

NEC Innovation Day 2023

Driving NEC's Next Growth

Research and Development of advanced technologies and creation of new businesses

December 15, 2023

Motoo Nishihara

Corporate Executive Vice President and CTO

\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.

A portrait of Motoo Nishihara, a middle-aged man with grey hair and glasses, wearing a dark suit and a blue striped shirt. He is smiling slightly and looking off-camera to the right. The background is a blurred office interior with warm lighting and modern decor.

NEC

Corporate Executive Vice President and CTO

Motoo Nishihara

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- **Strengths of NEC's R&D**
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 - ① Contribution to the IT Service Business
 - ② Contribution to the Social Infrastructure Business
- **Creation of new growth businesses**
 - ① Commercialization of the IP licensing business
 - ② Expanding Business innovation including Healthcare & Life Science



NEC's innovation creation scheme

NEC Organizational Structure (April 2023)

**Cross-Industry
Business Unit**

**DGDF
Business Unit**

**Public
Solution
Business Unit**

**Enterprise
Business Unit**

**Telecom Service
Business Unit**

**Aerospace and
National Security
Business Unit**

Digital Platform Business Unit

Global Innovation Business Unit

R&D

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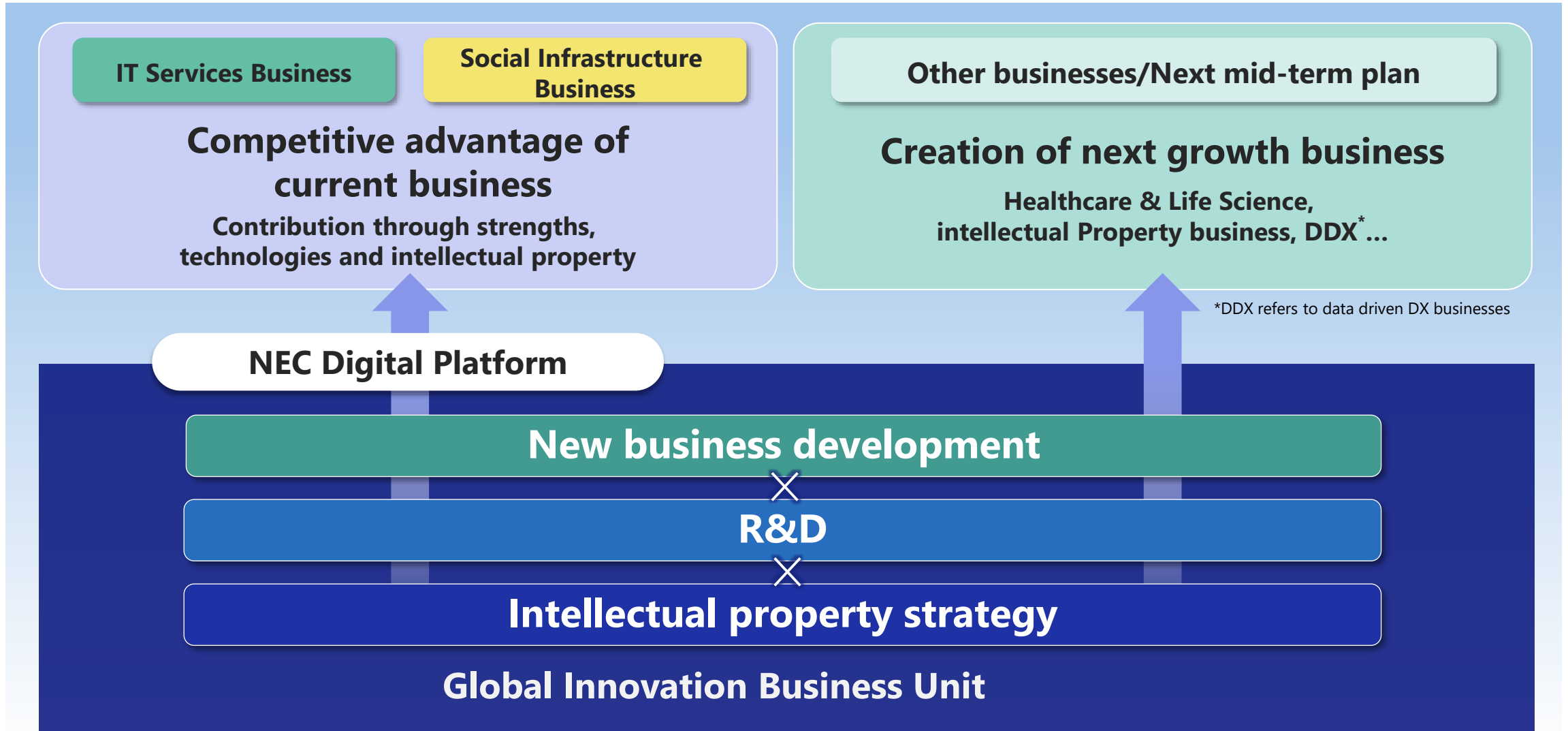
**New business
development**

×

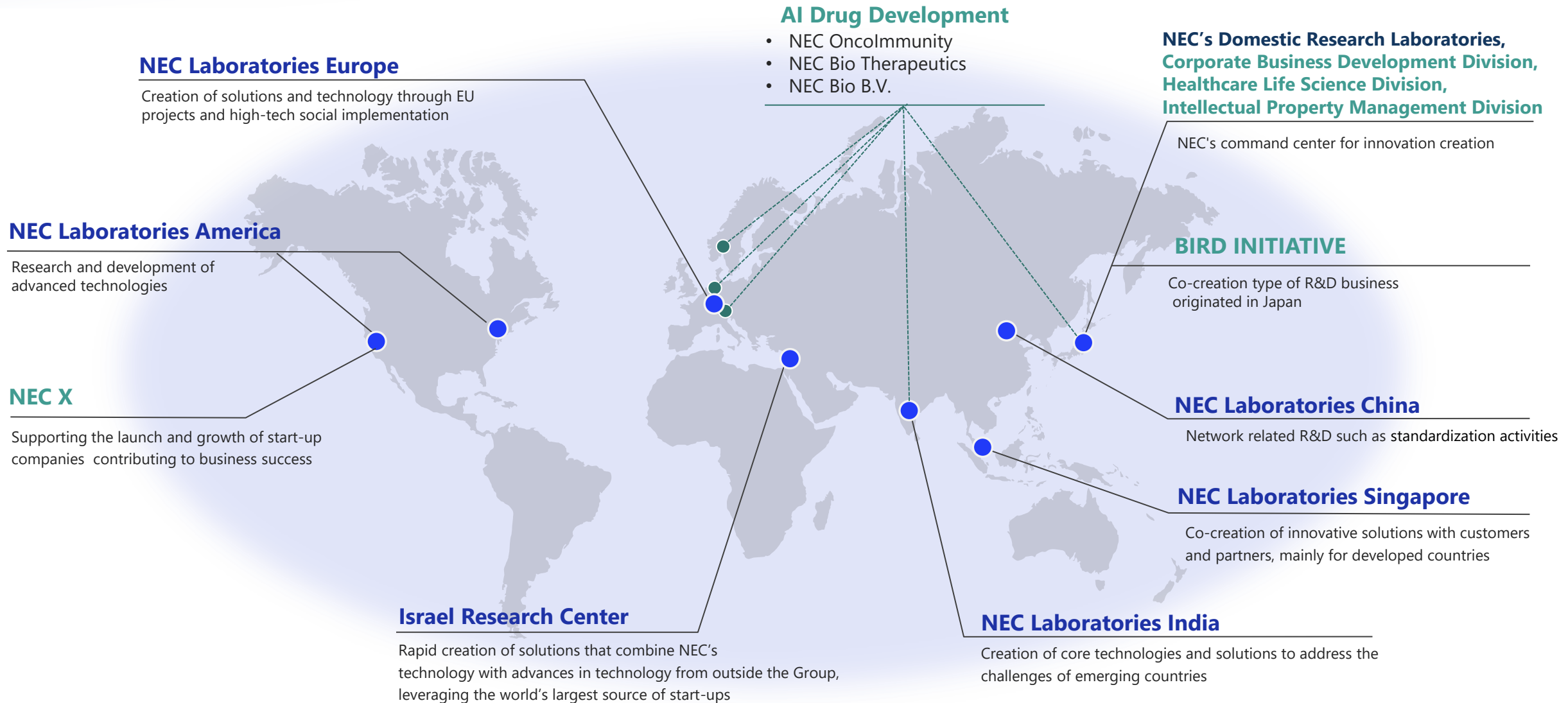
IP strategy

Corporate Staff

Driving the competitive advantage of current businesses and the creation of the next growth businesses

