Fujitsu Computing as a Service (CaaS) Introduction

FUJITSU LIMITED

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Our Purpose

Make the world more sustainable by building trust in society through innovation.

Key Technologies that supports Key Focus Areas

- Concentrating R&D resources in five technical areas

Vertical Areas

Sustainable Manufacturing
Circular, traceable manufacturing with consideration to the environment and people

Consumer Experience
Payments, logistics and retail that provide consumers with diverse experiences

Healthy Living
Supporting all kinds of people in living in ways that promote wellbeing

Trusted Society
Creating communities that embody safety, security, and resilience

Horizontal Areas

Digital Shifts
Data driven, Work style reform

Business Applications
Cloud integration, Application

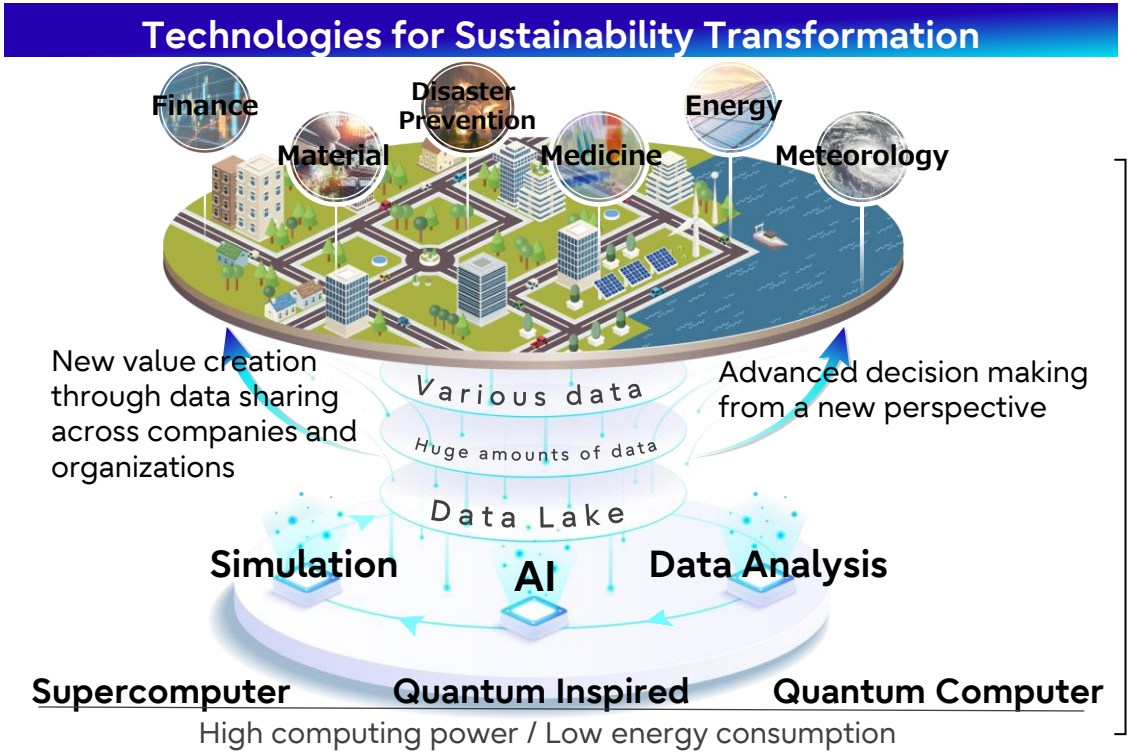
Hybrid IT
Cloud security

Key Technologies

Computing — Network — AI — Data & Security — Converging Technologies

Fujitsu technology vision

- Focus R&D in the 5 key technologies **to make the world more sustainable by building trust in society through innovation.**



5 Key Technologies

- Converging Technologies
- Data & Security
- AI
- Network
- Computing

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Vision & overview of Computing as a Service

World trend & direction of Fujitsu

- As society becomes more data driven and needs for data processing increase rapidly, Fujitsu will provide High Performance Computing(HPC) and other computing technologies as widely available services.

