FY2019 R&D Strategy Briefing

October 25, 2019

FUJITSU's R&D Strategy
FUJITSU's R&D Strategy

Hidenori Furuta
Corporate Executive Officer
SEVP, Technology Solutions Business, Japan Sales, CTO and CIO
SEVP, Head of Technology Solutions Business
Fujitsu Laboratories Limited, Director Chairman
Create a “DX company” business model that has a virtuous circle impact on the environment, society and business.

From an IT company to a DX* company.

* Digital Transformation (DX): Utilizing digital technologies and data to deliver innovative services and transform business processes.
Technology-based DX Company

Deliver value based on customer issues and DX technology

- Deliver value to customers and society.
Technologies Supporting DX

- Concentrating resources in 7 key technology fields

**Computing**
- Digital Annealer, High Performance Computing

**AI**
- Explainable AI, Wide Learning

**5G**
- Local 5G, Distributed ICT

**IoT**
- Dracena, Edge computing, Real-time digital twin

**Virtual World**
- (digital space)

**Value**

**Collection**

**Real World**
- (physical space)

**Cyber Security**
- Security by design, Multi-factor biometric authentication

**Cloud**
- Hybrid cloud and Multi-cloud

**Data**
- Virtuora DX, Data Lake, Chain Data Lineage

Technologies Supporting DX

◼ Concentrating resources in 7 key technology fields

Copyright 2019 FUJITSU LIMITED
Computing technology to solve unsolved complex social issues with optimal resources

Computational Demand and Supply

Moore's Law (miniaturization) stagnation,
Despite exponentially increasing AI Computations*

FY2012→FY2018

300,000x

Increasing exponentially with a 3.5 month-doubling time

Content-Aware Computing

Computational acceleration technology that maximizes computer performance

Supercomputer “Fugaku”
World's most advanced supercomputer
Effective performance of applications is 100 times comparison of K-computer

100 times faster by all coupling between 8192 bits

Digital Annealer
Quantum-Inspired Computing, Dedicated architecture to combinatorial optimization problem

Source: https://openai.com/blog/ai-and-compute/
Growing AI that is Explainable, Transparent, Accurate and High-Quality, trusted by society

Accountability for AI
Would trust a decision made by AI if the AI shows substantial reasons for reaching that decision

63%

The Ethical Imperative
Trust the decision of AI

9% Court decision
13% Medical diagnosis
22% Judging or refereeing decision in sport

Fujitsu Group AI Commitment (March 2019)
Fujitsu Group External Advisory Committee on AI Ethics (September 2019)

・「Design the Trusted Future by Data x AI」
  ・Deep Tensor × Knowledge Graph: Explainable-AI
  ・Wide Learning
    : AI to deliver optimized action plans for various industries

・High Durability Learning: Improving the trust of AI operations

AI accuracy
90% Start of operations (During Learning)
89% Accuracy degradation 70% Relearning (Cost increase)

Source: Fujitsu Technology and Service Vision 2019

Copyright 2019 FUJITSU LIMITED
Highly Trusted Data Management as a digital native in a Data-Driven Society

Data Free Flow with Trust **
(January 2019, Davos meeting)

Trustworthiness of Information*
Are concerned that data they use may have been falsified

Privacy
Worried organizations exploit personal data without permission

Data distribution and utilization platform

- **Chain Data Lineage**
  Trace the history of data between industries

- **Identity Hub “IDYX”**
  Controls the distribution of own ID information by the user

- **Virtuora DX**
  Safe and secure data distribution

Data history management technology

Exchange and update of personal information

Data history management technology

Freshness / Trustworthiness of personal data

Source*: Fujitsu Technology and Service Vision 2019
Accelerating DX with Managed Service AutomIZATION and Cloud Native Development

Cloud Market

Worldwide Public Cloud Service Revenue Forecast in 2020 (Gartner forecasts)

2,400 B$

Cloud-based IT spending by 2020 (IDC forecasts)

60 ~70%

Micro service / Containerization becomes a main current.

FUJITSU Cloud Service

- Multi-cloud ready for customer’s needs
- First acquisition of Azure Expert MSP in Japan
- AWS: 4000 certified personnel
- vmware for OSS
- Container application development and infrastructure utilization managed services
- Linux Foundation, Red Hat

Trusted Microservice Architecture

- Automated discovery of optimal parameters for frequent microservice changes
- Maintain overall service and system quality

Source: FUJITSU JOURNAL March 25, 2019
Networking that unconsciously connects diverse data and applications; and provides value to each and every individual.

Mobile communication

- **Local 5G, Private LTE (NEW)**
  - 5G Base Station comprising of Central unit and Radio unit
  - Strategic partnership with Ericsson
  - Virtual Software Base Station

- **Distributed ICT**
  - Network virtualization, Network slicing
  - Multi-Access Edge Computing (MEC)

- **Virtual place for 5G value**
  - Showcase for 5G actually feeling and virtual
  - Collaboration with 5G partner (collaboration lab)

---

Source: 2018 WHITE PAPER, information and Communications, Ministry of Internal Affairs and Communications, Japan
IoT

- Real-time Digital Twin handling large data applications and enhancing user and customer experience

Global data volume

- FY2025: 175 ZB
- FY2020: 80 B

Connected device quantity

Source: FROST&SULLIVAN DIGITAL TRANSFORMATION
Cyber Security

Protecting the entire security lifecycle against a variety of risks arising from technological innovation

Failures of Security
The cost of global cybercrime is expected to reach 3 trillion by 2020.

Are concerned about the risk of leakage of customer data and confidential information

Measures against cyber attacks
Providing solutions based on practical knowledge in cloud CSIRT activities

Global Managed Security Solutions
Visualizing the current state of the system and continuously operating advanced security services

Encryption of Biometric Authentication
Achieving secure and safety hands free cashless payment at real stores using the cloud environment

Source: Fujitsu Technology and Service Vision 2019
Global Technology Management

Fujitsu Group – CTO’s Mission

- Create a Global Technology Vision
- Technology Strategy & Investment based on Business Strategy
- Unified Delivery of Technology-related Internal Messaging
- Strengthening Global Research Functions
- Appoint and Oversee Fujitsu Group CTOs
Contribution to Global Business

- Technology development relevant to global services

- Service Management, Integration & Service Desks
- Workplace Services
- Hybrid Infrastructure, Network and SOC Services
- Intelligent Enterprise & ERP
- Application Services
- Business Process Outsourcing
- Digital R&D & Business Innovation
- Industry Specialists

Global Hubs

- Americas
  - Costa Rica
    - San Jose
- CEE
  - Poland
    - Lodz and Katowice
- NWE
- Oceania
  - Malaysia
    - Kuala Lumpur
- Asia
  - India
    - Pune, Noida, Hyderabad, Chennai and Bangalore
  - Philippines
    - Manila and Cebu
- Japan

GDC: WW 8 locations
Global Delivery Center

Industry knowledge
Technology know-how

Copyright 2019 FUJITSU LIMITED
Concentrate management resources on technologies that support DX

- Speedy technology development

Management Direction

- Further enhance our existing strength in IT field, and accelerate the growth in DX field
- Strengthen technology, create business opportunities and promote new business.

“Selection and Concentration” of R&D Expenses

- Talent/resource shift to key technology fields.
- Strong technology for profitable growth.

Concentrate resources in 7 key technology fields