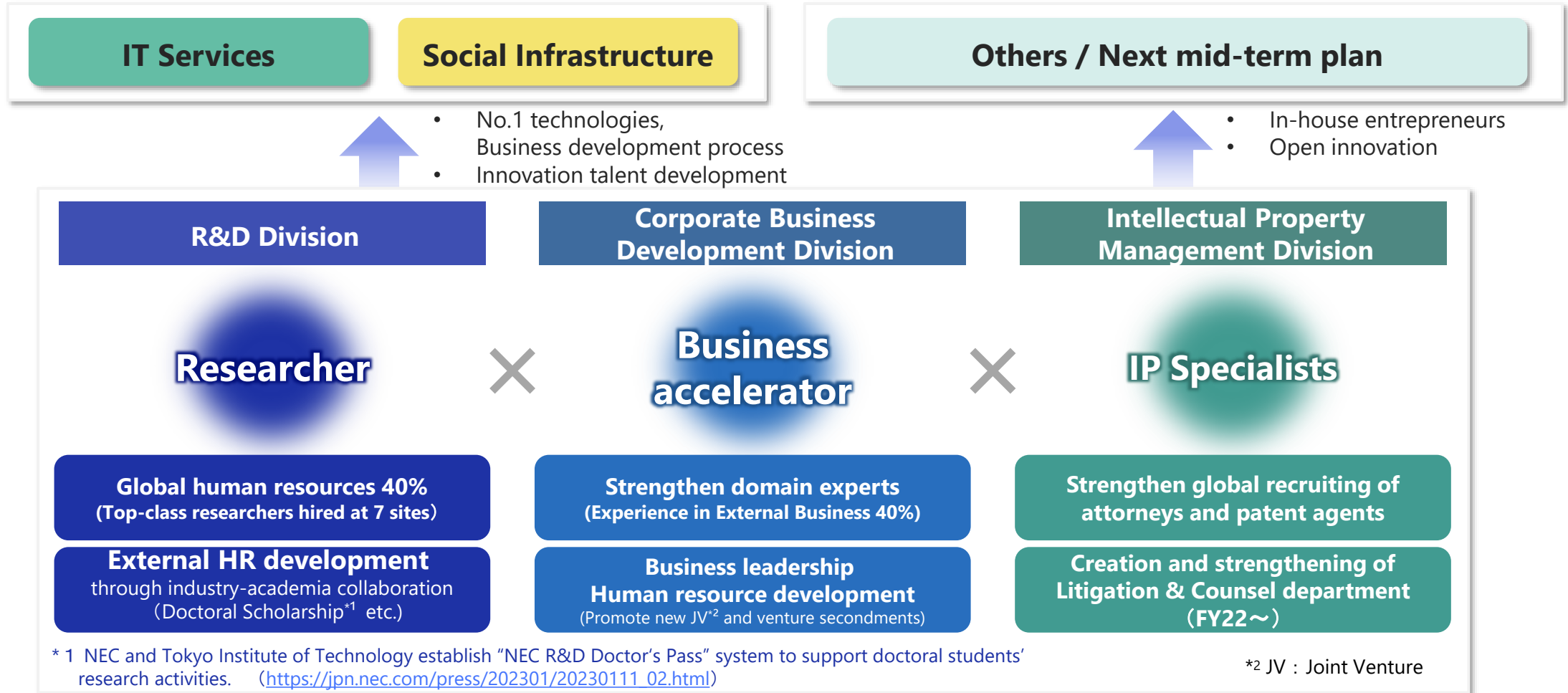


Expanding R&D and business development opportunities, utilizing our global assets



Developing specialized talent in research, business acceleration, and intellectual property for company-wide expansion

A team of 2,000 specialists committed to cultivating internal innovation talent
Drive company-wide innovation while developing No. 1 technologies and businesses





Strengths of NEC's R&D

High technological competitiveness on a global scale

Demonstrating world-class technological competitiveness in AI, security, telecommunications, and other fields at major international conferences

AI

Machine learning

The number of papers accepted by top-quality international academic conferences *1

Ranked 10th in the world

*1 Aggregation of the following major international conferences
NeurIPS、ICML、ECML-PKDD、KDD、ICDM

Video and image processing

The number of papers accepted by top-quality international academic conferences *2

Japan No.1

*2 Aggregation of the following major international conferences
CVPR、ICCV、ECCV、ACCV、ICPR

Security

Cyber Security

Yamashita Memorial Research Award, CSS2021, etc. *3

Received numerous awards

*3 Security: ACM CCS, Eurocrypt, IEEE S&P, etc.

Communication*4

Optical Communication

Acceptance of papers in top academic conferences*4

46 consecutive year

*4 Communication: OFC/ECOC, etc.

Machine learning: 2000-2022: Our research
Ranking of paper accepted at leading academic conferences (company-based)

Rank	Company name	#of papers
1	Google	1363
2	Microsoft	1342
3	IBM	982
4	DeepMind	450
5	Meta Platforms	428
6	Yahoo	347
7	Alibaba	292
8	Amazon	274
9	Tencent	216
10	NEC	215

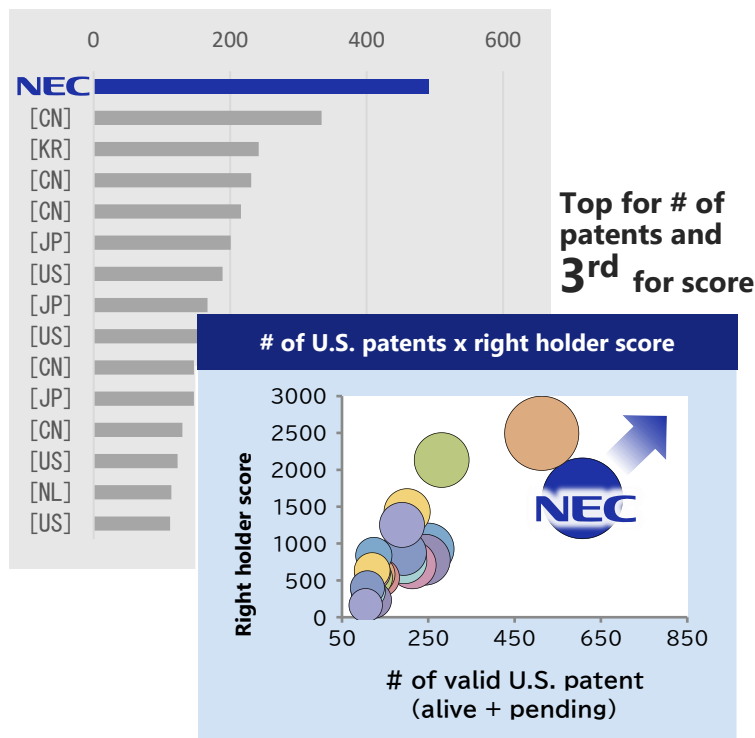
Global No.1 in the three major areas of Biometric authentication, Video recognition, Analysis/Prescription AI

NEC's core technologies across various business sectors: biometric authentication, video recognition, and analysis/prescription AI

Aiming to be the global No.1 patent portfolio in each area by 2025

Biometric authentication

of accumulative international patent applications



World No.1 biometric authentication technologies

Sustaining world-class expertise in biometrics: face, iris, and fingerprint
Ranked No. 1 in the world in benchmark tests conducted by NIST*1

Face recognition

World No. 1



FRVT (2019)

FIVE	(2017)
FRVT	(2013)
MBE	(2010)
MBGC	(2009)

No.1 in FRVT Ongoing 2021/8*2 and 2022/1*3

Iris recognition

World No. 1



IREX 10 (2022*4)

IREX 10	(2021)
IREX IX	(2018)
(Iris Exchange IX)	

Fingerprint recognition

World No. 1



MINEX	(2016,2006)
PFT/PFT II	(2013,2009)
FpVTE	(2012,2003)
SlapSeg	(2004)
ELFT	(2007)

*1 National Institute of Standards and Technology. The results of the NIST evaluation do not constitute an endorsement by the U.S. government of any particular product, service, or company.

*2 Ranked No. 1 by NIST for FRVT Ongoing 1: N Identification (Aug. 2021) Identification (T>0) under the category Gallery: Mugshot; Probe: Mugshot; N=12,000,000 as well as the category Gallery: Border; Probe: Border $\Delta T \geq 10$ years; N=16,000,000

*3 Ranked No. 1 by NIST for FRVT Ongoing 1: N Identification (Jan. 2022) Identification (T>0) under the category Gallery: Mugshot; Probe: Mugshot; N=12,000,000, as well as the category Gallery: Border; Probe: Border $\Delta T \geq 12$ years; N=3,000,000 and the category Gallery: Mugshot; Probe: Mugshot; N=12,000,000

*4 Ranked No. 1 by IREX 10: Identification Track (Sep. 2022) under the category Two-eye Accuracy, as well as the category Single-eye Accuracy and the category Rank Accuracy.

Ongoing investment in research AI supercomputer facilities to support various AI research and developments

AI supercomputer equipped with the largest GPU among Japanese companies is fully operational in March 2023
Achieved speedy R&D of generative AIs such as NEC LLM and timely business transfer and market launch

Building and operating an AI supercomputer requires ensuring reliability, middleware for high training performance, and operation software. NEC researchers spent about two years building the AI supercomputer.

Scale of AI supercomputer

Number
of GPUs

928 units

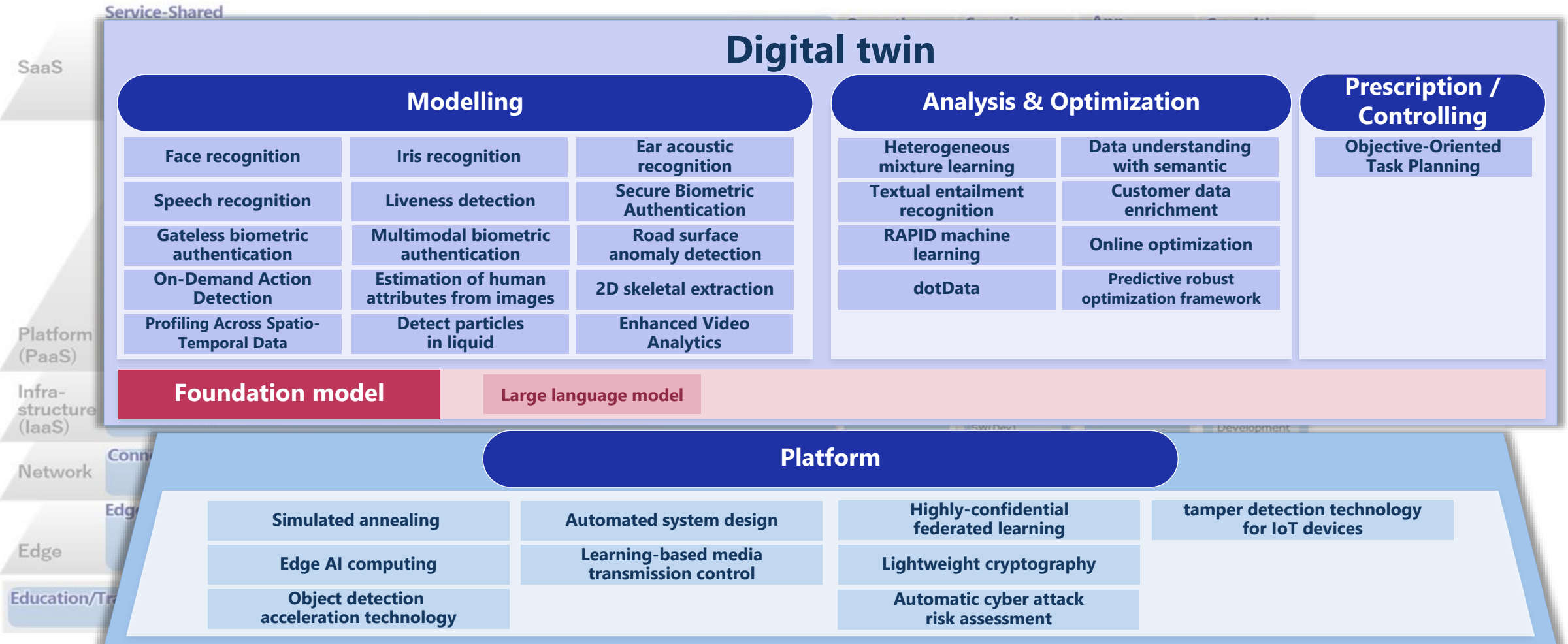
Computing
power

580 PFLOPS



Advanced technologies supporting the NEC Digital Platform (NDP)

