

**FY2018**

**R&D Strategy Briefing**

**September 20, 2018**

**FUJITSU**

shaping tomorrow with you

# Trust and Co-creation in the Digital Era

CTO, FUJITSU LIMITED  
CEO, FUJITSU LABORATORIES LTD.

**Shigeru Sasaki**



# Fujitsu Limited 80th Anniversary & Fujitsu Laboratories 50th Anniversary



## ■ Fujitsu Limited's 5th President, Kanjiro Okada (Term:1959-1970)



Fujitsu Laboratories was founded for developing the world's top-level technologies to drive the growth of the Fujitsu Group, in the autonomous and free atmosphere for researchers with broad consideration on what research and development ought to be.

Fujitsu Laboratories LTD.  
founded

Digital Service

Software / Solution Business

Fujitsu Limited  
founded

Computer Business

Communication Instrument Business

1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015 2020

# Fujitsu as a Technology Company



**To resolve societal issues and bring happiness  
to the people around the world**



An aerial photograph of a large, modern, multi-story building complex, likely a corporate headquarters or research facility. The building is white with many windows and a central entrance. In front of the building is a large, circular courtyard with a pond in the foreground. The sky is overcast.

Announced in 1976

# 信頼と創造の富士通

## Reliability and Creativity

# Transition of Reliability and Creativity

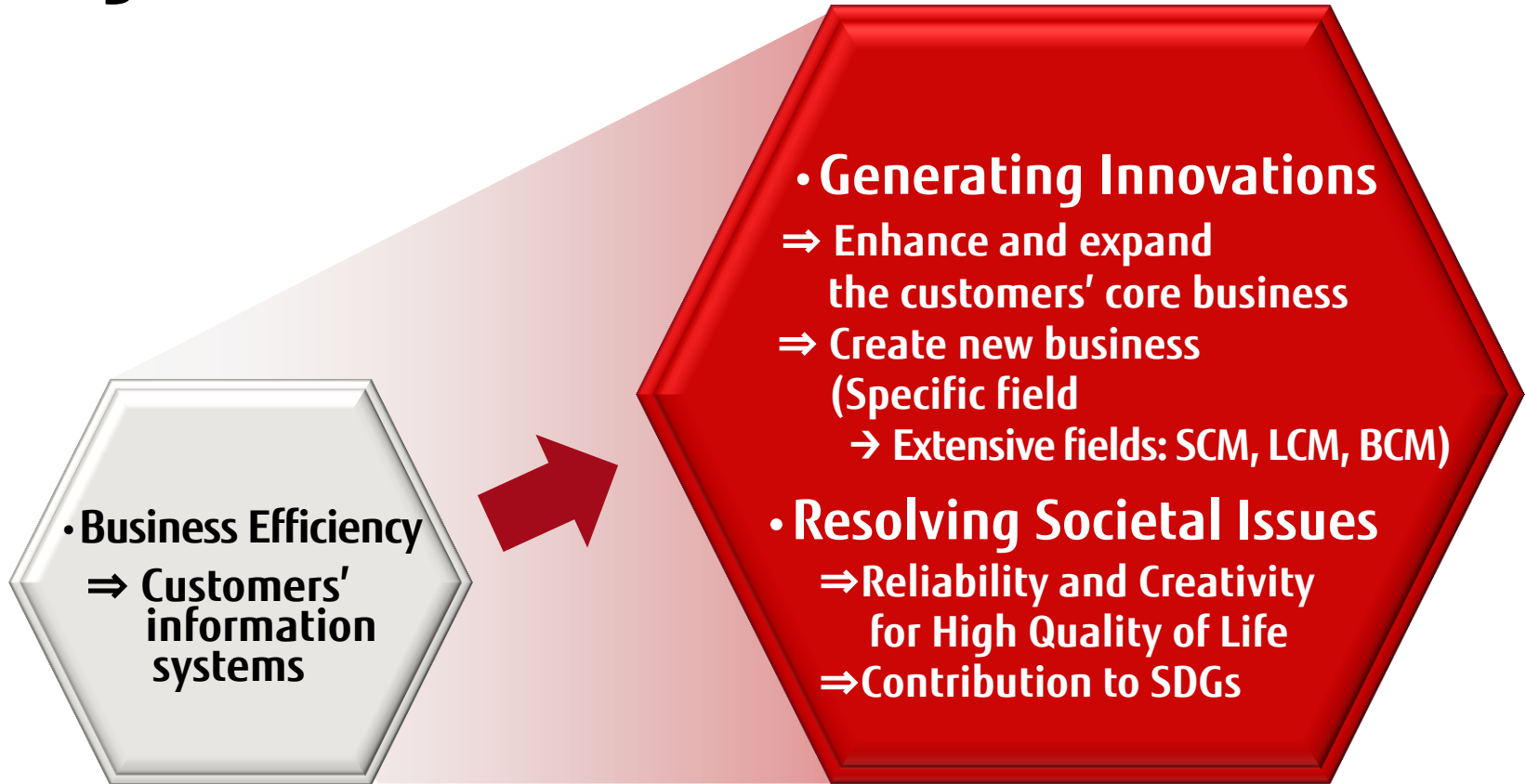
**1950- : Assaulting expansion of Computer Business**  
Acceleration of rapid growth in Japanese economy through promoting computing business

