# EARTH SIMULATOR (ES4)

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The Japan Agency for Marine-Earth Science and Technology (JAMSTEC) upgraded the supercomputer "Earth Simulator" to the fourth generation (ES4), improving its computing performance by about 15 times in March 2021.

ES4 is a multi-architecture supercomputer based on AMD EPYC CPUs, and combined with accelerators (NEC SX-Aurora TSUBASA and NVIDIA GPU A100), that can run a wide variety of programs. By combining general-purpose CPUs, vector engines with high effective performance that can utilize software assets cultivated in previous Earth Simulator, and GPUs that is useful for AI research, we aim to achieve both further development of conventional research and implementation of new research subjects such as AI research.

> Secure access via the Internet



User PC

### Earth Simulator (ES4) total performance

Total Peak Performance	19.5PFLOPS
Total Memory	556.5TiB
Shared Storage Capacity	61.4PB
Interconnect Bandwidth	200Gb/s (for two-way)

Earth Simulator (ES4)

ARTH SIMULATO

#### Contact regarding use of the Earth Simulator

NEC

# Japan Agency for Marine-Earth Science and Technology

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## **Details of Earth Simulator (ES4)**

ES4 consists of three types of nodes: ES4CPU nodes with AMD CPU only, ES4VE nodes with NEC SX-Aurora TSUBASA vector engine (VE), and ES4GPU nodes with NVIDIA GPU A100. Each of these nodes is linked to the same interconnected network, and this allows computing that involves multiple architectures and uses all nodes. ES4 storage is available for storing large-scale data and high-speed data access.



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## **Compute node specifications**

Type of cor	mpute node	ES4CPU	ES4VE	ES4GPU
Number of nodes		720	684	8
Per node	Number of CPUs (cores)	2 (128) AMD EPYC 7742	1 (64) AMD EPYC 7742	2 (128) AMD EPYC 7742
	OS	Rocky Linux 8		
	Total memory (host)	256GiB	128GiB	4TiB
	Number of accelerators	_	8VE (8 cores per VE) NEC SX-Aurora TSUBASA Type 20B	8GPU NVIDIA A100
	Total memory (per accelerator)	-	48GiB	40GiB