Integrating NEC's global No. 1 technology into the NDP for broad business applications
In FY2023, plans are underway to add approximately 20 new R&D technologies



Contribution to current businesses through global No.1 technologies

1

**Contribution to the
IT Service Business**

2

**Contribution to the
Social Infrastructure Business**

NEC's businesses

IT Services							Social Infrastructure		Future growth businesses			
Central and local government	Education	Smart Cities	Finance	Manufacturing	Retail	Transport & Logistics	Aviation Space Defense	Tele-communication	Healthcare & Life Science	Carbon-neutral	Automation	Metaverse



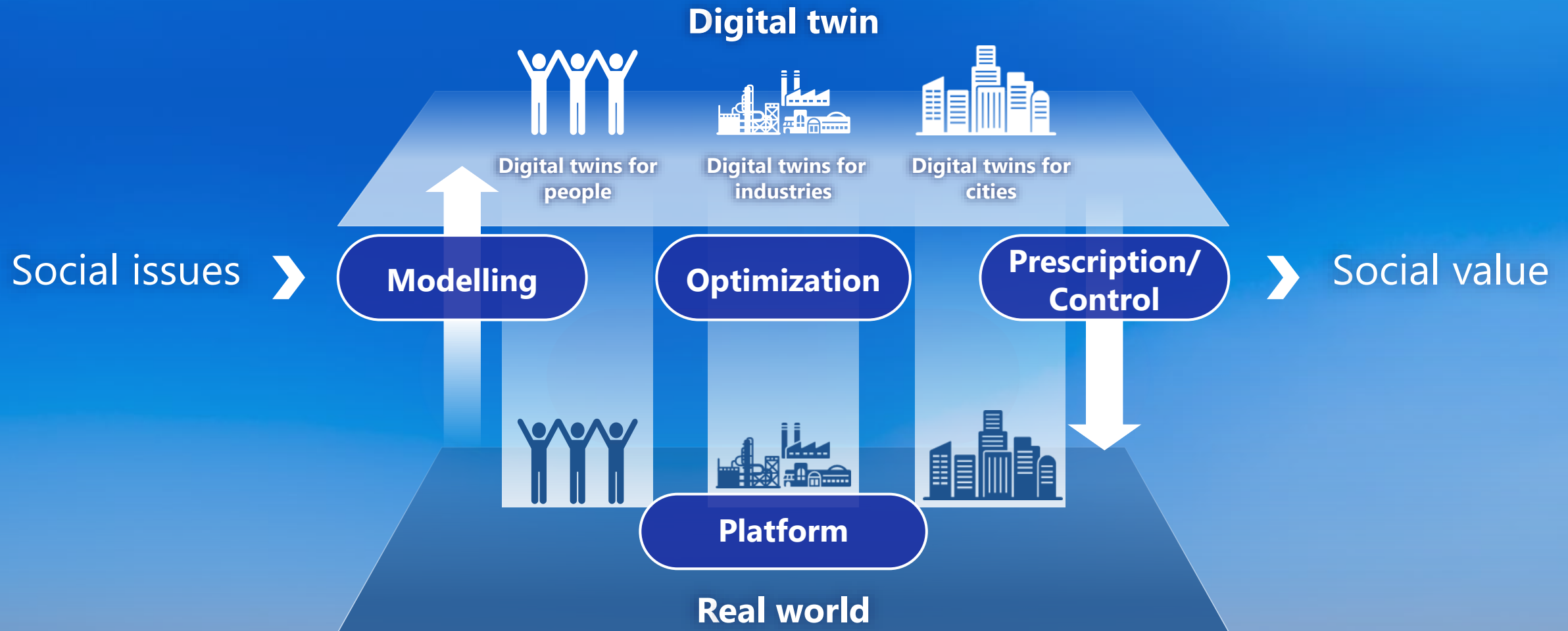
Contribution to current businesses through global No.1 technologies

- ① Contribution to the IT Service Business
- ② Contribution to the Social Infrastructure Business



Generative AI

Every industry is advancing towards smart transformation through DX and digital twins



First Generation AI

Reasoning as Search

Second Generation AI

Symbols and logic

Third Generation AI

Machine learning

A New Generation of AI

Foundation model
(including large-scale language models)

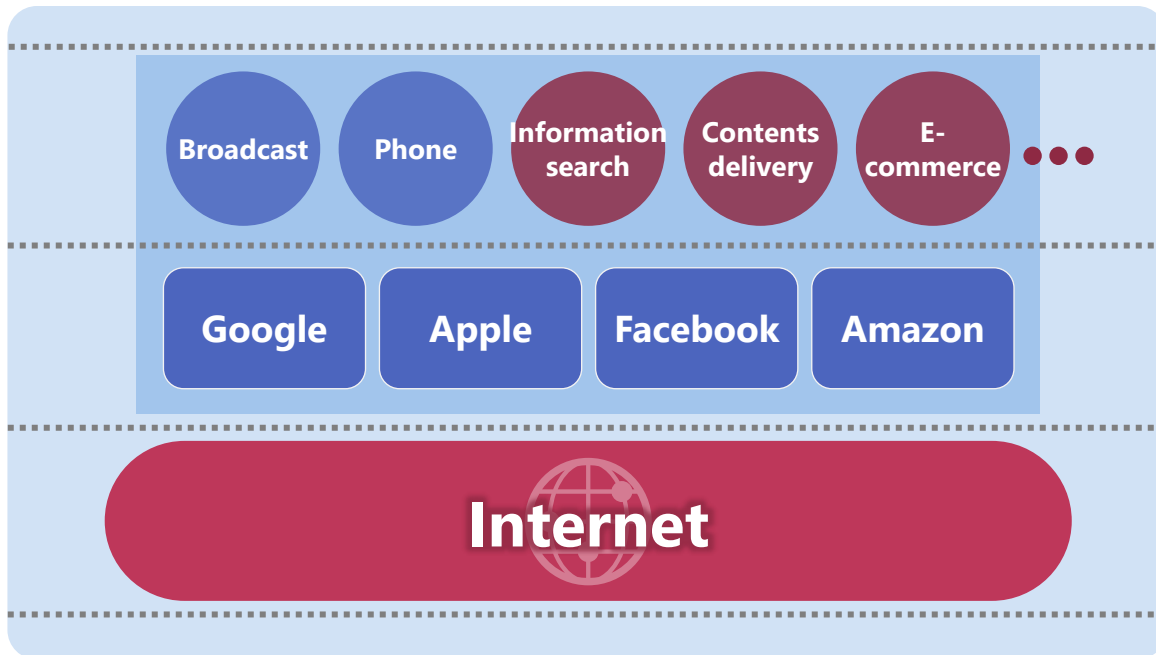
**AI is now entering the
era of foundation models**

Like the Internet, AI foundation models are revolutionizing society

Enabling easy AI development for everyone

Emergence of the Internet

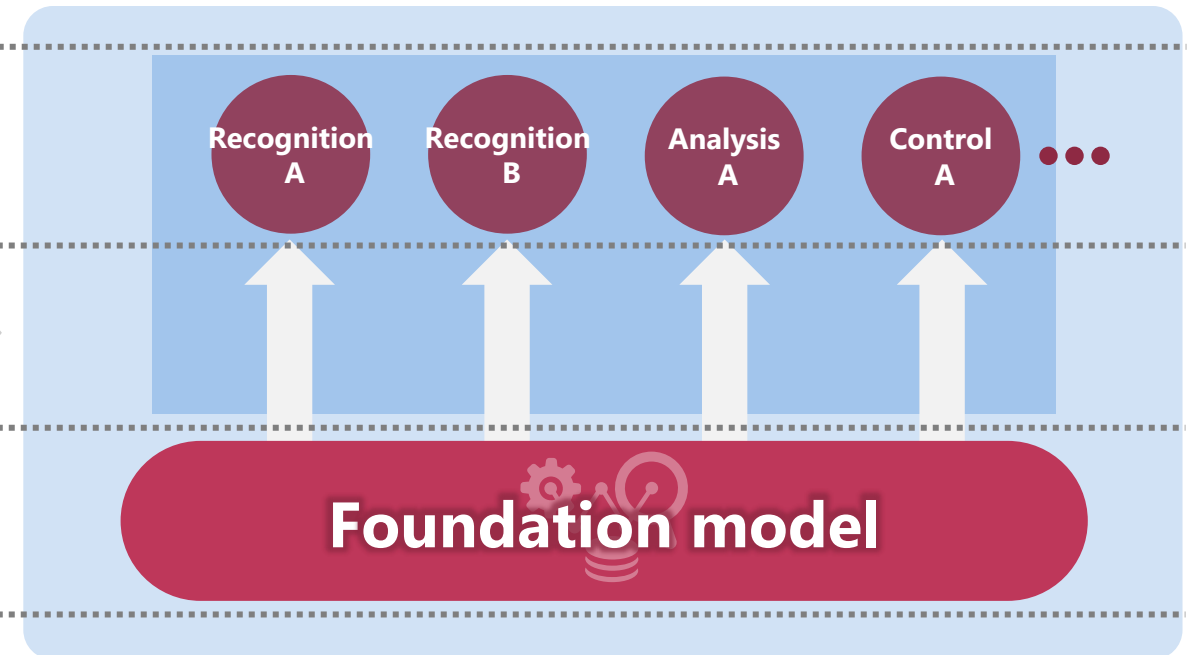
Diverse services created on the Internet



