FY2020
R&D Strategy
Briefing

October 13, 2020

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shaping tomorrow with you

Fujitsu's R&D Strategy

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COO & CTO

Head of Global Solutions Business
Head of International Regions
Responsible for Japan Region
Chairman of Fujitsu Laboratories

Our purpose is to make the world more sustainable by building trust in society through innovation
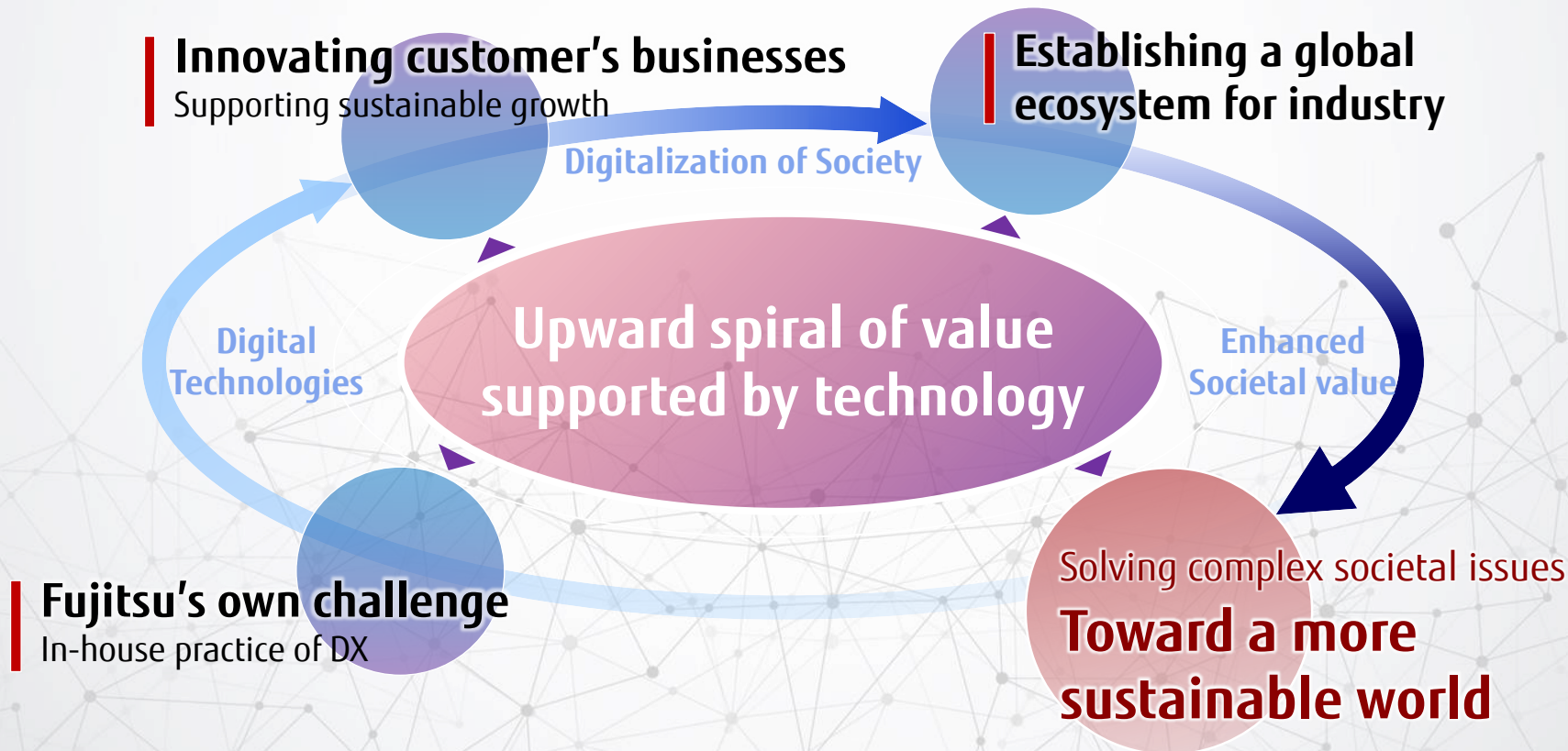
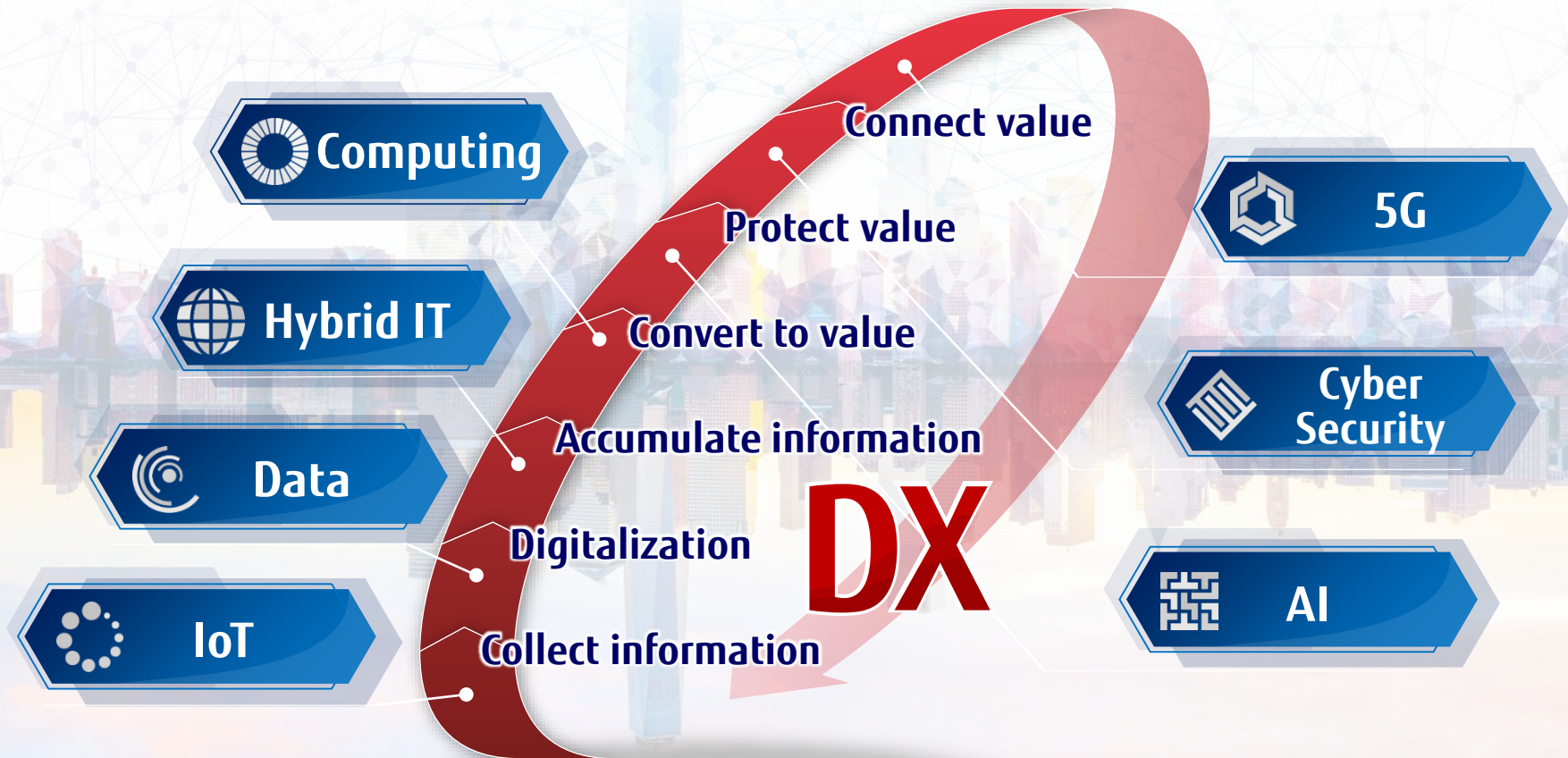Our Purpose indicates why Fujitsu exists in society.