Society

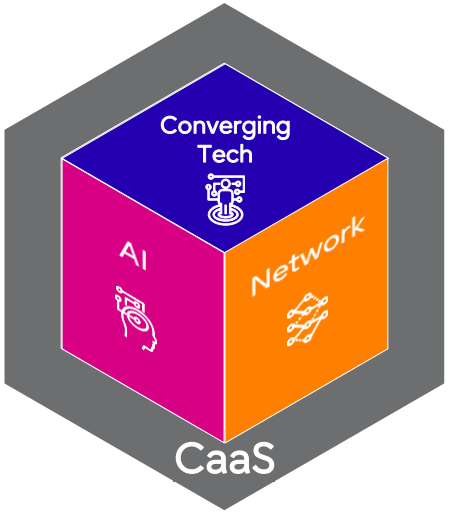
Tech-nology

World trend

- As more and more data is created on a daily basis, there is a growing demand for highly technical computing resources to leverage the vast amount of data to create new value.
- New technologies such as quantum computing are being studied for practical use.
- It is not an extension of the conventional technology, so if it is put into practical use, it can bring about a change in the world.

Direction of Fujitsu

- In order to meet the rapid increase in computing demand and realize the sustainable world proposed by Uvance, it is necessary to provide computing technology at a very high level from the semiconductor level to the data center.
- It doesn't only end with the release in October 2022, but it needs to keep growing as a service while taking in new things while keeping an eye on technology trends.



Focusing on computing technologies, Fujitsu will provide key technologies as integrated services.

Computing as a Service vision

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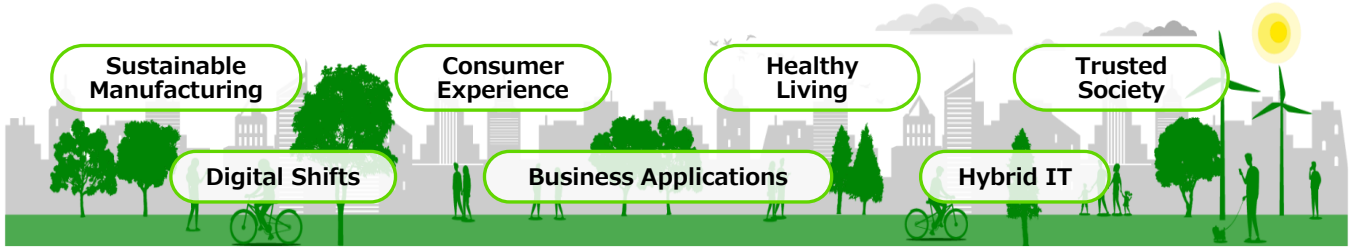

Application

Platform

AI | Simulation | Data Analytics

Computing as a Service

Low Power Consumption | Massive Computing Power | Trusted Platform

Available on public cloud

Middleware

OS

Hardware

High Performance Computing

A64FX Technology

Quantum-Inspired Technology

Digital Annealer

Quantum Simulator

Quantum Technology

Superconducting Qubit
Diamond Spin Qubit

By courtesy of RIKEN

Computing as a Service overview

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Ideal use of CaaS: HPC, Digital Annealer, AI