Low cost of creating new services

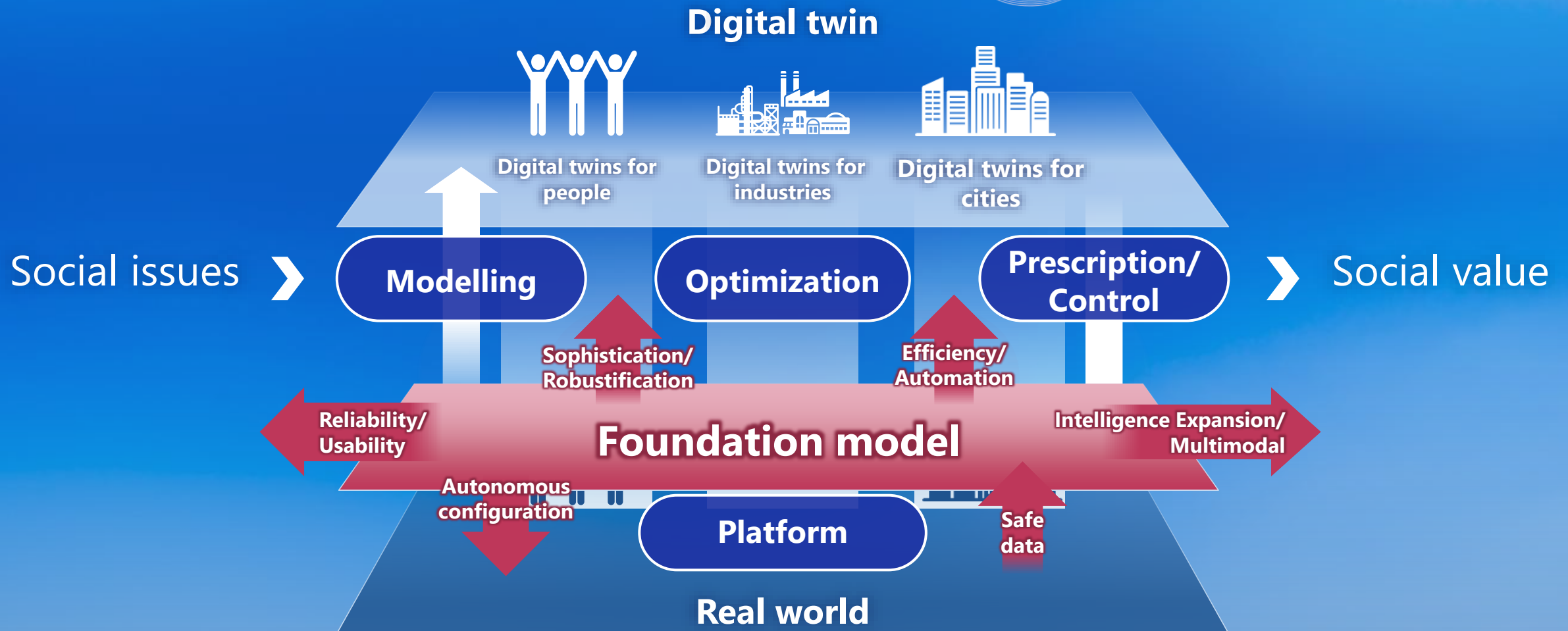
Emergence of the Foundation Model

Easily create diverse AI



Easily built from foundation models

All industries are getting smarter by collaborating with DX / digital twins



The foundation model greatly contributes to the advancement, automation, and scaling of DX/digital twin systems.

Advancement of DX through AI orchestration

Accelerating Business Creation by Integrating NEC's Strengths in Multimodal AI, Security, and Network Technologies

Proprietary Foundation Model

New architecture enables building purpose-specific AI models by flexibly scaling LLM and integrating with various specialized AIs.

Multimodal AI

Processing a variety of real-world events by combining global No. 1 image/audio and sensing technologies with LLM.

Safety and Security in the LLM Era

Addresses hallucinations, ethics, learning source validity, personal information leaks, etc., in addition to advanced cybersecurity to ensure safety and security in the LLM era.

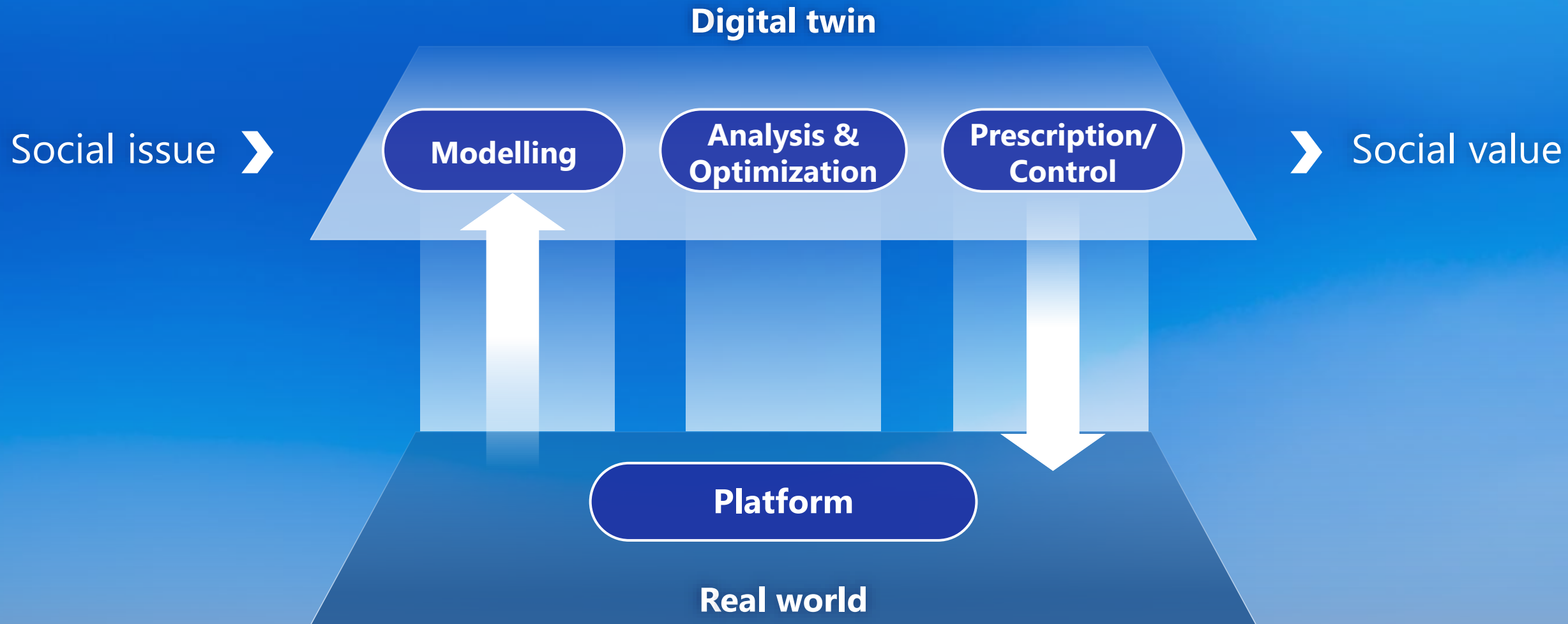
Automation of system construction and operation

Automates system construction and operation management in addition to streamlining software development and reducing power consumption.

Orchestration function

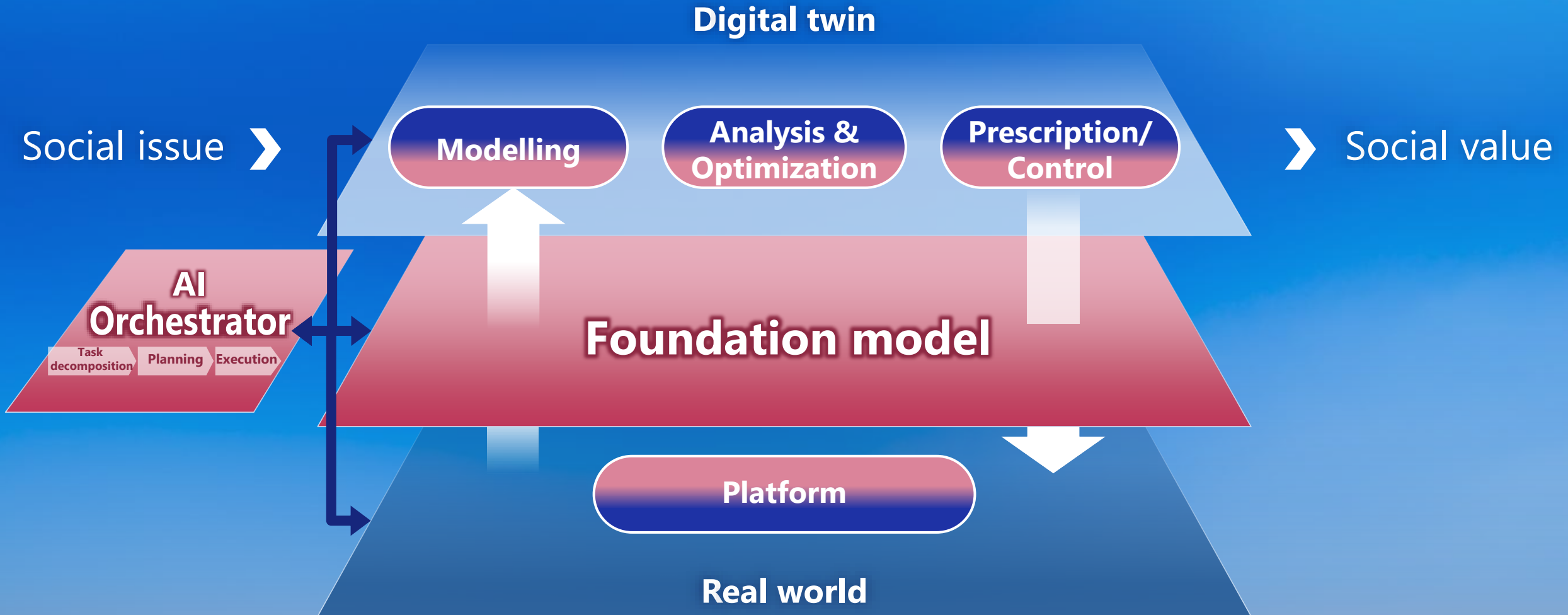
Automates diverse real-world operations by breaking down business processes into tasks, autonomously deploying and linking AI models, and controlling security and networks.