FUJITSU Way

Technology to Create a Better Society

Innovating customer's businesses
Supporting sustainable growth

Establishing a global ecosystem for industry

Digitalization of Society

Upward spiral of value supported by technology

Digital Technologies

Enhanced Societal value

Fujitsu's own challenge
In-house practice of DX

Solving complex societal issues
Toward a more sustainable world

Focusing on 7 Key Technologies

Computing

Hybrid IT

Data

IoT

Connect value

Protect value

Convert to value

Accumulate information

Digitalization

Collect information

DX

5G

Cyber Security

AI

Computing

Providing the increasingly complex and vast enormous computing capabilities needed to solve a range of societal challenges

Compared with the stagnation of Moore's Law (refinement), the improvement in AI compute is enormous*

300,000 x Increase in 5 years

* Source: "AI and Compute", OpenAI
https://openai.com/blog/ai-and-compute/

Innovation in Computing Technology ▶▶▶

4 world records

Fugaku
Ranked No. 1 in the world for supercomputer performance

Digital Annealer
Joint research in mid-molecular drug discovery (PeptiDream Inc.)

Quantum Computing

Superconducting approach
(RIKEN and University of Tokyo)

Optical approach
(Delft University of Technology)

Quantum algorithms
Error correction
(Osaka University)

Press release on Oct 13

Software Acceleration Technology ▶▶▶

Content Aware Computing
Automated control of AI calculation accuracy

Software technology that maximizes computer performance

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A I

Innovative solutions to societal challenges using trustworthy analysis based on ethics and transparency

Accountability of AI

Percentage of people who would trust AI if it showed substantial reasons for reaching its decisions

63 %

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Explainable AI

Deep Tensor

+

Knowledge Graph

⬇

Explains the reasoning behind AI's decisions

🔽

Reduced decision-making time for genomic medicine

14 days → **1** day

High Durability Learning

Degradation monitoring and automatic repair of AI accuracy

90% ---------- 89%

Accuracy degradation ・ Retraining

70%
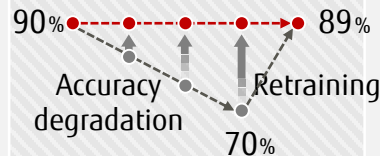
Automatic repair reduces AI degradation over time

🔽

POC at a factory of a major beverage manufacturer

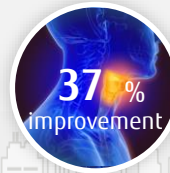Automatic repair
98 %
↑
70 %

Deep Twin
(Dimensional reduction and compression)
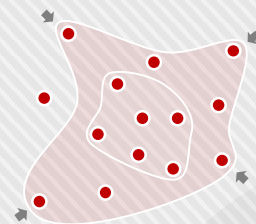
Represents essential data structure by reducing data dimensions without compromising the distribution and probability of the information

🔽

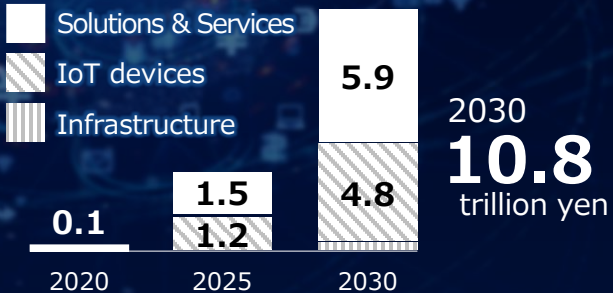Detecting thyroid abnormalities
(academic benchmark)

37 %
improvement

5G

Providing new value to everyone by connecting people with data and things in our complex and rapidly changing society