**1976- : Leading ICT business under the slogan of "Reliability and Creativity"**  
With mainframes as a starter, providing leading-edge, highly-reliable products/services to develop new ICT markets

**2010- : Driving sustainable development of society and economy in the digital era**

- Ensuring "Trust" in the hyperconnected society / economy
- Propelling Co-creation to generate persistent innovations
- Contributing to achieve SDGs for realization of sustainable and resilient society

# Changes in ICT's Role



# Changes in the Digital Era

- In the connected world, the number of elements concerning in combinations among company, people, business, data and system is extremely high, resulting in structures with "complexity" and "immensity"

"Complexity"  
"Immensity"



Difficulty in judging the "Quality"  
"Noise" contamination inevitable

- Through realization of the world that ensures "Trust," a huge number of elements which configure complex combination sets are to be connected more easily, accelerating "Co-creation"



# Trust and Co-creation in the Digital Era

FUJITSU

「Reliability」



「Trust」

「Creativity」



「Co-creation」





- **Generating innovations through Trust and Co-creation in the digital era and promoting societal and economic development**

## **Trust:**

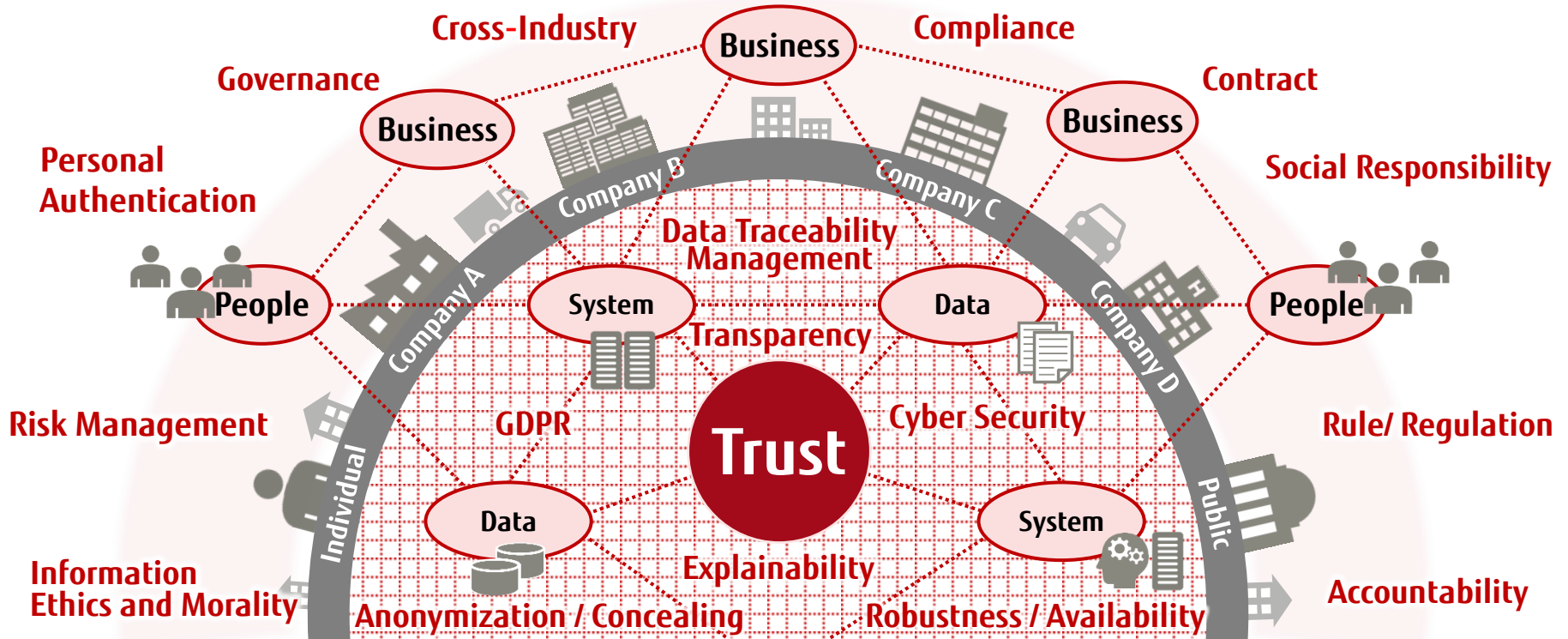
**Develop safe and secure cutting-edge technologies to create "Trust" in society and customers business environment**

## **Co-creation:**

**Enhance and expand the customers' core business for mutual growth through cutting-edge technologies**

# Values created through Trust of the Digital Era

- Privacy Protection ● Big Data Utilization ● Work Style ● Corporate Growth / Development ● Rule Revision ● Social Infrastructure Maintenance
- Data Portability ● Data Business ● SDGs ● Brand Promotion ● Co-creation Business ● De facto Standard ● Business Continuity ● AI Social Implementation