Every industry is advancing towards smart transformation through DX and digital twins



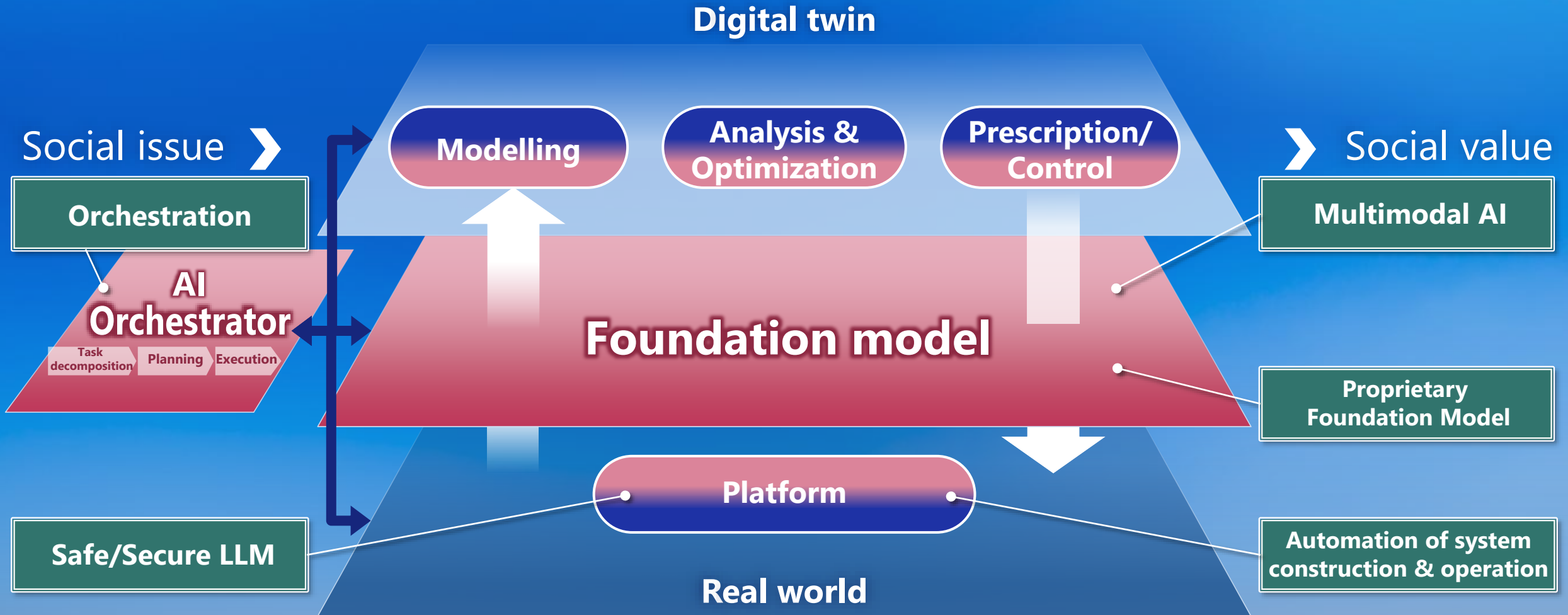
AI Orchestration

Building verse businesses with advanced AI-driven system automation

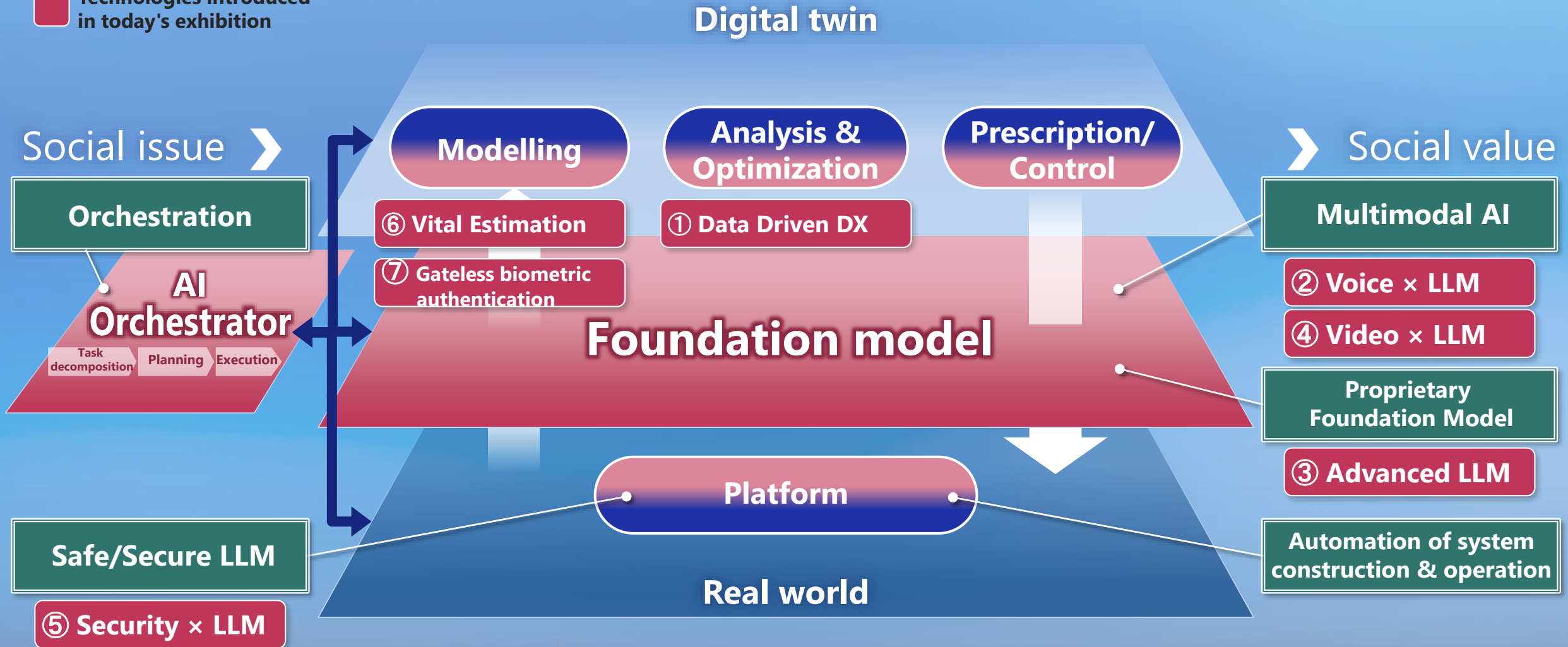


AI Orchestration

Building verse businesses with advanced AI-driven system automation



Technologies introduced
in today's exhibition



```
graph TD; A[Proprietary Foundation model] --> B[Safe and secure LLM]; A --> C[Multimodal AI]; B --> D[Automated construction & operation]; C --> D;
```

Proprietary Foundation model	Multimodal AI
Safe and secure LLM	Automated construction & operation

Sophisticated large language models(LLMs)

To be commercialized

- **Enhanced 13B LLM: Building large and high-quality training data ensures lightweight models with world-class Japanese language proficiency**
- **Support for long prompts : Long-text processing capable of processing "entire books" (up to 150x longer prompt)**

World-class Japanese language processing

**Up to 150 times longer prompt
than third-party LLMs**

The diagram shows a vertical stack of three colored rectangles representing training data amounts: a small green rectangle at the bottom labeled 'Domestic top LLM', a medium red rectangle in the middle labeled 'V1 (July)', and a large red rectangle at the top labeled 'V2 (Dec)'. To the left of these rectangles, the text 'Amount of training data' is written vertically, followed by a double vertical bar symbol '||', and then 'Learning Cost required'. To the right of the rectangles, a blue box contains the text 'Double the data' with a blue arrow pointing left towards the 'V2 (Dec)' rectangle. Below this, another blue box contains the text 'Short-term learning through the use of AI supercomputers' with a blue arrow pointing up towards the 'V2 (Dec)' rectangle. At the bottom, a horizontal axis represents the number of parameters, with a black rectangle labeled 'Oversea top LLM' spanning from '13 billion' to '175 billion'. To the right of this axis, the text 'Number of parameters' is written vertically, followed by a double vertical bar symbol '||', and then 'Operational Cost required'.

A horizontal stacked bar chart comparing win rates across four categories: 'vs W', 'vs X (Japanese)', 'vs Y (Japanese)', and 'vs Z (Japanese)'. The legend indicates three outcomes: Win (dark blue), Draw (light blue), and Lose (grey). A vertical red line marks the 50% win rate threshold.

Opponent	Win	Draw	Lose
vs W	59%	6%	35%
vs X (Japanese)	78%	9%	14%
vs Y (Japanese)	90%	4%	6%
vs Z (Japanese)	95%	0%	5%

**Up to 300k
Jpns character**

internal and external business documents

In-house Manuals

Books
Meeting minutes
Call Center History
medical records
News Article
Email, Tweet

Our research December 2023

Orchestrating a brighter world **NEC**

Scalable foundation model

Proprietary
Foundation model

Multimodal AI

Safe and secure
LLM

Automated
Construction & operation

Expansion of large language model

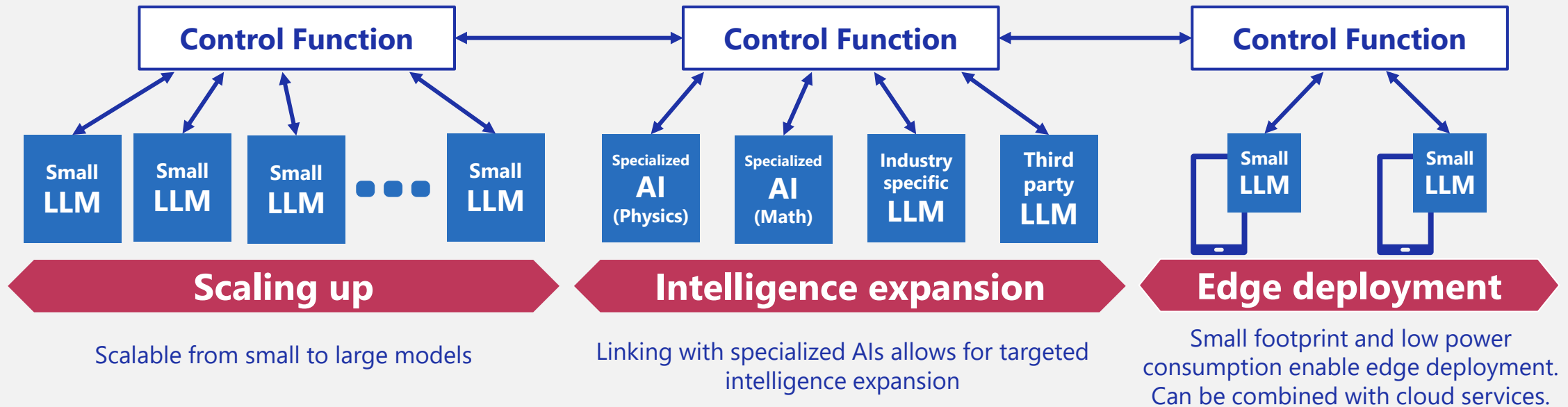
Scalable large language models

R&D

Developing "new architecture" that flexibly combines models according to input or tasks to create new AI

- Combining small models enables linear scaling of size and intelligence
- Towards a world where LLMs are embedded in edges, distributed deployment and collaboration is possible by combining power-saving edge and cloud computing

Note: A large-scale model of 100B class is also under development



Integrating Multimodal AI with LLM

Proprietary
Foundation model

Multimodal AI

Safe and secure
LLM

Automated
construction & operation

Exhibit

Video x LLM

R&D

Real-world perception and interpretation utilizing video recognition technology and LLM

- Automatic generation of detailed descriptions for real-world videos
- NEC's advantage lies in its extensive collection of video recognition AI for converting videos to text
- The generated text is processed through an LLM to convert it into meaningful information and generate coherent sentences.

