



Selene - NVIDIA DGX A100

Ranked 23rd Supercomputer according to TOP500 as of November 2024

Introduction



Selene is NVIDIA's AI supercomputer, built in 2020 using DGX SuperPOD architecture. With 560 DGX A100 nodes, it delivers up to 63.4 petaflops (HPC) and 2.8 exaflops (AI) performance, supporting cutting-edge research in AI and scientific computing. (Chen, 2021)

Figure 1. NVIDIA Selene Supercomputer

Manufacture & Institution

Manufactured in Nvidia - Santa Clara, California

Adopted by Argonne National Laboratory & University of Florida (Trader, 2020)



Figure 4. NVIDIA Headquarters & Map

Energy Efficiency

Selene achieved ~24 GFLOPS/W by using A100 GPUs, efficient interconnects, MIG technology, and air cooling, earning it #2 on the Green500 list in June 2020 (Caulfield, 2020).



Figure 5. NVIDIA DGX A100 System

Architecture

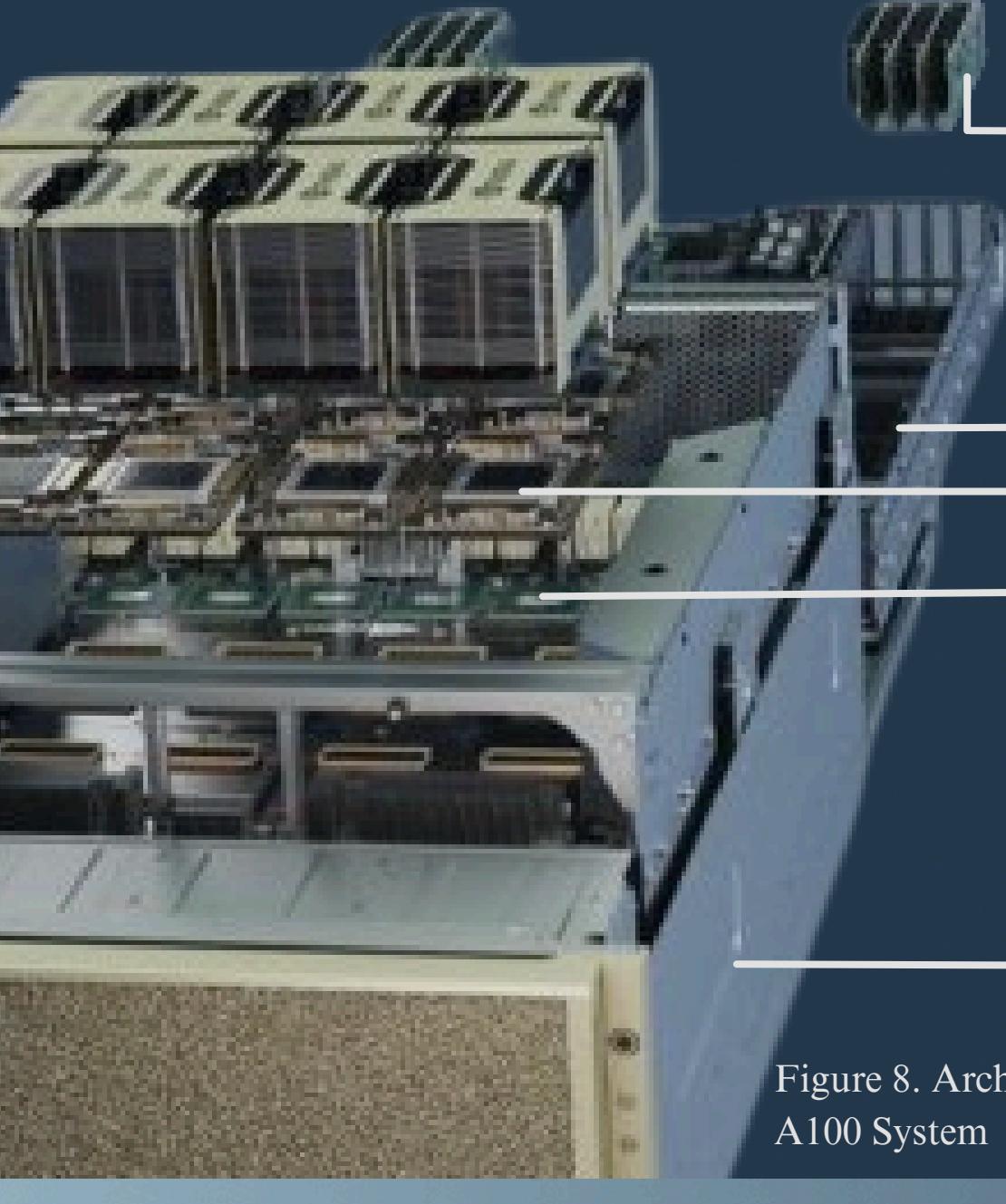


Figure 8. Architecture of NVIDIA DGX A100 System

Operating System



Figure 2. Linux Ubuntu 5.3+



Figure 3. CentOS

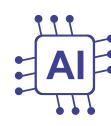
Rank & Performance

TOP 500 - Rank 23 November '24, however as of recently...

System	Rmax (PFLOPS)	Rpeak (PFLOPS)	TOP500 Rank (Jun 2025)
Selene	63,46	79,22	30
Frontier	1.102	1,686	1
Fugaku	442	537	4
LUMI	379	550	3
Leonardo	238	250	2

Table 1. Rank and Performance of Selene June 2025

Key Applications



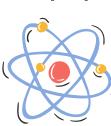
AI Training & Self-Driving R&D: Uses A100 GPUs to lead in AI research and high-performance computing. (NADDOD, 2025)



Covid-19 Research: Built using 280 DGX A100 systems with Mellanox InfiniBand networking. (Trader, 2020)



AI Art & Generative Models: Applied in scientific problems like protein docking & quantum chemistry. (NADDOD, 2025)



Scientific Simulations: Supports large scale simulations in various fields. (Wikipedia, 2023)

Unique Features

First modular AI supercomputer based on NVIDIA's DGX SuperPOD architecture (Chen, 2021)

First supercomputer to break the 26 GFLOPS/W efficiency barrier (Harris, 2020)

Dual capability to handle both HPC and AI workloads (Porter, 2022)

Fun Facts

Selene was built in just under three weeks during the COVID-19 pandemic to support coronavirus research. (Wheatley, 2020)



Figure 6. Selene supercomputer in NVIDIA's data center.

9x Mellanox ConnectX-6 200Gb/s Network Interface

Dual 64-core AMD Rome CPUs and 1TB RAM
8x NVIDIA A100 GPUs

6x NVIDIA NVSwitches

4.8 TB/s Bi-Directional Bandwidth
600 GB/s GPU-to-GPU Bandwidth

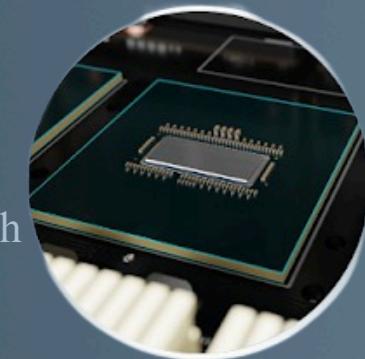


Figure 7. Close up of NVSwitches

15TB Gen4 NVME SSD

*This architecture shows a single NVIDIA DGX A100 system. Selene is built by interconnecting hundreds of these systems using Mellanox HDR Infiniband

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