**Trust can be easily damaged  
even by slightest misconduct**



# Achievement of Trust by Technologies

- Privacy Protection ● Big Data Utilization ● Work Style ● Corporate Growth / Development ● Rule Revision ● Social Infrastructure Maintenance
- Data Portability ● Data Business ● SDGs ● Brand Promotion ● Co-creation Business ● De facto Standard ● Business Continuity ● AI Social Implementation

## Borderless IoT Security

User / Data traceability assurance

## New Market Development

Creating trustworthy values by digital technologies

## Digital Annealer

All combinatorial problems solved completely with high-speed and accurately

## Chained Lineage

Realizing trustworthy, safe and secure distributed data exchange

## Connecting-X

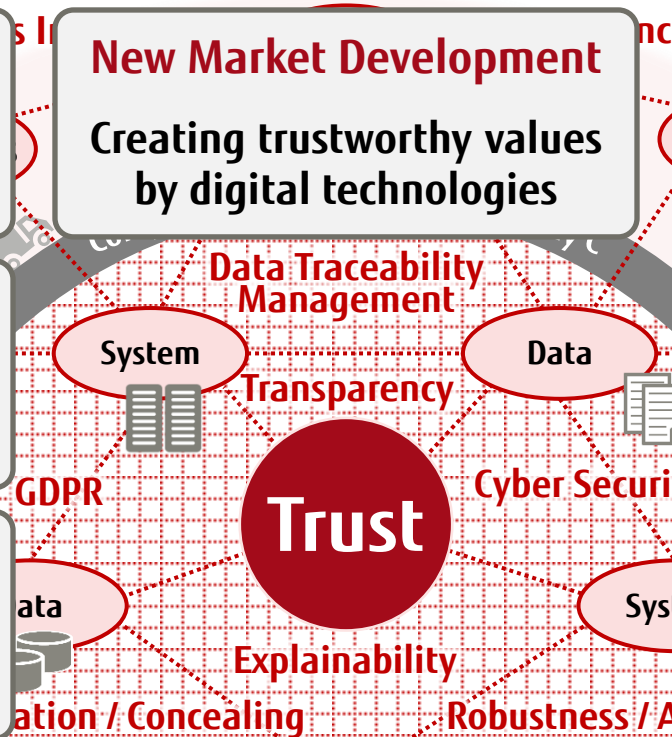
Network to deliver a real-time UX with high security