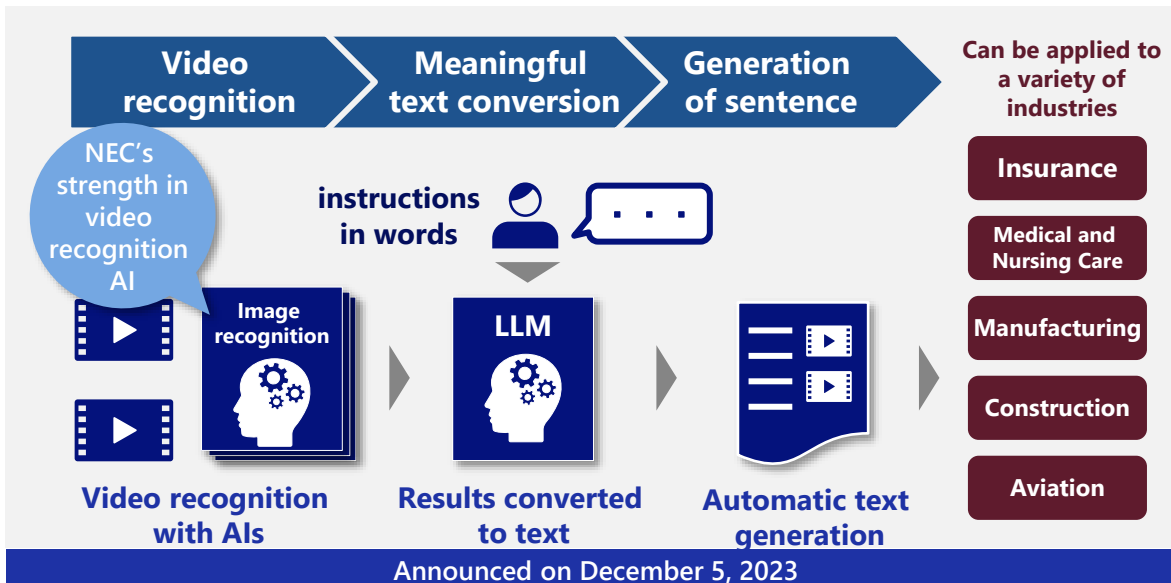
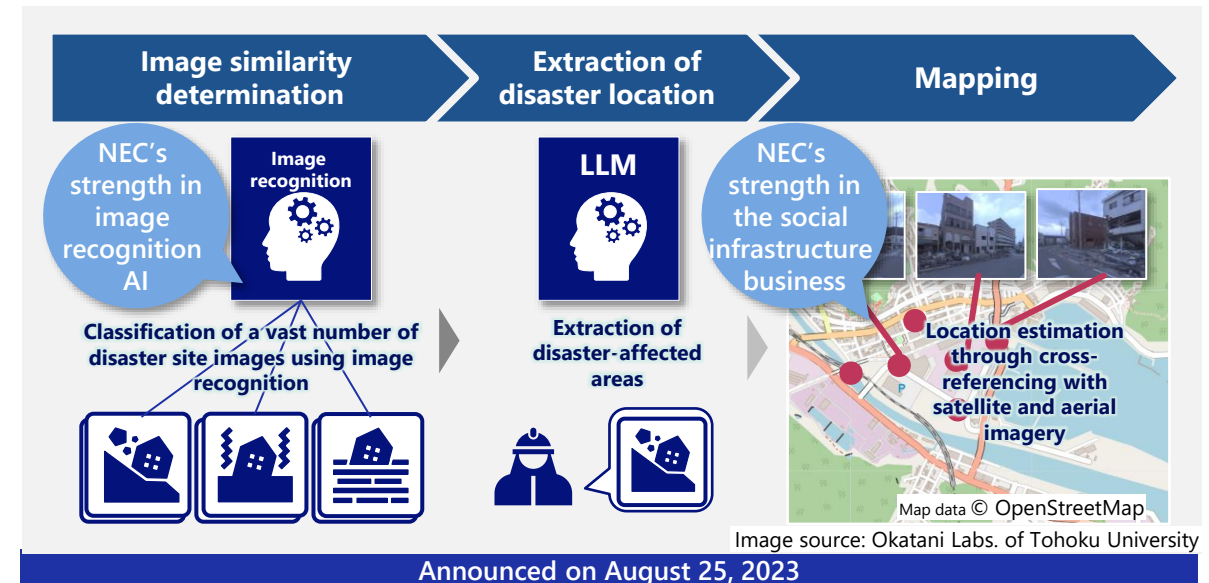


Image and location information x LLM

R&D

Disaster Response Solutions

NEC's technologies for similarity assessment and location prediction can accurately detect disaster situations and exact locations, even down to street addresses, from a constant flow of images. When combined with LLM, the technology can swiftly describe the disaster in detail, improving the speed of emergency responses.



Utilization of the foundation model

Proprietary
Foundation model

Multimodal AI

Safe and secure
LLM

Automated
construction & operation

Exhibit

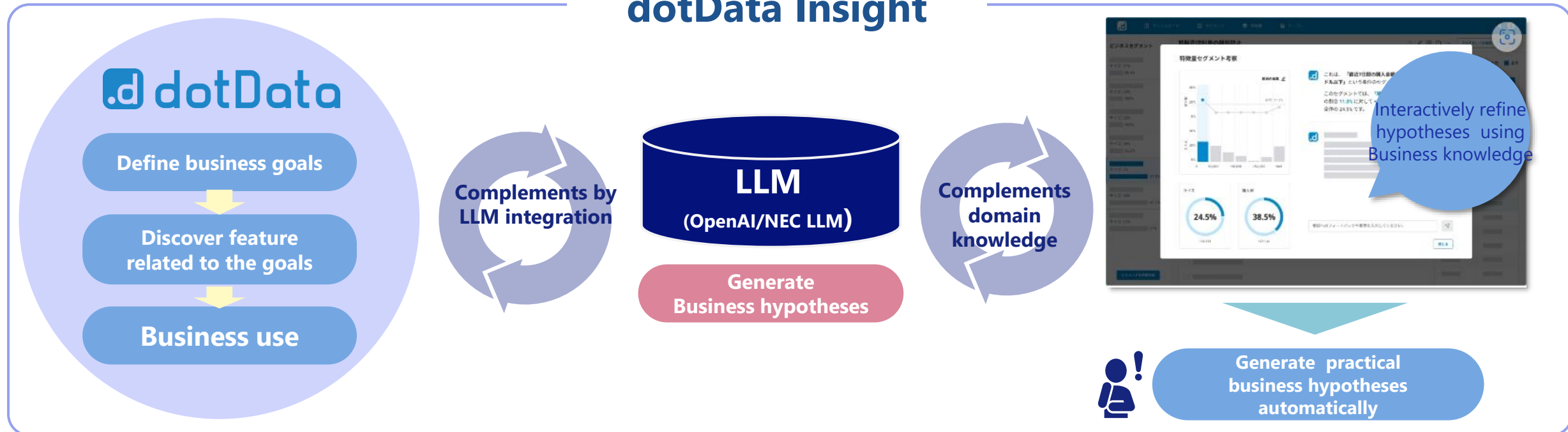
Applications of Large Language Models

Data Driven DX Solution : "dotData Insight"

Product

- dotData Insight enables business people of non-analytics expert to automatically gain new "business insights"
- By fine-tuning LLM with the data a customer has, the system can generate customer-specific answers (plan to release in early 2024)

dotData Insight



Announced December 6, plan to release early 2024

LLM-enhanced security and platforms

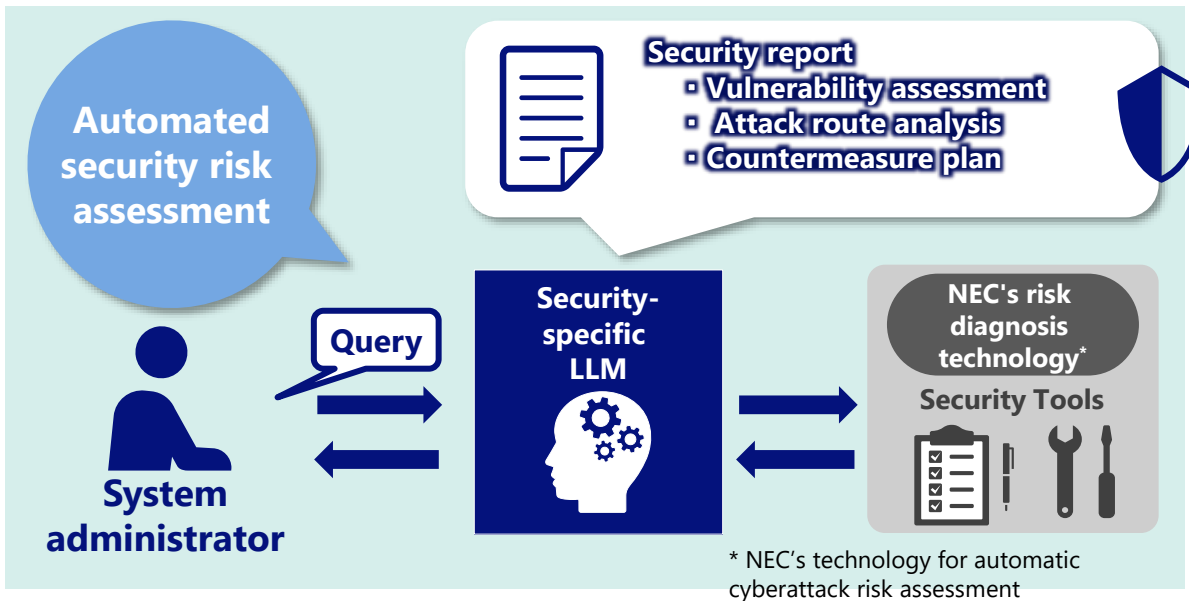
Exhibit

Security x LLM

Automated security risk assessment by LLM

R&D

- Even non-experts can diagnose security risks.
- A security-specific LLM, utilizing NEC's cyberattack risk assessment technology, quickly responds to queries with diagnosis results and reports.