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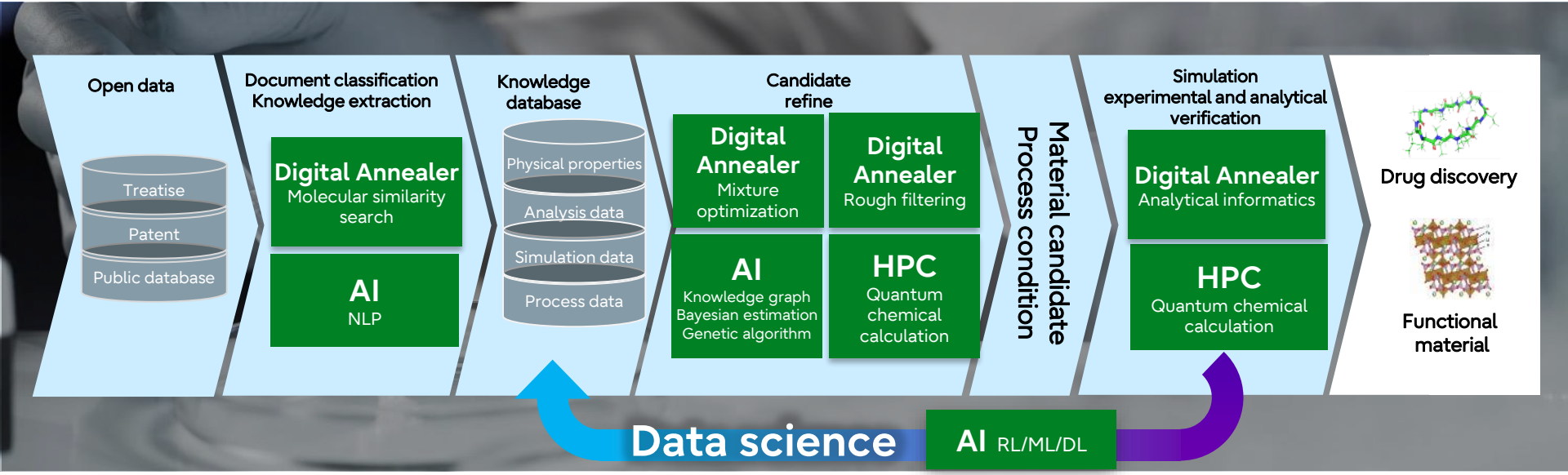
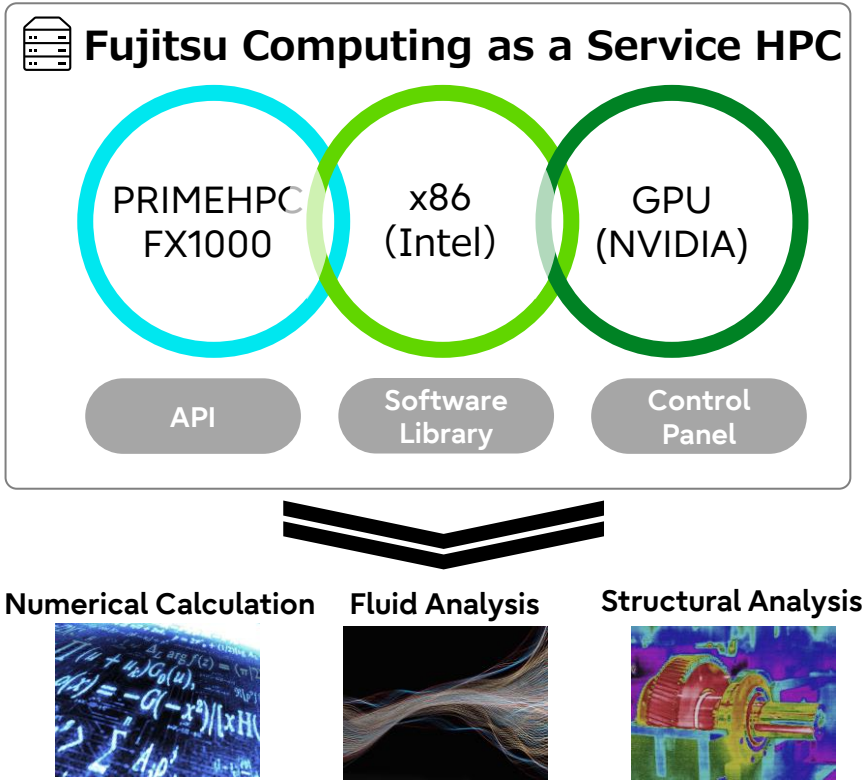
With CaaS(HPC x Digital Annealer x AI), we will expand the possibilities for new drug discovery and new material development and realize innovation that leads to solving social issues together with our customers.



Fujitsu Computing as a Service HPC (CaaS HPC)

CaaS HPC overview

- **FUJITSU Supercomputer PRIMEHPC FX1000, featuring the technology employed by Fugaku, the world-leading supercomputer, will be offered as a cloud service**
- **We help you focus on research and analysis by providing them in an easy-to-use environment from deployment to operation**



Points of CaaS HPC

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1 “Fugaku” technology for faster processing

Fugaku compatible hardware and software for
fast large-scale simulations

2 On-demand HPC services

All the necessary environment for HPC job execution is prepared
by the service side, and the HPC environment can be available
on demand by simply subscribing to the service

3 Providing the job operation API

Job operations such as submission and cancellation
can be performed from the customer's business application
or newly developed application via API.