## Datafinic Computing

Distributed processing of ever-increasing massive data

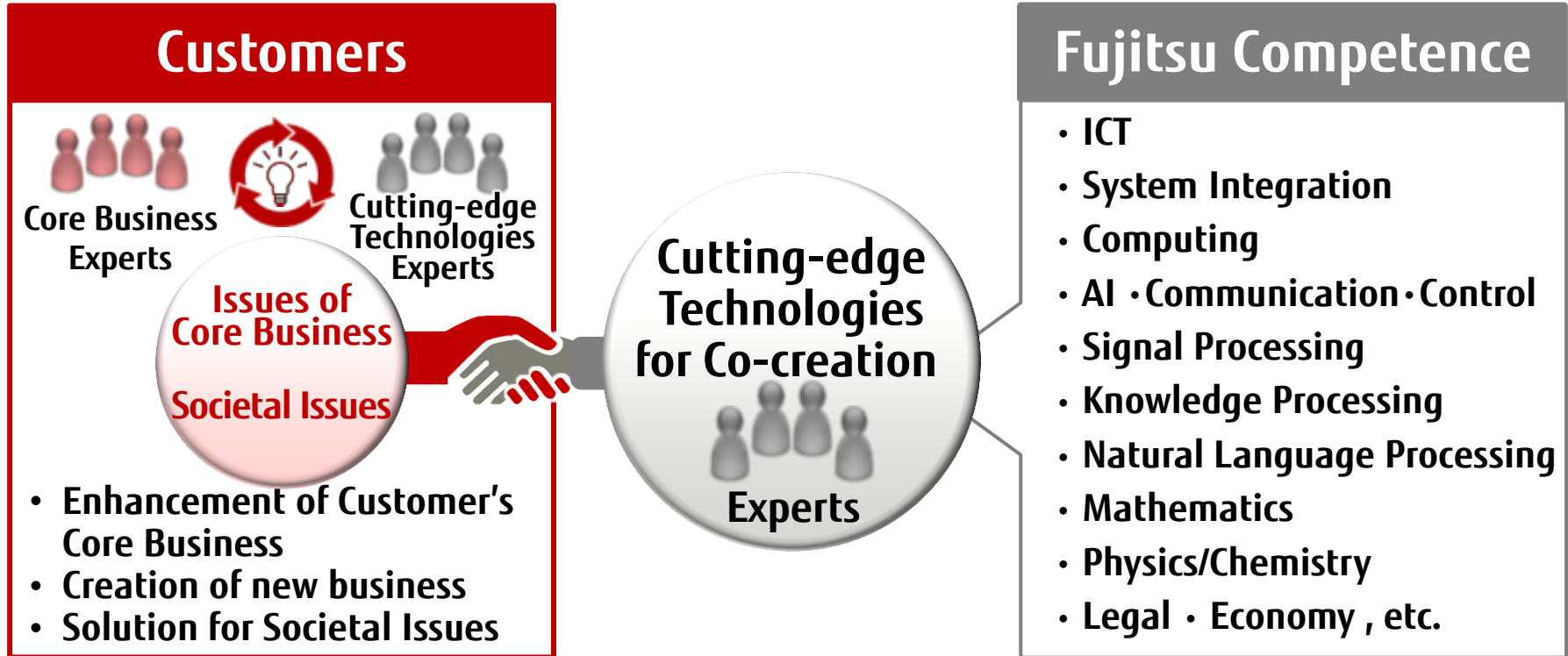
## Explainable AI

AI that is reliable, understandable and controllable to human



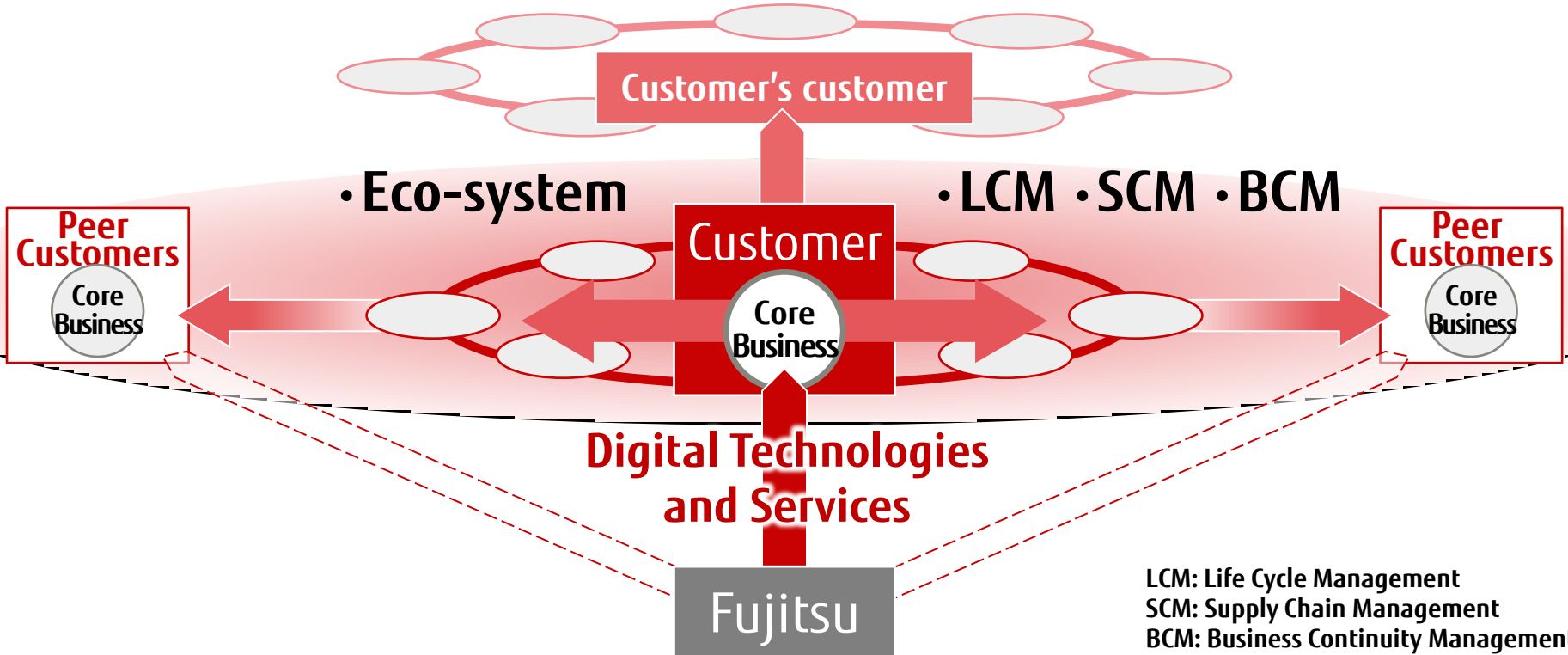
# Co-creation through Technologies

## ■ Co-creation beyond the relationship of IT vendor



# Strategy of mutual growth with customers

- Exploit new market with digital technology and high-value business model



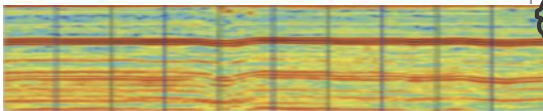


# Digital Co-creation Use Cases

## SIEMENS Gamesa



Manual inspection focusing only on the parts with possible defects detected by AI reduced the inspection time by 80%



Social Infrastructure Inspection

## Hospital Clinico San Carlos



**Analysis of patient's medical interview chart/medical record**

Anonymous  
CIP:  
Sex: Female  
Age: 63

**Diagnoses**

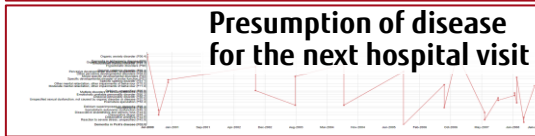
- F43.0: Dissociative convulsions
- F43.0: Acute stress reaction
- F43.0: Other pervasive developmental disorders
- F43.2: Post-traumatic stress disorder
- F43.1: Atypical autism
- F43.9: Mental and behavioural disorders, due to use of nicotine

