Digital Platform Strategy

Hiroshi Kodama, Executive Vice President
Great reset

**Personal Changes**
Change to a new life style for safety and security

- Digital connection which transcends physical boundaries
- Increase in digital consumption
- 49% increase in internet traffic
- More than 300 million participants in online conferences

**Societal Changes**
Change to a society with more focus on sustainability

- Digital shift in various settings
  - Lifestyle
  - Business style
  - Workstyle

**5 themes aimed at achieving DX for change**
- Remote
- Online
- Touchless
- Automation
- Transparency/Trust

World Values

- Life: Different personalities all living together
- Society: Integrating social changes and technology
- Security: Safety and security supported by transparency
- Politics: International cooperation and competition for leadership
- Earth: Environment and resource strategies

Change to a new life style for safety and security

Societal Changes

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Digital shift in various settings

- Lifestyle
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5 themes aimed at achieving DX for change

- Remote
- Online
- Touchless
- Automation
- Transparency/Trust
We're developing a digital platform by connecting data of all kinds in order to build a data-driven super-city with a safe, secure, fair and efficient society.

**Provided Value**

- **Smart City**
- **Digital ID**

**Expand Economic Sectors**
- Link up economic sectors (My Number, MaaS, etc.)
- Establish business in each economic sector

**Expand Technology & Services**
- Social Evolution by Digital
- Achieving overall societal safety, security, fairness and efficiency (Use and application of data and Digital ethics)
- Service business
- Technological strengths

**City OS** connecting people, goods, enterprises and towns
- (Improve productivity, reform of working style, Well-Being)

**Expand operation areas by collaborating with industry partners**

**Biometrics Identification**
- By collaborating with technological partners

**Provide Value**

- Data-driven super-city

**Market Expansion**

**5G, Cloud, AI, Blockchain, Digital ID**
Key Strengths of Our Digital Platform

Smart City (City OS: FIWARE)
- Implementation in Japan: 11 cities
- FIWARE Foundation platinum member
- Data connection and utilization platform

Digital ID / AI
- World's No. 1※1 in face/ fingerprint/iris recognition
- Implemented over 1,000 systems worldwide
- Advanced Analytics PF

Network / Edge
- Smart Connectivity
- Public Safety
- Decentralized control/ Edge AI

Cloud
- Managed services (Leading position※2)
- Multi-Cloud (Top Class Industry Player in Japan)
- Hybrid (Enterprise - Public - Government)

Security

※1: Won the 1st Place five times in the USA National Institute of Standards and Technology contest (Face recognition)
※2: IDC MarketScape: Japan Managed Cloud Services 2018 / Vendor Assessment Source IDC Japan February 2019
NEC leads board, technological development/operation, standardization, market application, globalization

Registered as a platinum member of the FIWARE Foundation in February 2017 for the first time among Japanese companies

Expand and Spread Worldwide

FIWARE Participant※1

- 993 enterprises
- 18 business hubs (iHub)
- 2 accelerator programs
- 10 FIWARE Lab nodes
  (Europe, Africa, India, Mexico, Brazil)
- 350+ FIWARE Foundation members※2
- 30 countries, 140 cities※3

Cases of Japan’s Smart City Initiative

NEC Digital Platform Strategies

Consultations predicting a future where society has a vastly different New Normal

③ Enhancing the DX Strategy
Upstream Approach/Structure

Linking technology from value provided to customers / Achieve DX with a sense of speed

② Establishment of DX offerings

One platform linking the world / Laboratory technology

① NEC Digital Platform

Formulation of Digital Transformation strategy

Innovation Creativity

Customer Contact Reform

Business Reform

Human Resources & Platform

One stop from upstream to offerings
Process to Deliver Value and Organizational Functions

- **Delivery**
  - NEC Safer Cities
  - Provide value to customers
    - Cooperation with existing systems
  - NEC Value Chain Innovation

- **Value creation Value chain**
  - (Ecosystem economy zone)
  - Digital Hub: Digital Capability
    - Business framework, System framework

- **Enable use of technologies**
  - Products, Services
    - Common platform
    - API
    - Engine
  - Engineering
  - Cloud
  - Security

- **Technologies**
  - Research into underlying technologies

- **Offering**
  - Consulting, Offering
    - Design thinking method, Co-creation program

- **DX Offering**
  - Digital Platform
    - H/W (System Platform BU)