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Fujitsu Computing as a Service Digital Annealer (CaaS Digital Annealer)

CaaS Digital Annealer

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- Fujitsu's own architecture with digital circuits inspired by quantum phenomena that solves combinatorial optimization problems.

Quantum Technology

Still in the research phase

- Difficult to maintain quantum state
- Connection and extension constraints

Digital Annealer

Easy application of real problems

- Digital circuit makes stable operation and miniaturization easy
- Fully coupled architecture allows for easy mapping of complex problems

Digital Annealer roadmap

*The contents of the roadmap are subject to change without prior notice.

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4th Generation Digital Annealer Service Released

Field of Application

- Prefectural Delivery
- National Delivery
- Medium-Molecular Medicine
- Financial Portfolio
- Manpower Management

1st Generation
Scale: 1,024-bit

2nd Generation
Dedicated hardware implementation
Scale: 8,192-bit

3rd Generation
- Hybrid seeking architecture
- Large-scale (100,000-bit)
- Improved convenience (Correspond to cost term, constraint term separation)

4th Generation
- **Large-scale annealing core integrated with multi-GPU implementation**
- **10 times faster compared to the 3rd Generation**

Next Generation

~2018 | 2020 | 2022 | 2023 onwards

Applicable area

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Aiming to solve social issues

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CaaS use cases

Drug discovery

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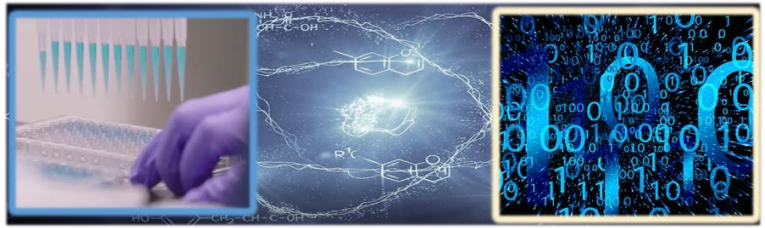
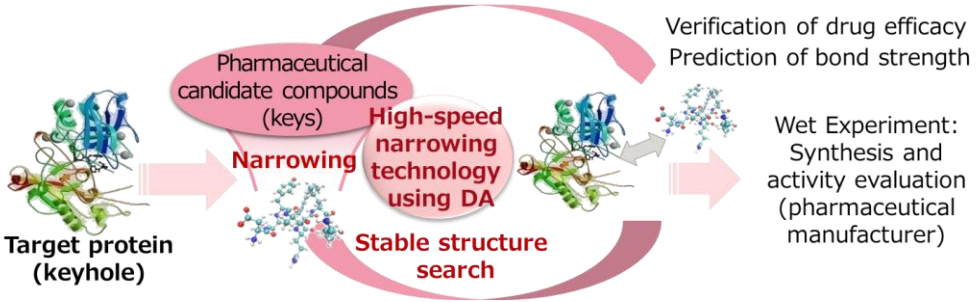
Experiment (wet process) → **Calculation (in silico)**

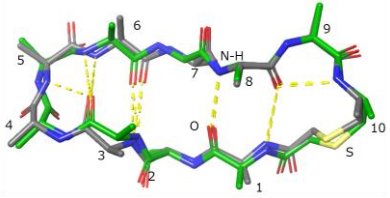
- Experimental search of a new drug requires a large number of trials and errors.
- Designing and evaluating drug candidates on a computer will significantly reduce time and cost.





However, explosive increase in computational complexity makes it difficult to search for stable structures of drug candidates for medium-sized molecules.

With DA, experimental and calculated structures agree with a remarkable accuracy of 0.73Å in Root Mean Square Deviation (RMSD) value.



Comparison of experimental and calculated structures of a cyclic peptide

Gray: Experimental result
Green: Calculated result

CaaS roadmap

CaaS roadmap

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2023 ~

- Expansion outside Japan
- Sequential expansion of software services
- Providing Data e-TRUST in Japan

2022/10 “Fujitsu Computing as a Service” launched in Japan

Delivering HPC,Digital Annealer,AI as a cloud service

Thank you