

# TSUBAME4.0 Supercomputer

More of Everyone's Supercomputer, Operation Started in April 2024

## System Overview



### Components of TSUBAME4

#### Compute Node Racks

- HPE Cray XD665
- Direct Liquid Cooling + Rear Door Cooling (20°C)

#### Network

- InfiniBand NDR200, 4 ports / node
- Full-bisection Fat Tree Topology

#### Storage

- HPE ClusterStor E1000
  - HDD 44.2PB, 280GB/s
  - SSD 327TB, 325GB/s
- Node Local SSD: 460.8TB (in Total), Read 1,632GB/s, Write 648GB/s

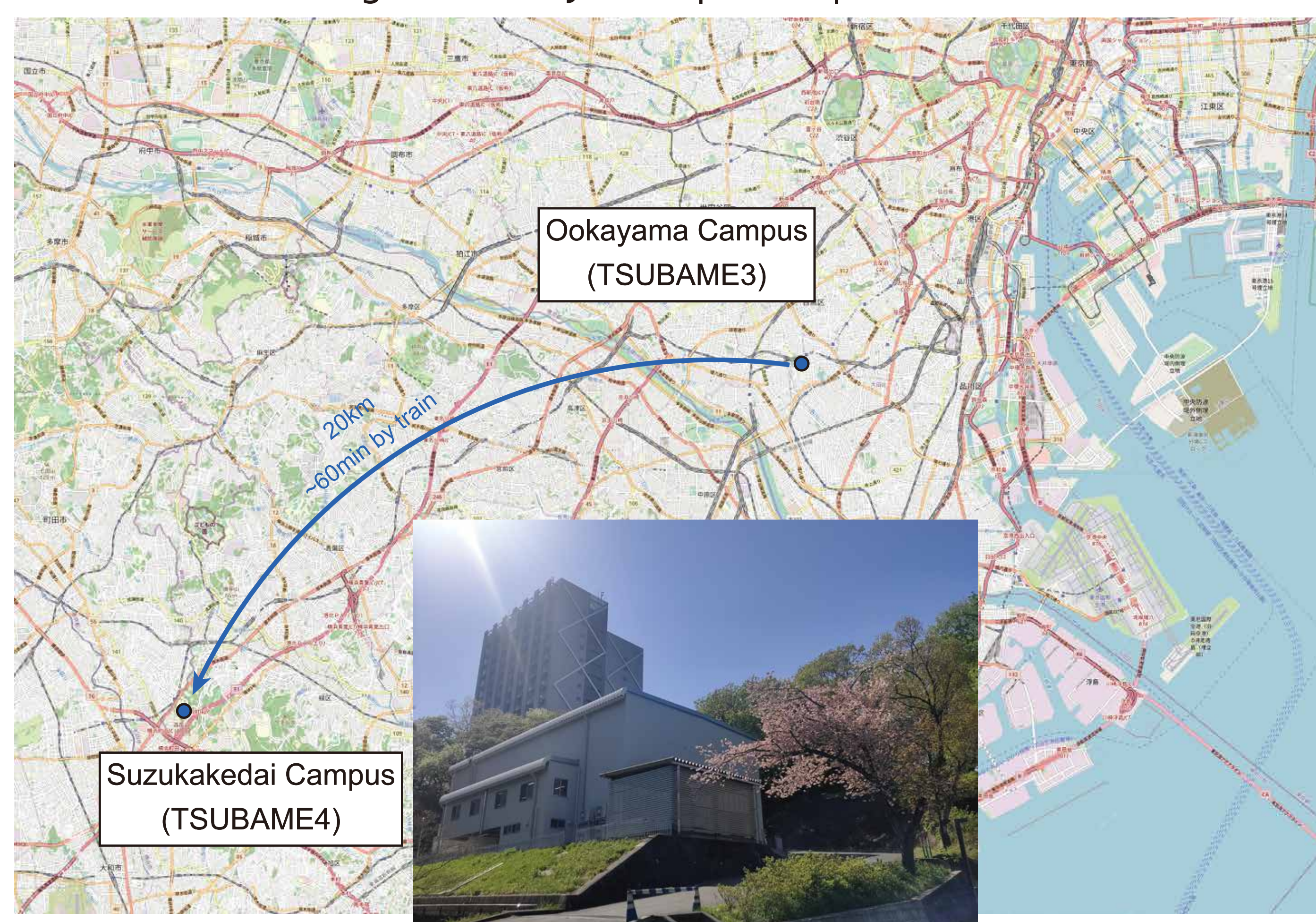
### Comparison with previous generation

	TSUBAME3.0(2017-)	TSUBAME4.0(Apr 2024-)
<b>Computational Performance</b>		
• FP64 Matrix	12PFlops	<b>66.8PFlops (5.5x)</b>
• FP64 Vector		<b>34.7PFlops (2.8x)</b>
• Deep Learning (FP16 Matrix)	47PFlops	<b>952PFlops (20x)</b>
<b>GPU Memory Bandwidth</b>	1.56 PB/s	<b>3.07 PB/s (1.97x)</b>
<b>Number of Nodes</b>	540 Nodes (homogeneous config)	<b>240 nodes (homogeneous config)</b>
<b>GPUs</b>	2,160 NVIDIA P100	<b>960 NVIDIA H100</b>
<b>Cooling / Inlet Water Temperature</b>	Free Cooling with Cooling Tower, 32°C	<b>Chiller, 20°C</b>
<b>Power Consumption (incl. cooling)</b>	1,080kW (Spec. value) 400~600kW(Operation)	<b>1,820kW (Spec. value) 650~850kW(Operation)</b>

## Location and Data Center Facilities

Unlike past TSUBAME series, TSUBAME4.0 is hosted at Suzukakedai campus, another campus of Science Tokyo.

In order to accommodate heavy water-cooled supercomputers, we renovated a building exclusively for supercomputers.



The new supercomputer room is 200m<sup>2</sup> wide, 30kN/m<sup>2</sup> load capacity, and 4m ceiling height. The power is supplied by 3-phase 415V voltage, with 2000kVA capacity.



All components of TSUBAME4.0 are cooled by a single cooling source, 8 chillers, whose cooling capacity is 200kW each to generate 20°C water in 30°C environment.

Processors in compute nodes are directly cooled. Other components and storage, management nodes are indirectly cooled by rear door.

