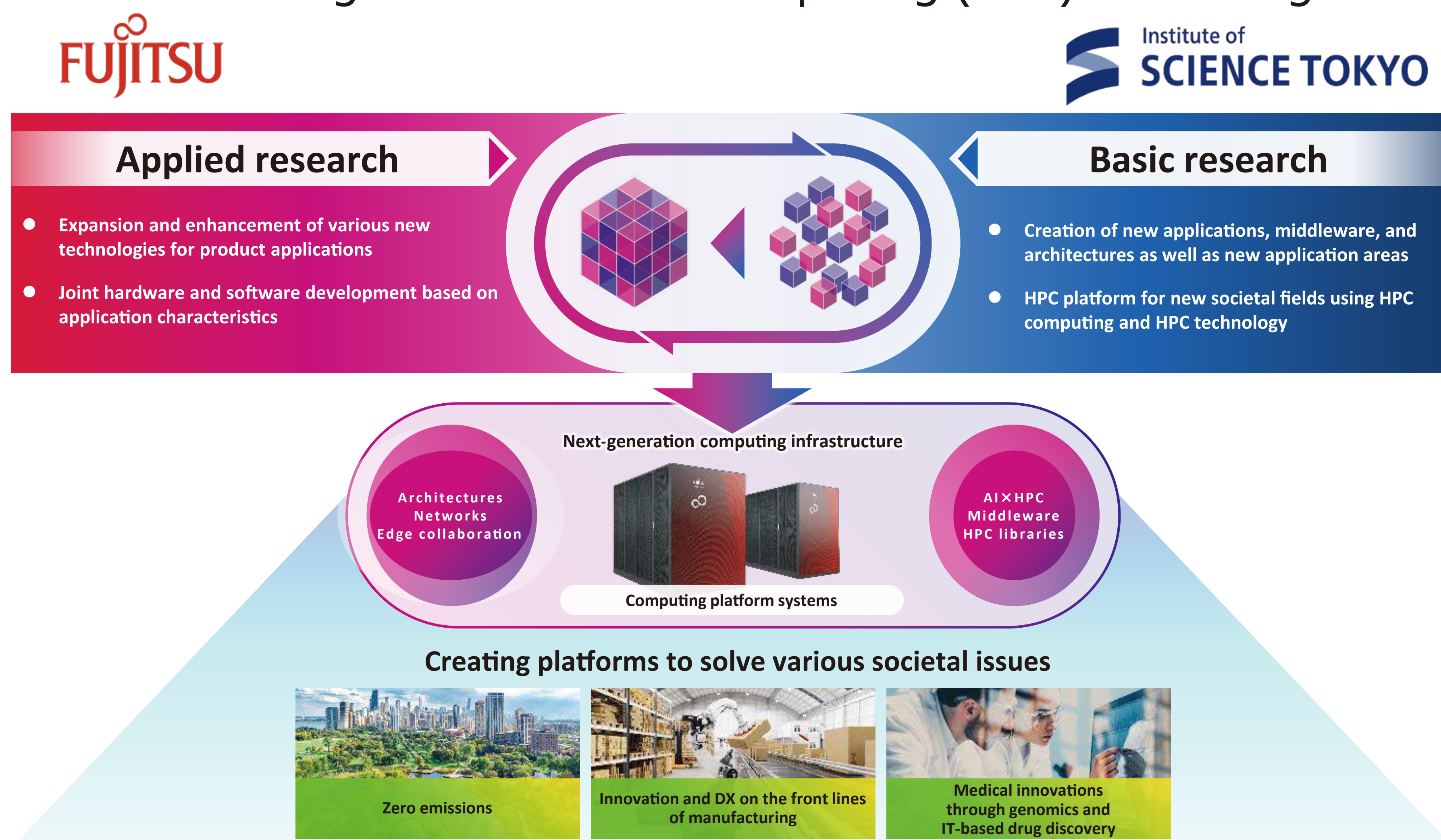


Collaborative Research between Science Tokyo and Fujitsu

Overview of Collaborative Research Cluster

The purpose of **Fujitsu Next Generation Computing Infrastructure Collaborative Research Cluster** is to realize a new computing infrastructure capable of extremely large-scale data processing and simulation based on AI and High Performance Computing (HPC) technologies.