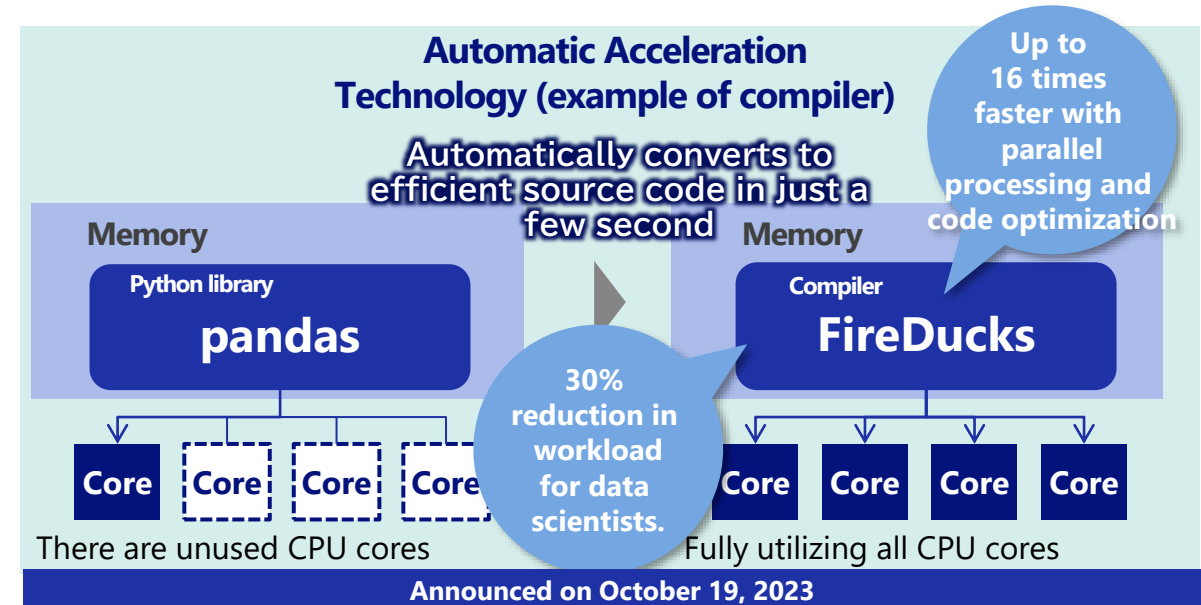
Automatically acceleration of programs

Automatic Acceleration for Data Analytics (Compiler, Accelerator)

R&D

- Accelerating computation-intensive table data processing by 16x and deep learning processing by 4x. It will be enhanced by user program efficiency optimization via LLM.
- Equivalent to reducing data scientists' workload by 30%

Note: Beta version now available, <https://fireducks-dev.github.io/>





NEC

Corporate Executive Vice President and CDO

Toshifumi Yoshizaki

After two years of efforts in building an AI supercomputer and developed an LLM with world-class Japanese performance. NEC announced the launch of a generative AI service centered on the NEC's LLM on July 6, 2023.

Apr. 2021

Nov. 2022

Jan. 2023

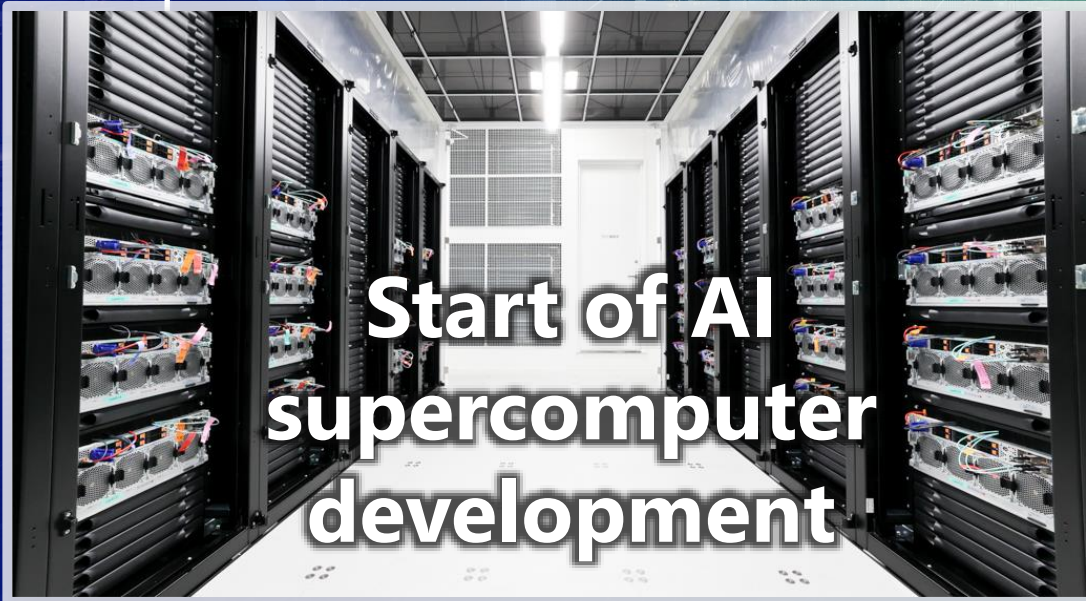
Mar. 2023

Jul. 2023

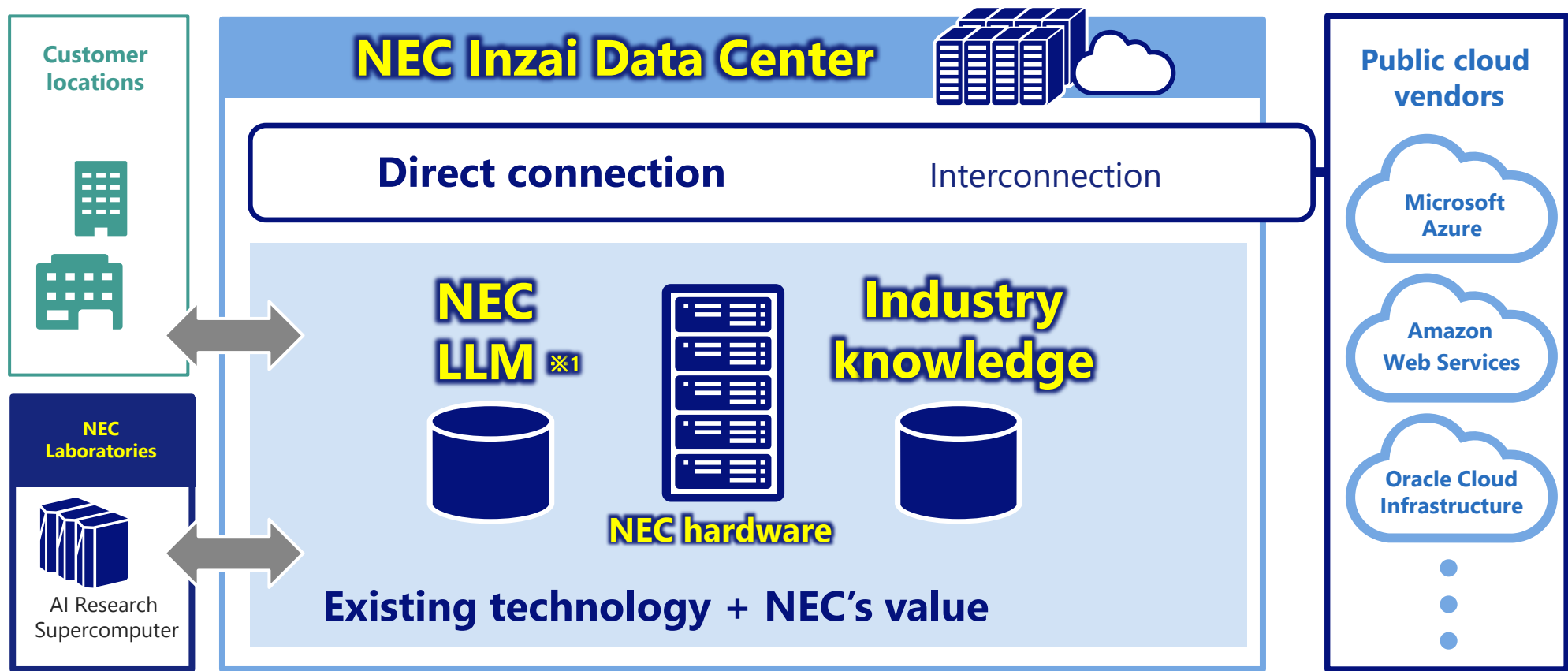
ChatGPT

Davos

Full operation of AI
supercomputer



Utilizing the comprehensive capabilities of NEC and the strengths of global vendors to provide a highly specialized generative AI environment for Japanese customers