**Setting/resource use patterns**

- High frequency visits to ER

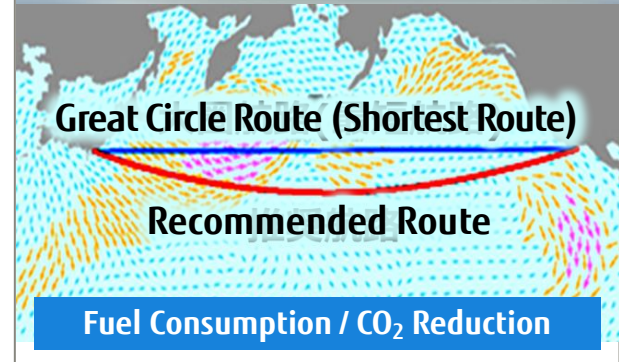
**Diagnostic patterns**

No diagnostics-related patterns estimated



Diagnostic Support for Medical Specialists

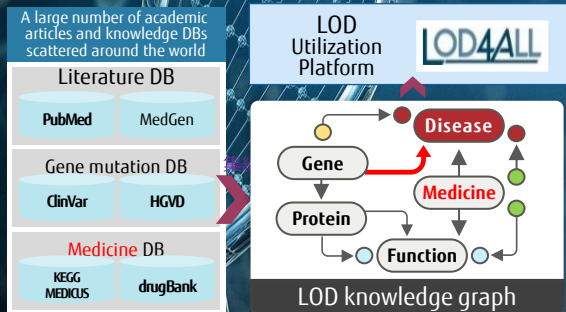
## Mitsui O.S.K. Lines Ube Shipping & Logistics



# Open Innovation

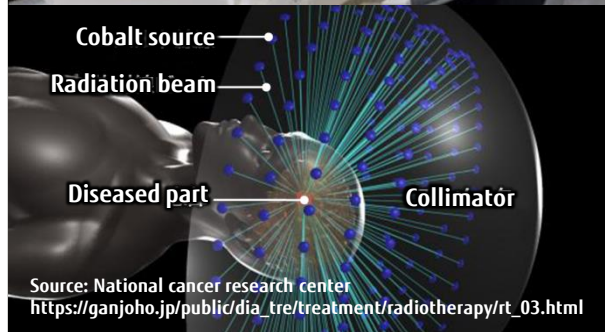
## Kyoto University

### "Explainable AI" Integrated Database for Genomic Analysis



## Toronto University

### "Digital Annealer" Advanced Cancer Treatment



## MITSUBISHI ESTATE CO., LTD. SoftBank Corp., and The University of Tokyo

### "Blockchain" Field trial of new service creation and urban development based on data utilization platform



# **Fujitsu's R&D Strategy:**

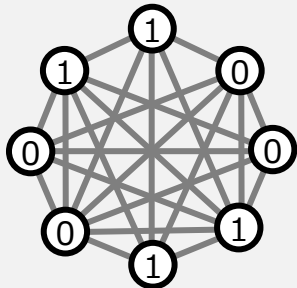
**Developing Cutting-Edge Technologies for Promotion of the Growth  
in Customers' Trustworthy Business through Co-creation in the Digital Era**



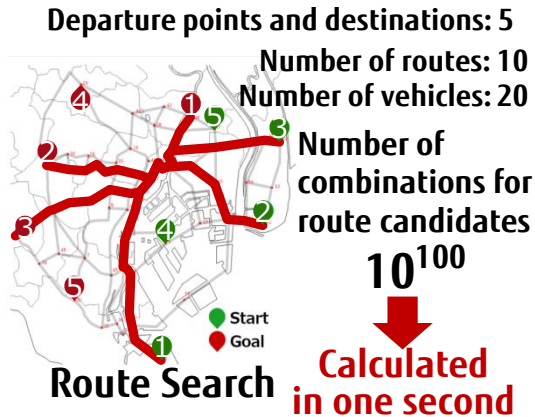
# Digital Annealer

- Finding the best combination from a huge number of combinatorial elements with high speed and accuracy
  - Improved efficiency in drug discovery informatics
  - Shortest route selection for goods delivery and alleviate traffic congestion
  - Productivity enhancement by task schedule optimization

## Technologies



Inter-bit Full Connection



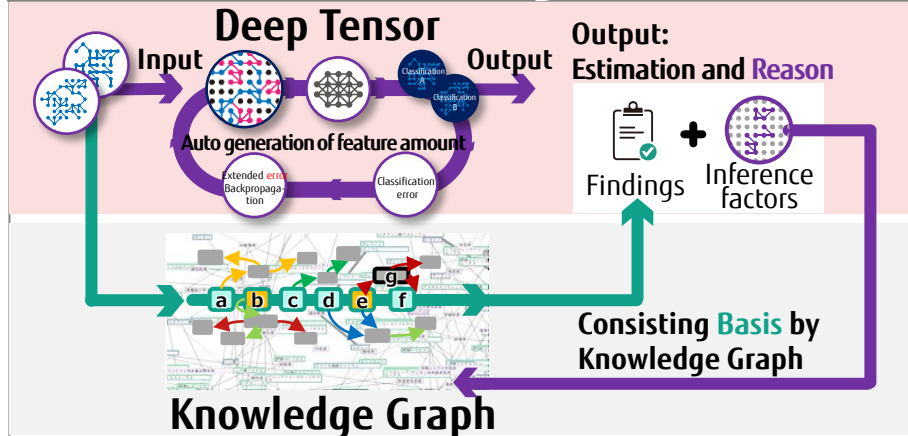
## Target Markets "Potential Markets"

