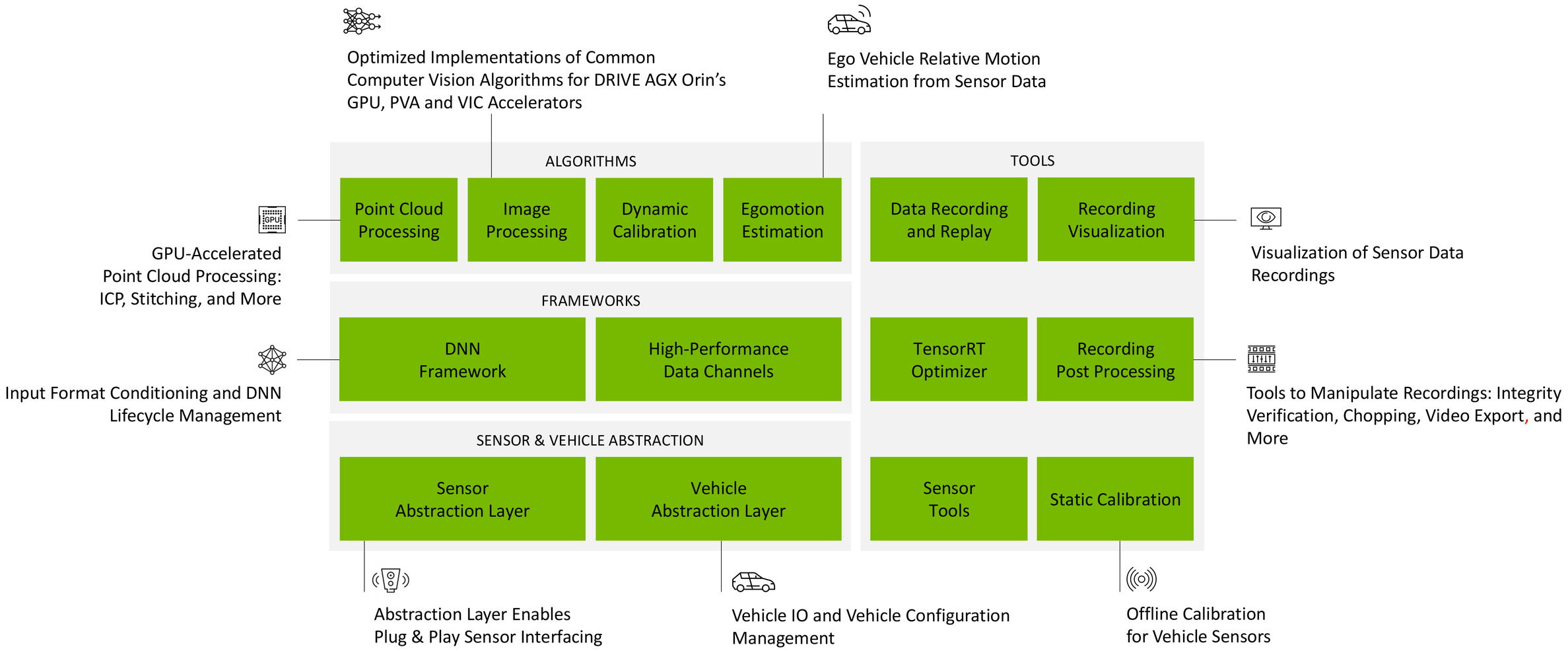
CGF enables structured and dependable software.





DriveWorks Modules

A rich library of algorithms and tools to bootstrap AV development.



Get Started with DRIVE SDK

Extensive documentation and training material available on NVIDIA Developer.

Learn More

- Visit the DRIVE Training page for webinars and other resources
- Check out information related to DRIVE AGX Orin, DriveOS SDK, and DRIVE AGX Orin supported sensors

Get Access

- Join the DRIVE AGX SDK Program on NVIDIA Developer
- Read the docs for DriveOS and DriveWorks documentation
- Download DriveOS which includes DriveWorks, NvMedia, CUDA, cuDNN, and TensorRT

Contact Us

- Contact an authorized DRIVE distributor or the NVIDIA Automotive Team


NVIDIA