Global Research and Development Center for Business by Quantum-AI Technology

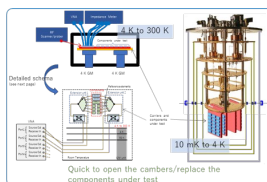## G-QuAT: Research Center for Quantum Computing

- Support implementation of quantum technology to social society

- Core missions are use-case creation, supply chain development, business ecosystem

- Three research platforms

1 **HPC x Quantum Computing Testbed**

ABCI-Q & Quantum computers

2 **Quantum Hardware Testbed**

low-temperature evaluation system

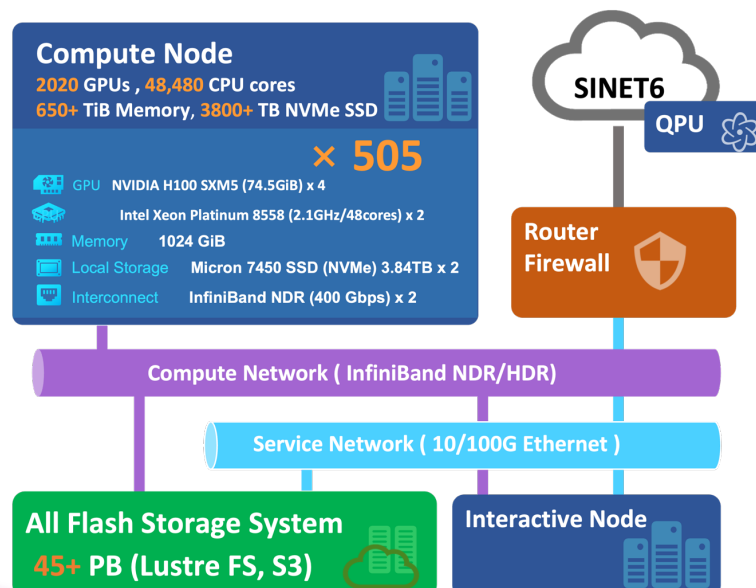**3** **Fabrication Platform for Quantum Computers**

Service for quantum device prototyping

ABCI-Q: HPC x AI x Quantum Computing Infrastructure

- HPC/Simulation performance (fp64): **138.4 PFLOPS**

- AI performance (bf16): **2.1 EFLOPS**

- Provide a **quantum-classical hybrid computing environment** in collaboration with various quantum computers

  - G-QuAT on-premise QCs: Neutral atom (QuEra), superconducting (Fujitsu) and photonic (OptQC)
  - GPU-based quantum simulator and quantum annealing engines: NVIDIA cuQuantum, Fujitsu Digital Annealer, Fixstars Amplify AE, etc.

Supermicro SYS-221GE-TNHT-LCC

Compute Node
2020 GPUs , 48,480 CPU cores
650+ TiB Memory, 3800+ TB NVMe SSD

× 505

GPU	NVIDIA H100 SXM5 (74.5GiB) x 4	
	Intel Xeon Platinum 8558 (2.1GHz/48cores) x 2	
Memory	1024 GiB	
Local Storage	Micron 7450 SSD (NVMe) 3.84TB x 2	
Interconnect	InfiniBand NDR (400 Gbps) x 2	

SINET6
QPU

Router Firewall

Compute Network (InfiniBand NDR/HDR)

Service Network (10/100G Ethernet)

All Flash Storage System
45+ PB (Lustre FS, S3)

Interactive Node

ABCI-Q will be available early 2025

AIST SC24 Web Site
https://www.digiarc.aist.go.jp/event/sc2024/