- Materials Informatics  
Chemistry, Battery, Magnetics, Ceramics, Materials and Devices Analysis, etc.
- Medical care  
Drug Discovery, Advanced Cancer Treatment, Tailor-made Medical Care, etc.
- Route Optimization  
Delivery Route, Traffic line "Work Schedule", Congestion Forecast, etc.

# Explainable AI

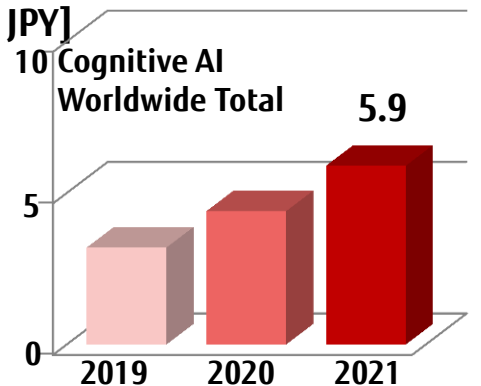
- AI that is reliable, understandable and controllable to human
  - Innovating cancer treatment by inferring the disease from genetic mutation
  - Forecasting the corporate growth rate from past results and economic indicators
  - Work style reform based on expected changes in employees' health from daily activity data

## Technologies



## Target Markets "World Wide"

- Cancer Genomic [T JPY]
- Social Infrastructure check
- Fintech
- Logistics
- Quality Control
- Manufacturing
- AI Simulation

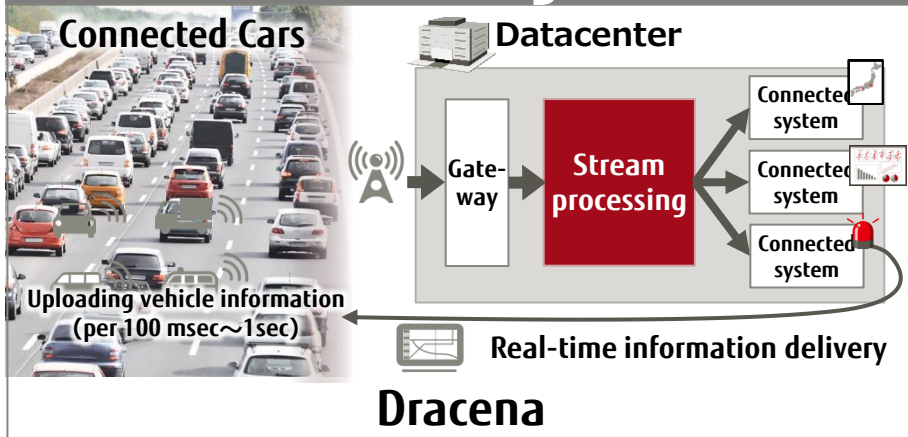


Source : IDC Worldwide Black Book: 3rd Platform Edition, June 2018, Rate: 1USD=112JPY

# Connecting-X

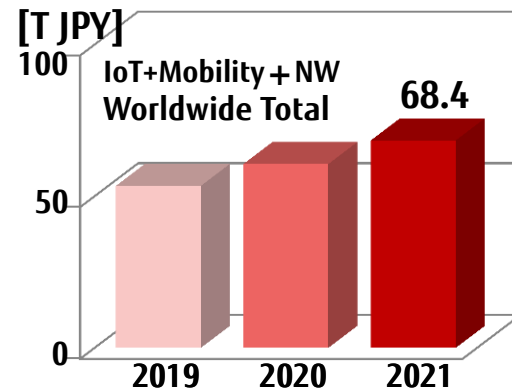
- Network for delivering a real-time UX with high security
  - Real-time digital twin for processing large amounts of IoT stream data
  - Collecting / Analyzing the data from connected cars and feeding the required data back to users in real time
  - Optical fiber network for connecting data centers securely to transmit large-capacity data

## Technologies



## Target Markets "World Wide"

- IoT
  - Connected-car
  - 5th Generation
  - Dracena
- Optical Network
  - Datacenter Network
  - Backbone Network
- Manufacturing
  - Factory Automation