Global market forecast for Private 5G

Solutions & Services
IoT devices
Infrastructure

2020	2025	2030
0.1	1.5 / 1.2	5.9 / 4.8

2030
10.8
trillion yen

5G (Enterprise & Telcos) ●●●

Accelerate DX in vertically integrated organizations

- Establishment of 5G Vertical Service Office to consolidate Fujitsu's technological capabilities and knowledge
- **Private** 5G Partnership Program
- FUJITSU Collaboration Laboratory

Cloud Wireless Service

- Achieve seamless optimization from edge to cloud
- Managed service for license bands
- Covering everything from planning to operation
- Flexible software base stations

Beyond 5G 6G

- Support for larger capacity, multiple connections, and low latency
- Advanced information communication closer to human sensing
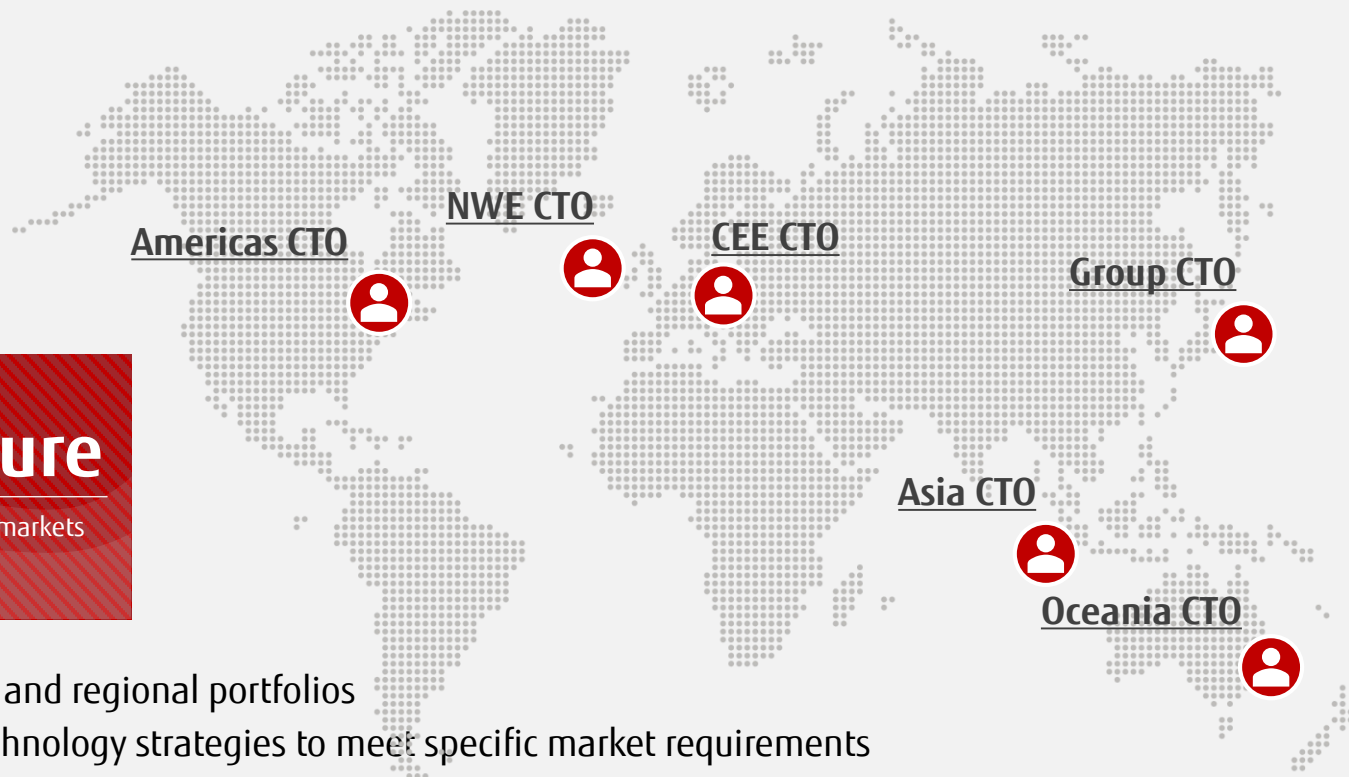- Achieve advanced cyber-physical fusion