Brief History

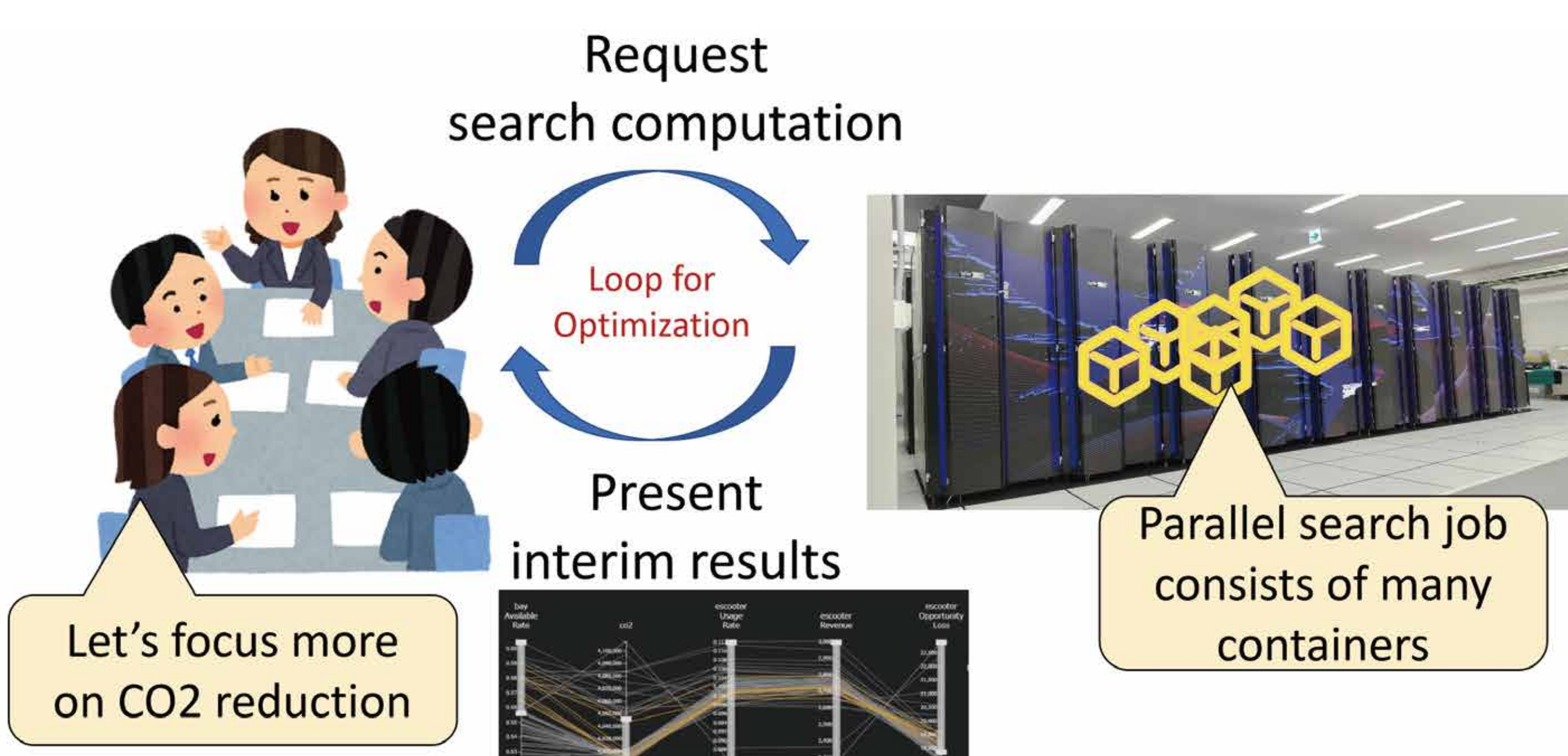
- Oct 2022: The cluster was established between Tokyo Institute of Technology (Tokyo Tech) and Fujitsu
- Oct 2024: Tokyo Tech became **Institute of Science Tokyo**, due to merger with Tokyo Medical and Dental University

Leader: Science Tokyo) Prof. Hidehiko Masuhara
Deputy Leader: Fujitsu) Fellow Naoki Akaboshi, Science Tokyo) Prof. Toshio Endo

Fujitsu	Application	Science Tokyo
Research Manager: Miwa Ueki Researcher: Toshio Ito, Kota Itakura	Large Scale AI/ML Digital Twin Material, Fluids...	Prof. Ono Isao, Prof. Rio Yokota, Prof. Ryo Onishi Prof. Katsuki Fujisawa, Prof. Takefumi Kanamori
Research Manager: Masahiro Miwa Researcher: Hiroki Ohtsuji, Jun Kato, Akane Koto	System/Middleware Interactive, Real-time Resource Management GPU, Next-gen memory	Assoc. Prof. Ryuishi Sakamoto, Assoc. Prof. Akihino Nomura Assoc. Prof. Ryohei Kobayashi, Prof. Toshio Endo, Prof. Hidehiko Masuhara 1 Technical Staff, 10 Graduate Students