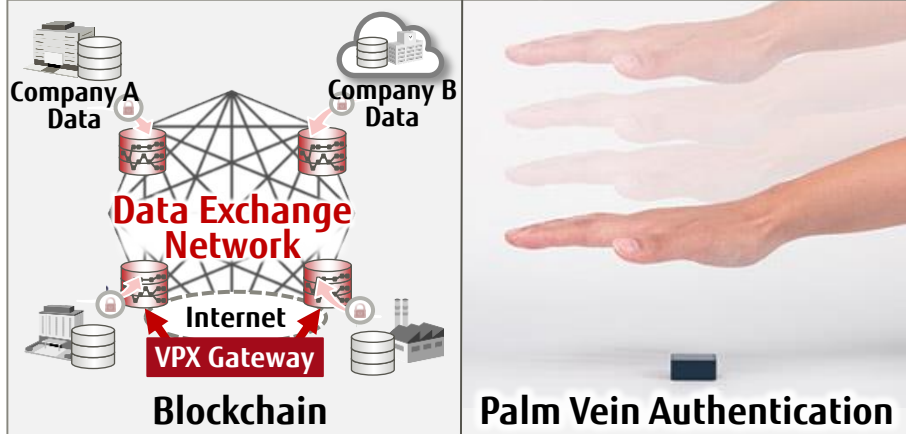


Source : IDC Worldwide Black Book: 3rd Platform Edition, June 2018, Rate: 1USD=112JPY

# Borderless IoT Security

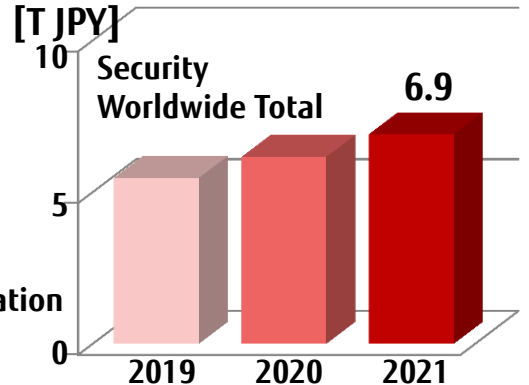
- User / Data traceability assurance
  - Data trail management by blockchain and history records
  - Personal data concealing / anonymization for secure utilization
  - Highly reliable privacy protection by palm vein authentication

## Technologies



## Target Markets "World Wide"

- Cyber Security
  - Forensics technology
- Blockchain
  - Connection Chain
  - VPX
- Authentication / Authorization
  - Palm Vein Authentication
- Data Security
  - GDPR



Source : IDC Worldwide Black Book: 3rd Platform Edition, June 2018, Rate: 1USD=112JPY



# New Market Development

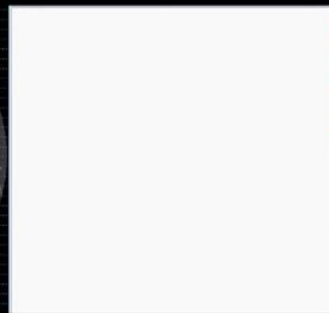
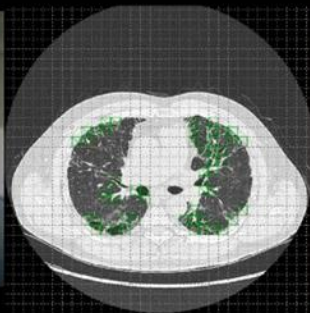
- **Creating trustworthy values by utilizing digital technologies**
  - Scoring support by 3D sensing that revolutionizes the world of sports
  - Sensecomputing to analyze human psychology by sensing data
  - Integrated surveillance for facilities by optical fiber sensing

## Technologies



## Target Markets "Potential Markets"

- **Athlete Sensing**  
Gymnastic scoring support, Application for Training, Healthcare "Rehabilitation", Entertainment "Commercial/Movie Production"
- **Sensecomputing**  
Sensitivity Digital Marketing, Work Style Reform
- **Facility Surveillance**  
Temperature measurement by Optical Fiber, Deterioration predicting solution



**General-Purpose  
Computer  
(Digital Bit)**

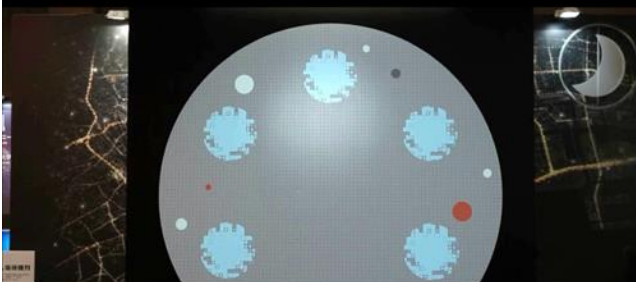
0

[0] or [1] States

**Quantum  
Computer  
(Quantum Bit)**

[0] or [1] Both States

**Superposition**



Laser irradiation approx. 2.3 million/sec.