Opening of 5G base stations / Global specifications

- Globally deployable O-RAN compliant
- Deployment results in domestic fields
- Under development in DISH Network

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Globally Unified Technology Strategy

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New CTO Structure

A stronger technology strategy for global markets

- Americas CTO
- NWE CTO
- CEE CTO
- Group CTO
- Asia CTO
- Oceania CTO

▶ Creating a global portfolio and regional portfolios

▶ Implementing regional technology strategies to meet specific market requirements

Supporting Customer Transformation on a Global Scale

NWE · **CEE** · **Oceania** · **Asia** · **Japan** · **Americas**

Provide Solutions Optimized for Each Region

Global portfolios, account plans, and offerings

Manufacturing · Mobility · Finance · Retail

Core technologies that support customer values

Supporting Powerful Global Solutions

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FUJITSU Work Life Shift

Smart Working
Borderless Office
Culture Change

technology

Remote working technologies

- FUJITSU Collaboration Space
- Remote Virtual Environment Computing

Global strategic partners

- Microsoft
- Citrix
- VMware
- ServiceNow

Mobility

Automobile insurance

Eco driving

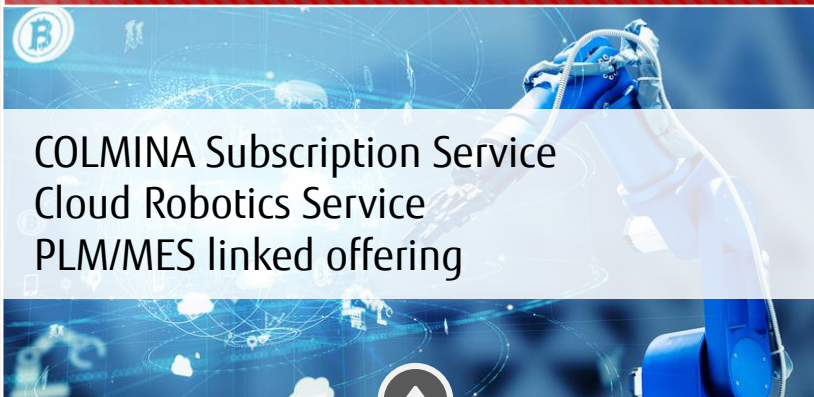Connected car security

technology

Digital Twin Analyzer

Digital Annealer

V-SOC
Upstream

Supporting Powerful Global Solutions

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Monozukuri - Manufacturing

COLMINA Subscription Service
Cloud Robotics Service
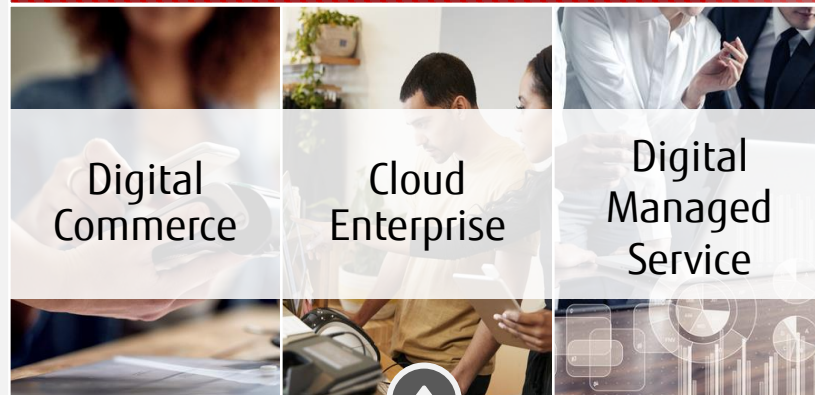PLM/MES linked offering

technology

Subscription-based
services technology

AI + Cloud Robotics
factory automation
technology

Retail - Digital Commerce -

Digital
Commerce

Cloud
Enterprise

Digital
Managed
Service

technology

Face + Palm vein
hybrid authentication
technology

AI image
recognition

Promoting the practical application of technology

Connect services across industries to create new value

Social Design Business Unit

Cross-Industry
(collaboration across sectors)