- **From 2019 IR Day**
  - Labor-saving
    - • Labor saving in order placement
    - • Enhance store loyalty
  - Demand forecast
  - • Enhance store loyalty
  - • Automatic order placement
  - • Demand forecast
  - • Payment, Hospitality, etc.
  - Heterogeneous mixture learning technology
  - Face recognition technology
**Targets of Digital Strategy and Initiatives for the Next Mid-Term Plan**

### Digital Shift (Previous IR DAY)

<table>
<thead>
<tr>
<th>Ratio of Digital Projects*</th>
<th>Strategic Targets (2018→2020)</th>
<th>Level of achievement (As of August 2020)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12%</td>
<td>27%</td>
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</table>

<table>
<thead>
<tr>
<th>Digital Track Records (AI, biometric recognition)</th>
<th>Strategic Targets (2018→2020)</th>
<th>Level of achievement (As of August 2020)</th>
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<tbody>
<tr>
<td>Accumulative 3,000</td>
<td></td>
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<tr>
<td>Accumulative 1,700</td>
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<table>
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<tr>
<th>Digital Human Resources</th>
<th>Strategic Targets (2018→2020)</th>
<th>Level of achievement (As of August 2020)</th>
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<tr>
<td>3,000</td>
<td></td>
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<tr>
<td>1,600</td>
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</tbody>
</table>

### Change Lever

#### Adapting to Under COVID-19 and the New Normal
- Ensuring safety aimed at the resumption of business (infection control initiatives)
- Work style & business style transformation
- Process reform assuming remote work
- Ensuring information transparency and reliability

### Digital Frontier

#### Next Mid-term Management Plan

#### DX growth strategy

*: Classified domestic SI and service businesses into SoE/Bimodal/SoR by applying IDC’s definition of the 3rd platform. Of them, SoE/Bimodal projects are regarded as digital projects.
Overall Initiatives

• Domestic IT services: Aim for No. 1 operating margin (FY2025)

Platform Model

- High added value
- Expanded efficiency

Digital platform

- One Architecture
  - Digital ID
  - Connectivity
  - Security
- Strengths (R&D)
  - Smart City
  - Data connectivity and utilization platform
  - AI optimization
- Edge AI
- Ecosystem
  - Business model
  - Alliances
  - Players (position)

SW engineering and mobilization

- Integrated management platform (SW factory)
- Remote projects
- Automation
- Modernization

Cloud business

- SaaS/PaaS Portfolio
- Secure managed cloud
- Multi-cloud connectivity x
  - Edge DC (local 5G)

* Currently under consideration. Information will be disclosed once decided.

* IT services: SBU involved in SI and services
① – 1. NEC Digital Platform

- Enhance worldwide support, data function, network connectivity etc.
- Line-up of solutions responding to hybrid IT and edge computing
Offer an optimal cloud environment to support our customers’ digital shifts with mega-cloud connections and closed multi-cloud connections of our data centers.

**Strategy Point**

- Digital and domain pillars
- Complement for expanding strengths
- Collaborative interface

**SaaS/PaaS Portfolio**
- Government (ISMAP)
- Public IaaS
- Managed services

**Secure Managed Cloud**
- Government (ISMAP)
- Public IaaS
- Managed services

**Multi Cloud Connectivity**
- Edge DC (Local 5G)
- Direct connect
- DC collaboration
Support NEC’s digital platform through smart orchestration under hybrid IT environment, embedding progressive technologies and digitalization of maintenance services

- **Smart Orchestration (Hybrid IT+ Edge)**
  - Enabling integrated operation and management under more expanded and complicated hybrid IT environments by combining cloud-on-premises-edges

- **Decentralization/Upgrading of data analysis utilization through DX (Edge AI/Vector/Quantum)**
  - Offering edge devices with AI engine embedded such as video and biometric recognition
  - Applying combination optimization by simulated annealing machines (vector technology) and developing to quantum computers (quantum devices)

- **Digitalization of Maintenance Services**
  - Increased speed and efficiency through AI utilization in detecting handicap levels and operator assignments
  - Expand maintenance range through Digitalization of maintenance services

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**Hybrid IT Platform**

- PC Server
- Mainframe
- Storage
- WebSAM Middleware
- WebCTX Middleware
- Facial recognition system
- POS
- ATM

**Advanced Data Analysis Technology**

- Quantum Computer
- SX-Aurora TSUBASA

**Maintenance Services**

- Smart glasses
[Reference] Connected Platform (Device – Edge - Cloud)

Device (NEC AI Accelerator) - Intelligent edge - Cloud

Implement the high-speed, labor-saving, and high security with one architecture

<Usage example: Video facial recognition>

Cloud
- Managed Cloud
  - Video
    - Increased bandwidth
  - Dashboard
    - Managed service
    - Secure storage