# Exhibits: Fujitsu Laboratories' 8 Emerging Technologies for Leading the World with Trust



**Innovative  
Computing Solving  
Social Issues**

**Reliable AI  
that Develops  
the Society**

**Data  
Management  
System that  
Facilitates the Value  
Creation Cycle**

**Information  
and Communication  
Management  
in the 5G Era for  
Connecting Cyberspace  
and Physical World**

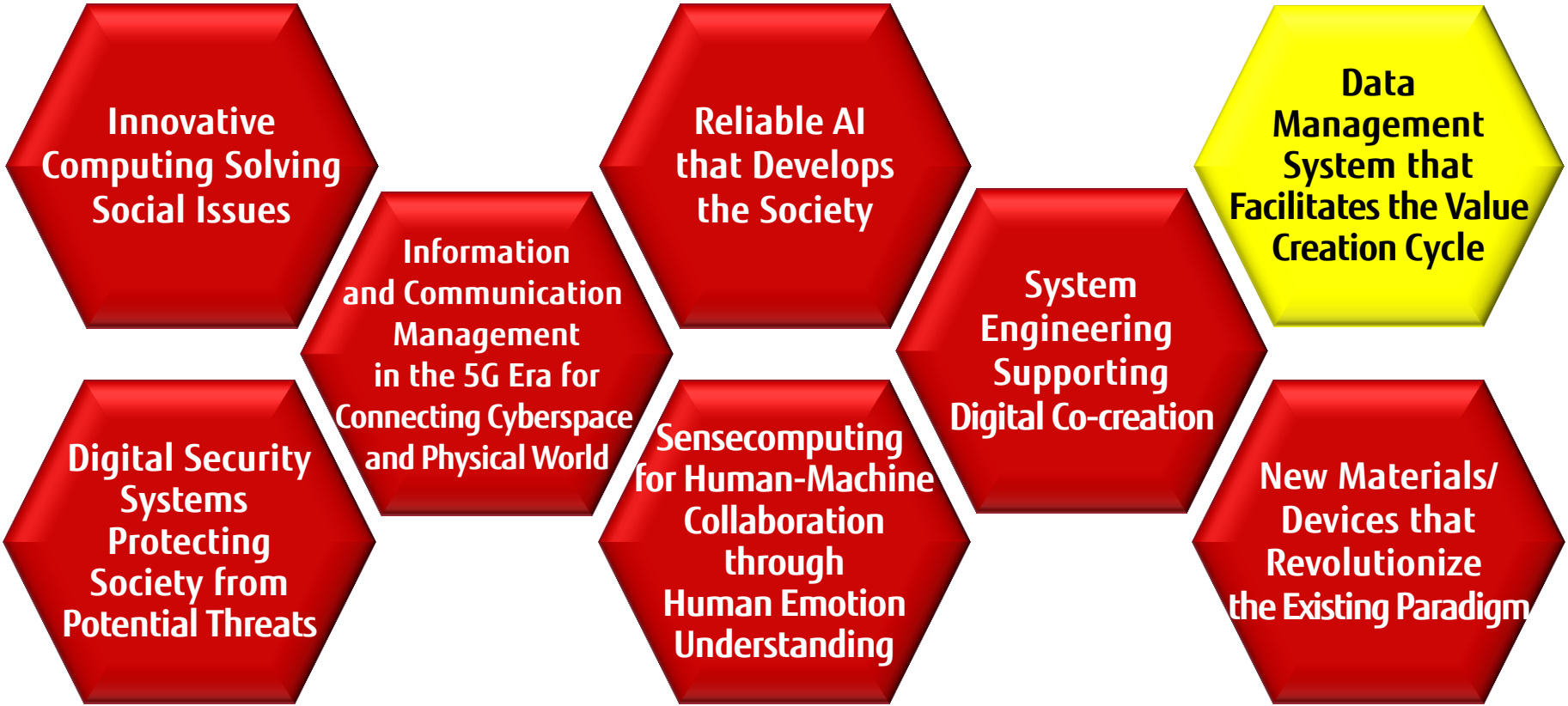
**System  
Engineering  
Supporting  
Digital Co-creation**

**Digital Security  
Systems  
Protecting  
Society from  
Potential Threats**

**Sensecomputing  
for Human-Machine  
Collaboration  
through  
Human Emotion  
Understanding**

**New Materials/  
Devices that  
Revolutionize  
the Existing Paradigm**

# New Press Release



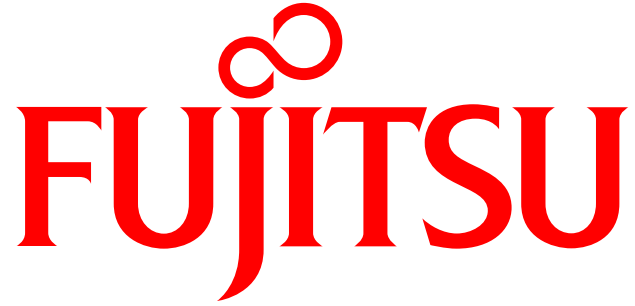


The background of the slide is a grayscale photograph of a large, modern, multi-story office building with a curved facade and many windows. The building is surrounded by a landscaped area with trees and a circular driveway. In the foreground, there is a body of water, possibly a pond or a lake, which reflects the building and the sky.

# 信頼と創造の富士通

## Reliability and Creativity

**In the Digital Era**  
**信頼と創造の富士通**  
**Trust and Co-creation**

The logo features a red infinity symbol positioned above the word "FUJITSU". The word "FUJITSU" is rendered in a bold, red, serif typeface. The letter 'J' is notably stylized with a long, sweeping tail that extends downwards and to the left.

**FUJITSU**

shaping tomorrow with you