Fujitsu Laboratories

Purpose
(societal issues)

Technologies
(fundamental and applied)

Software Technology Business Unit

Investigate the commercialization of technologies

Accelerating Growth in DX Business

No.1 Accuracy

Behavioral Analysis Technology
Recognizes 100 basic actions

Human Behavior Sensing

REC ●   02:34:32

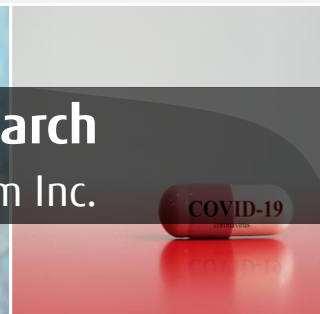Crime prevention   Consumer behavior   Task monitoring   Driving

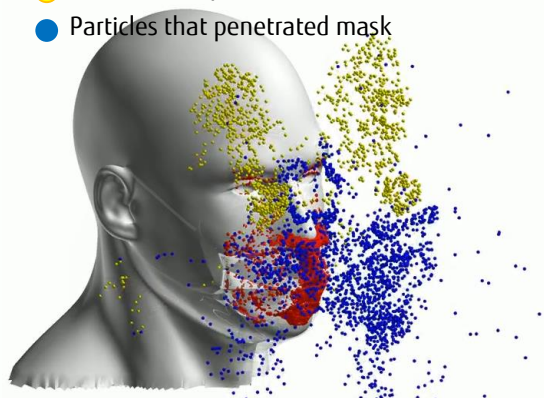## Digital Annealer **+** Digital Laboratory Platform

Drug discovery and research
Joint research with PeptiDream Inc.

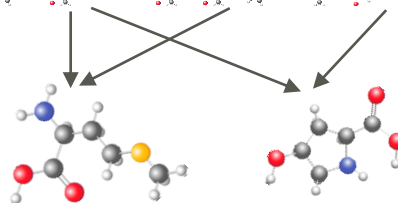COVID-19

Working to Overcome COVID-19

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Predicting and controlling viral droplet infections

- 🔴 Particles caught by mask
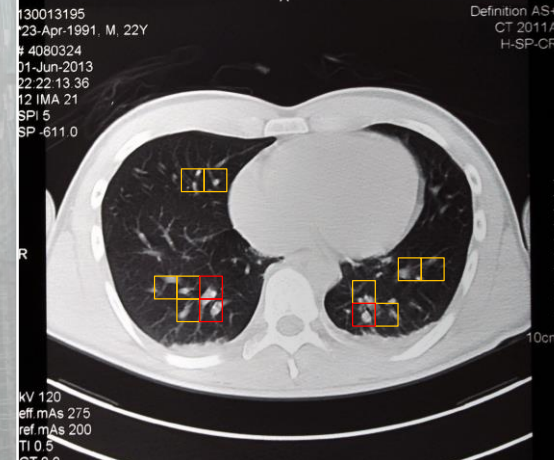- 🟡 Particles escaped from mask
- 🔵 Particles that penetrated mask