Edge
- Intelligent processing
  - Features
    - Face recognition
    - Security Apps
  - Feature quantity
    - Reduced load
  - Reduced bandwidth

Device
- NEC AI Accelerator
  - Built-in
  - Reduced load
  - Reduced bandwidth
  - Feature quantity
### DX Offering Structure (Sample)

- **Plan to expand further**

<table>
<thead>
<tr>
<th>Purpose of DX</th>
<th>Value provided by DX (Customer issues)</th>
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<tbody>
<tr>
<td>Overall Strategy</td>
<td>Formulation of DX strategy</td>
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<tr>
<td><strong>Innovation Creation</strong></td>
<td>Creation of new markets and business opportunities</td>
</tr>
<tr>
<td><strong>Customer contact reform</strong></td>
<td>Transformation of customer experience</td>
</tr>
<tr>
<td><strong>Business reform</strong></td>
<td>Reforming the supply chain, Automation of operations, Work style reform/new work styles, Creation of digital trust</td>
</tr>
<tr>
<td><strong>Common</strong></td>
<td>DX human resources development, Strengthening of IT infrastructure</td>
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</tbody>
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#### DX Offering Themes (Solutions)

- **Transformati of customers' business models**
  - Future Creation Design
  - Asset utilization Consulting

- **Creation of hospitality customer experiences**
  - Creation of enhanced new customer experiences

- **Automation of operations through AI/RPA**
  - Improvement of workplace and enhancement of productivity through IoT

- **Digital workplace**
  - Safety & security

- **DX human resource development (DET)**
  - Optimization/modernization of IT systems
  - Data utilization infrastructure

- **Realization of smart factories**
  - (Process Innovation)
  - Mobility service that supports the safe and secure movement of people (Transportation services supporting the safe and comfortable movement of people (Transport))
  - Supply chain transformation through coordination among companies/Realization of a secure, safe and efficient workplace (Logistics)
  - Digital transformation of financial services (Business Process Transformation)

- **Realization of smart workplaces**
  - Touchless easy new customer experiences (Smart Hospitality)
  - Digital transformation of financial services (Business Process Transformation)

- **Realization of smart retail environment**
  - Trusted and secure retail environment

- **Realization of marketing with an understanding of customer behavior**
  - Clever shopping experience that pleases consumers (Fan Marketing)

- **Realization of marketing with an understanding of customer behavior**
  - Business assistance for working people

- **New digital links and customer experiences in financial services (Digital Customer Engagement)**
  - Enhancement of responses to address increasingly complex Risks and regulations through utilization of digital technology

### VCI Offering (Value Chain Innovation)

- **Connected Manufacturing**
- **Intelligent Logistics & Mobility**
- **Smart Retail CX**
- **Smart VenueCX**
- **Digital Finance**

※ Some of the offerings provided

※ Announced on July 7
③ Maximizing Upstream Capabilities

Strengthen upstream human resources in NEC Group

- Enhance DX lead consulting resources with upstream DX strategy approach
- Develop DX offerings with design-oriented approach and enhance business incubation
- Strategically leverage ABeam’s 6,000 professional consultants for DX businesses

Consulting ~ overall design ~ determination of area of digitalization

Technology design ~ implementation ~ operation

Strategic consultants (organizers)  Designers  Data scientists  Technologists  Engineers

Leverage ABeam’s team of 6,000 consultants
Strengths in each strategic area (Strategy, Industry, Process, Technology)

Abundant NEC Group human resources support end-to-end execution and implementation
about 20,000 SEs, about 3,000 DX professionals (expected to increase to about 5,000 by the end of FY2022)

Back officers Approx. 2,600
Approx. 23,000

Talent Development (NEC)

- Strategic Consulting
- Business Analyst
- Future Creation Design
- Data Scientist
- Data Engineer
Integrate disaster prevention data with data connectivity, supporting decision making through comprehensive situation analysis.

Support real-time situational recognition and judgement by displaying various information on the shared screen:

- Road Traffic Actual Sales
- Road Regulations
- River Water Level Screen
- Rainfall Distribution Time Series Display

Wide collaboration with neighboring local governments by sharing use of IoT platform.
Cross Sector Services ~Tourism & Transportation~
(Toyama / Takamatsu)

Realize tourism and transportation services across sectors (Toyama),
Rolling out in other areas with De facto standard (Takamatsu)

Experiment of reusability in another city – reusability of application functions
with cross sector services which are realized through a collaboration with
different IT systems including private sectors

Experiment in Toyama
Suggest recommendations and navigate to destinations etc.