System Infrastructure Supporting Real-World Interactive HPC

USE CASE: Human-Machine interaction for multi-objective optimization

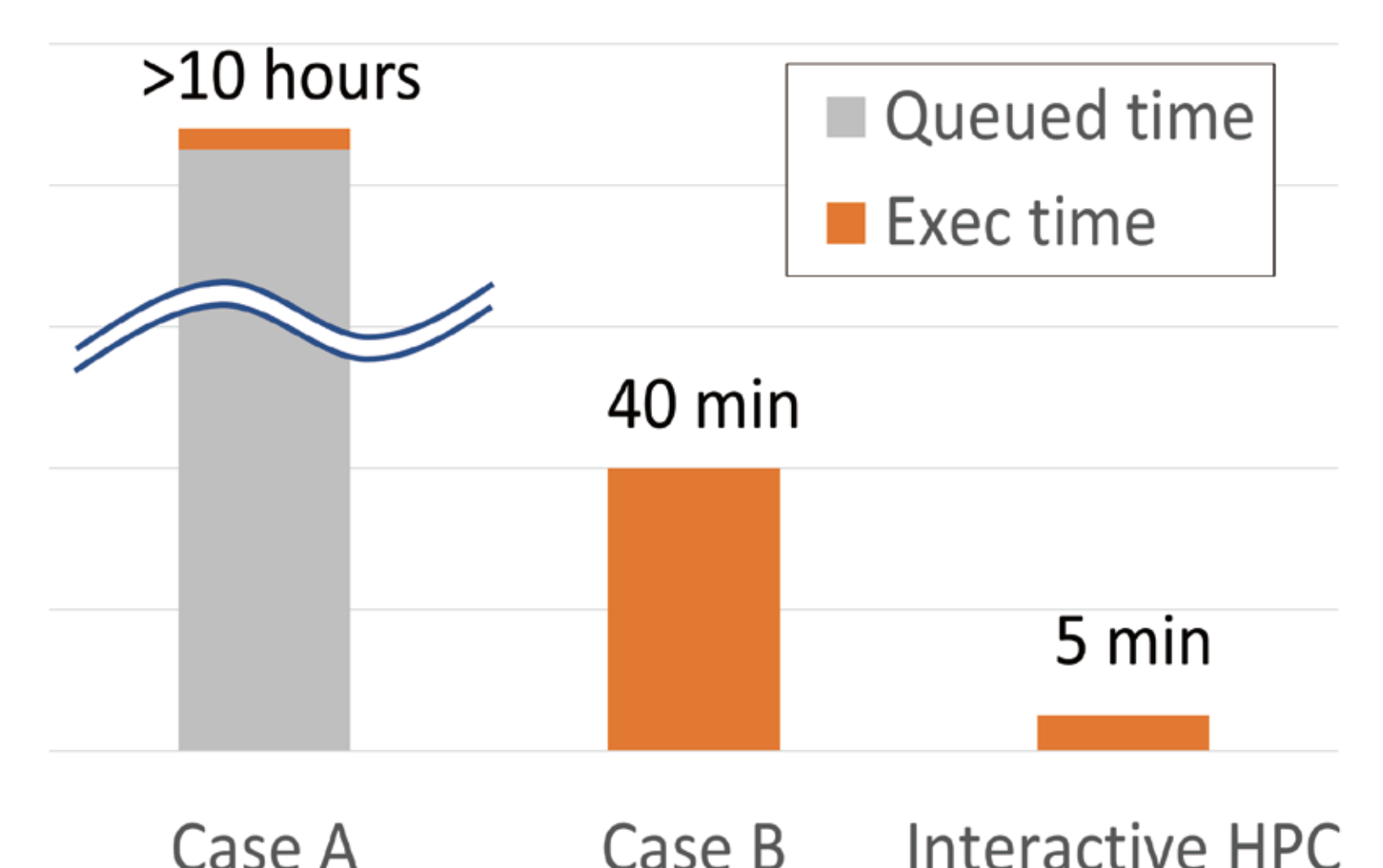


Issue 1: Traditional HPC uses batch job scheduling, which imposes long queued time

Prototype of preempting scheduler is developed

Issue 2: Traditional HPC does not allow jobs with `root` privilege, which prevents execution of multi-container applications

User-level container orchestration tool, **mini-compose** is developed



[Case A] Each search cycle may suffer from large queued time

[Case B] Using dedicated/small nodes cause long execution time

[Interactive HPC] Total time is improved by preempting scheduling

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