Identify candidate drugs 02

Over 2000 potential pharmaceutical drugs
1～2 years ➡ 10 days

Target protein of COVID-19
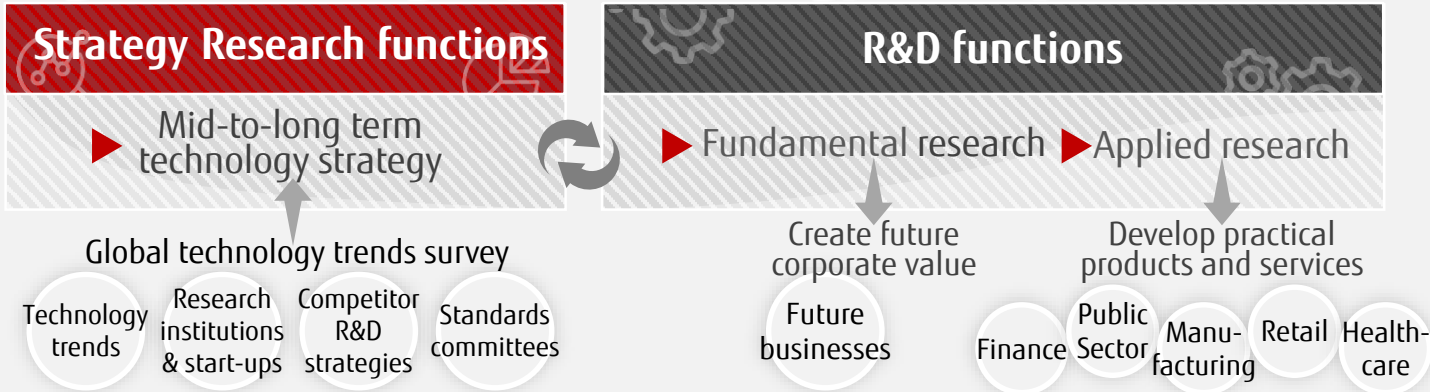
Diagnostic support for COVID-19 pneumonia 03

R&D Approach for the Future

'Selection & Focus' in R&D for transformation into a DX company

▶ Shift to a technology development model that enables the rapid creation of products and services through open technology development

Strengthen Strategy Research functions to realize strategic R & D through open technology development

Strategy Research functions

R&D functions

▶ Mid-to-long term technology strategy

▶ Fundamental research ▶ Applied research

Global technology trends survey

Create future corporate value

Develop practical products and services

- Technology trends
- Research institutions & start-ups
- Competitor R&D strategies
- Standards committees
- Future businesses
- Finance
- Public Sector
- Manu-facturing
- Retail
- Health-care

R&D to create future paradigm shifts and innovation

▶ Continue the R&D of cutting-edge technologies to achieve a sustainable society, while at the same time promoting technology development to address the social risks posed by innovative technologies

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Computing
Fugaku, Digital Annealer, Quantum Computing, Content-Aware Computing

Hybrid IT
Auto Bug Detection/Fix, Hybrid Ops/AI Ops, CI/CD, Auto-Adjust Container Parameters

Data
Digital ID Tech., Connection Chain, Chain Data Lineage

IoT
Dracena, Real-time Digital Twin, MEC/Hyperconverged Edge, Human Sensing

DX

5G
Private 5G, Software Base Station, Millimeter-Wave Radio, Optical Transmission, Next-Generation 6G
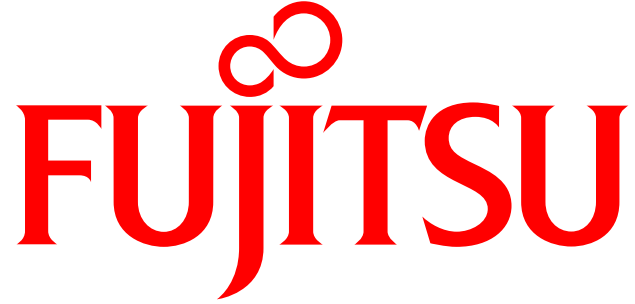
Cyber Security
Multimodal Biometric Authentication, AI for Security, Security for AI, Security by Design, Privacy Protection

AI
Behavioral Analysis Tech., Explainable AI, Trusted AI, AI×HPC, Topological Data Analysis, High-Durability Learning

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