Reuse application functions

Experiment in Takamatsu

Local MaaS Services

Toyama Light Rail
Cyclocity
Jorudan Transit Planner Biz
GURUNAVI Web Service

Data connection & utilization platform

Local MaaS Services

Public Transportation
Cyclocity
Jorudan Transit Planner Biz
GURUNAVI Web Service

Data connection & utilization platform
Example of Advanced Initiatives in MIC Trial Projects (Maebashi City 5G x Automated Driving Bus)

Testing remote control and road-vehicle connection necessary for implementation of automatic driving by utilizing local 5G and carrier 5G

Verifying the mechanisms required for self-driving by utilizing 5G’s features contributes to improvements of efficiency and automation of remote operators

Gunma University CRANTS Test Road

- Demonstration of specific applications
- Remote control
  - Higher speed and larger capacity
- Road-vehicle communication
  - Larger capacity and lower latency

Demonstration Test on Public Road

- Demonstration of self-driving buses with passengers from the general public on city roads (normal commercial bus service routes)
- Maebashi City
  - Demonstration test of self-driving buses in general passenger automobile carrier business
  - Confirmation and evaluation of social acceptance required for commercialization
  - Coordination with demonstration tests in other regions (Numazu)

Set 2022 Target for Implementation
Hawaii: Initiative Aiming for Restarting Tourism with Safety and Security

To establish a structure enabling to secure safe visits to Hawaii in order to restore Hawaii's tourism

Currently implementing infection control solutions at 5 Hawaian airports

- Implemented phase 1 thermal systems. All infection control solution functions are to be in-service by the end of December
- Utilizes precise body surface temperature detection solutions
  - Connecting of facial authentication and thermal camera ※Patented technology
  - Maintains precision with high volume of transactions
- Initial implementation costs are approx. USD 37.5million in total including installation costs and maintenance fees for 10 years etc.

※Patented technology

Image of body surface temperature detection
NEC HQ Internal System Demonstration: Initiative for a New Work Style

Initiated a digital office project to create the new work style in the New Normal era with DX

Walk-through facial authentication gates
Body surface temperature + face mask detection

Gateless
Facial authentication + Thermal multiple simultaneous detection

Smart Stores
(Grab & Go, no cashier)

Facial & Iris authentication (Multimodal)
※Available from March 2021

Door/Locker/Copier/Vending machines

Prevent the Three C’s - Social Distance
AI risk visualization & tracing

VR - Integrating Real-life and Online

Work Style Visibility - Health Management
(Productivity, Engagement, Well-Being)
Seven-Eleven Japan: Multimodal Biometrics Authentication

Conducted PoC for multimodal biometrics settlement system:
Labor-saving store limited to NEC Group employees under operation on the 20th floor, Mita Kokusai Building

Realized secure & touchless settlement for customer with mask kept on by combination of World’s No.1 facial and iris recognition systems

Start

Preprocessing

Facial features

Authentication completed in two seconds

Result

Facial camera automatic adjustment

Iris features

Approved

Not approved

Extract

Verify

Accepting masked face

Iris

Facial

Multimodal biometrics authentication

Eye position (Adaptable to various heights)

Focus

Brightness

Facial image

Iris image
Event management with optimal infection control and security using NEC’s facial recognition technology

Entry/Exit management and body surface temperature detection used for infection control

- Infection control optimized by staggering the arrival times of athletes, caddies, and other related persons and using body surface temperature checks
- Facial recognition used at venue staff & media entrance for uncomplicated management of name and affiliation management and even group arrivals
- Face mask compatible facial recognition allows for smoother registration operations than ever before
Summary: Our Vision and Strategy for Digital Platform

ESG Value Creation
- Solving Societal Problems (Life / Social / Security / Politics / Earth)
- Achieving Well-Being supported by industrial and technological revolutions

Customer Transformation
- Provision of End-to-end offering
- Huge improvement of efficiency and creating innovation

Societal Development

Solution to Business Agenda

Profitability Improvement in Growth Business
- Operating concept (NEC Way) embodied
- Expand platform business with NEC Group’s own DX and platform

Enhancement / Utilization of Digital Platform

Achieving Data-driven Smart-city
Orchestrating a brighter world

NEC creates the social values of safety, security, fairness and efficiency to promote a more sustainable world where everyone has the chance to reach their full potential.