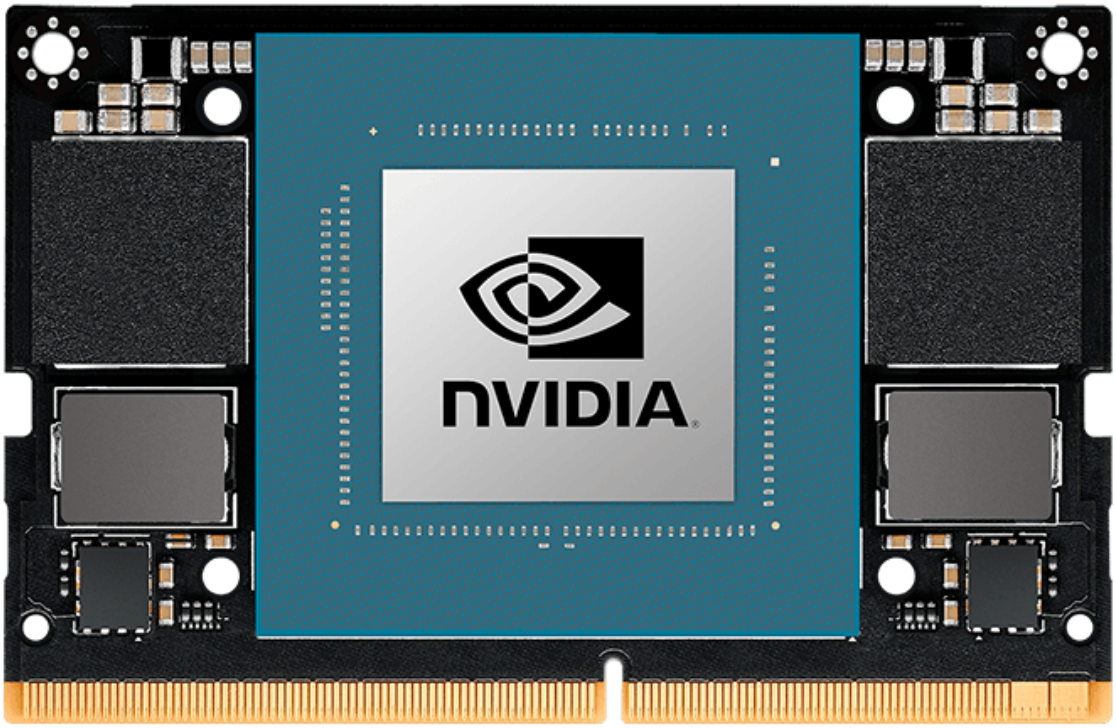
Introduction to Jetson Orin Nano

Jetson Orin Nano is a new member of the Jetson series, with the core board shown in the following figure



overview

The Jetson Orin Nano development kit is equipped with an Orin Nano module with 8GB/4GB version of memory.

- Orin SoC's CPU is based on the Cortex-A78AE architecture.
- Orin Nano is equipped with 6 cores in 8GB/4GB, with a maximum frequency of 1.5 GHz
- In terms of GPU, the Ampere architecture GA10B is equipped with 1024 CUDA cores and 32 Tensor Cores, with a maximum frequency of 625MHz.
- Orin Nano only has a hardware decoder and no hardware encoder, with a coding capacity of only 1080p30, supported by 1-2 CPU cores.
  From the perspective of computing resources, the Orin Nano 8GB specification is basically the same as the Orin nano 8GB version, which is half of the AGX Orin 64GB version, but with lower frequency and therefore lower power. The power of the Nano module is only 15W. At extremely low power, Orin Nano still provides extremely strong performance, with a single precision floating-point performance of 1.28 TFLOPs.**The Orin Nano 8GB and Orin nano 8GB specifications are very similar, but there are also the following differences in addition to frequency and power**.

Performance comparison between orin nano and nano

Models	Jetson Nano (FPS)	Jetson Orin Nano 8GB (FPS)
PeopleNet (v2.5 unpruned)	2	116
Action Recognition 2D	32	368
Action Recognition 3D	1	26
LPR	47	979
Dashcam Net	11	398
Bodypose Net	3	136
Resnet50	36	1144

From the graph, it can be observed that the performance of Orin Nano is an order of magnitude improvement. According to official data, Orin Nano has achieved AI performance of 40 trillion operations per second (TOPS), which is 80 times higher than the previous nano.

Comparison between Orin nano 4GB and 8GB

	Jetson Orin Nano 4GB	Jetson Orin Nano 8GB
AI Performance	20 TOPs	40 TOPs
GPU	512-core NVIDIA Ampere architecture GPU with 16 Tensor Cores	1024-core NVIDIA Ampere architecture GPU with 32 Tensor Cores
GPU Max Frequency	625 MHz	
CPU	6-core Arm® Cortex®-A78AE v8.2 64-bit CPU 1.5MB L2 + 4MB L3	
CPU Max Frequency	1.5 GHz	
Memory	4GB 64-bit LPDDR5 34 GB/s	8GB 128-bit LPDDR5 68 GB/s
Storage	- (Supports external NVMe)	
Video Encode	1080p30 supported by 1-2 CPU cores	
Video Decode	1x 4K60 (H.265) 2x 4K30 (H.265) 5x 1080p60 (H.265) 11x 1080p30 (H.265)	
Camera	Up to 4 cameras (8 via virtual channels***) 8 lanes MIPI CSI-2 D-PHY 2.1 (up to 20Gbps)	
PCIe*	1 x4 + 3 x1 (PCIe Gen3, Root Port, & Endpoint)	
USB*	3x USB 3.2 Gen2 (10 Gbps) 3x USB 2.0	
Networking*	1x GbE	
Display	1x 4K30 multi-mode DP 1.2 (+MST)/eDP 1.4/HDMI 1.4**	
Power	5W - 10W	7W - 15W
Mechanical	69.6mm x 45mm 260-pin SO-DIMM connector	