※1: large language model



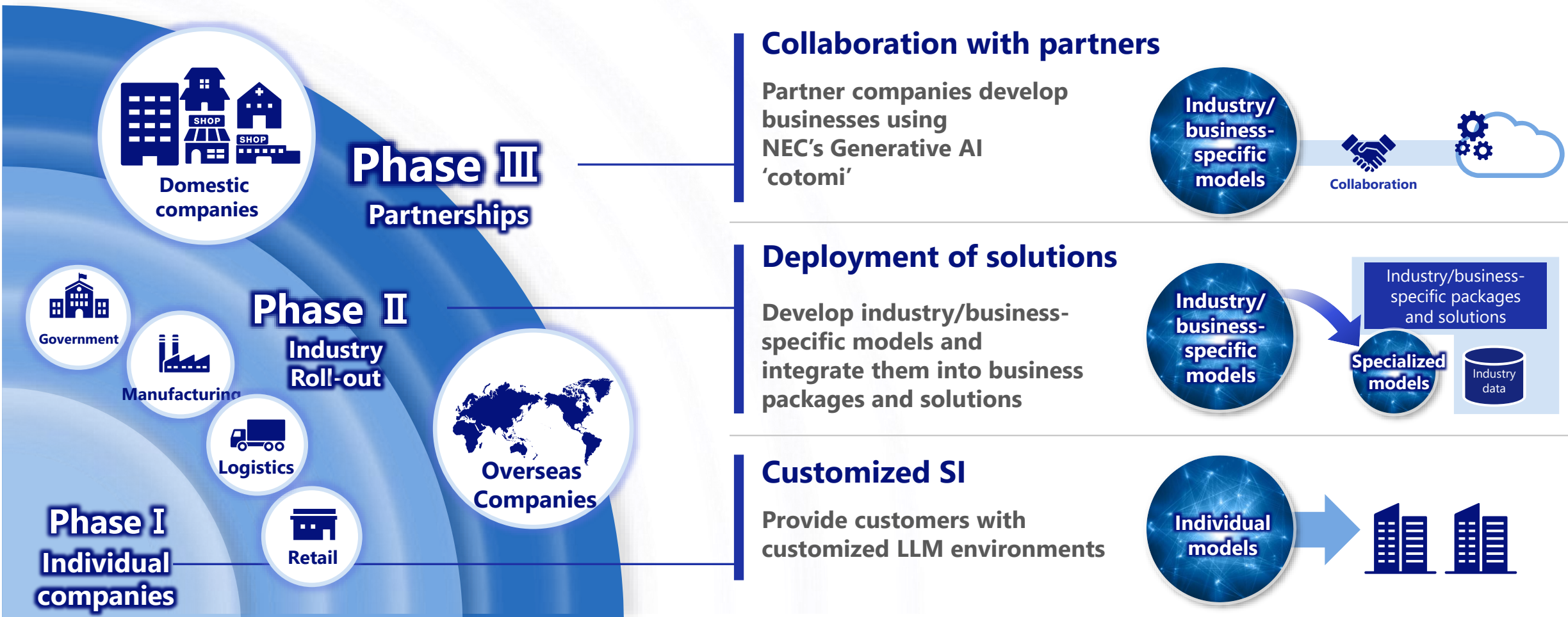
Words show the future, and things come to fruition.

cotomi
[コトミ]

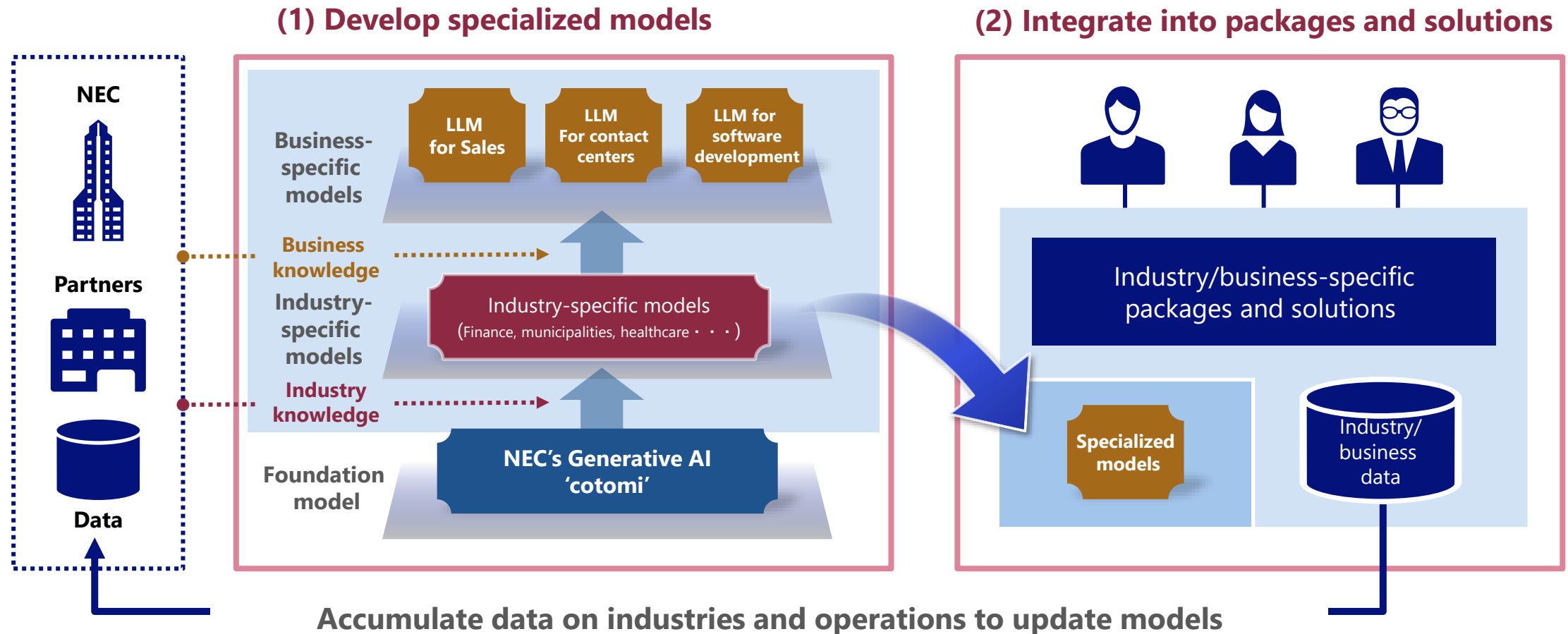
NEC Generative AI is Everywhere



In addition to focusing on individual companies, we will progressively grow our business by deploying industry/business-specific solutions on a one-to-many basis, and by forming strategic partnerships.



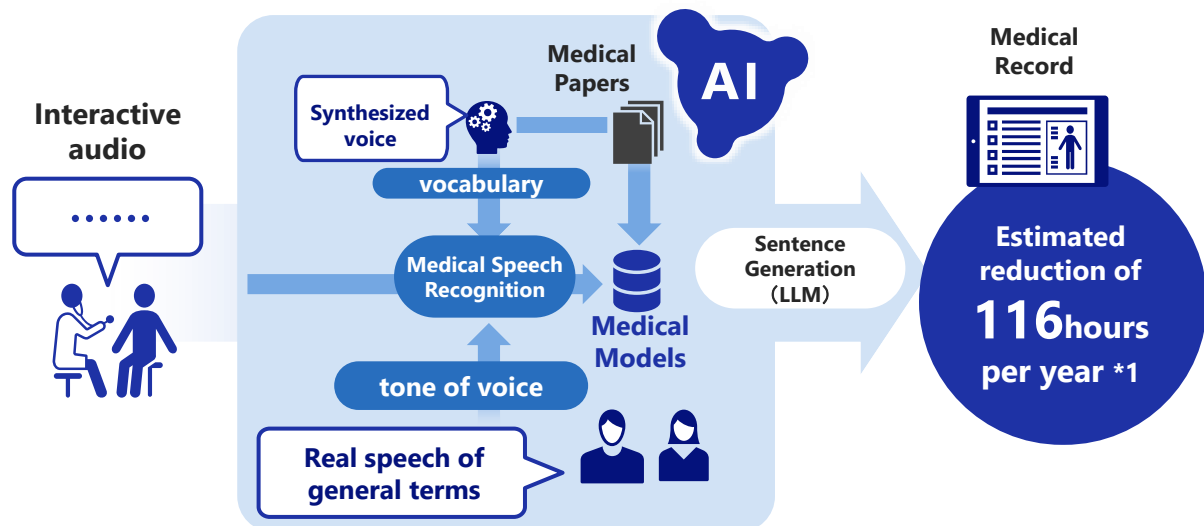
Leveraging NEC's Generative AI technology and industry expertise, we aim to (1) develop specialized models and (2) integrate them into packages and solutions.



By supporting the creation of electronic medical records and medical documents with LLM, the time required to create medical documents has been halved, and the possibility of improving operational efficiency has been confirmed.

Automatic creation
of electronic medical records

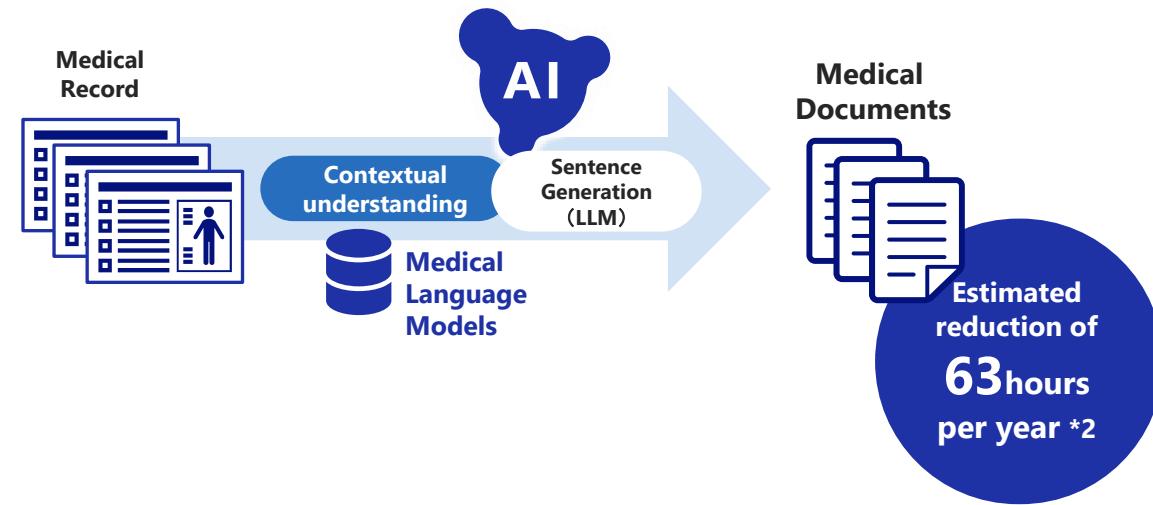
LLMs that have learned medical terminology automate the creation of medical records



*1 Inference values based on on-site observations

Automatic creation
of medical documents

Understand medical terminology and treatment progress, and summarize medical records
Eliminates the need for doctors to re-read medical records



*2 Evaluation results by 10 physicians at Tohoku University Hospital



Reducing the workload of physicians with records. Aiming to create an environment where doctors can concentrate on their medical practice

Finance, municipalities, manufacturing, etc.

Co-creation of industry-specific LLMs with various customers

Mitsui Sumitomo Insurance Co., Ltd.



**Specialized Models
for
the Financial Industry**

Developed an inquiry response function equipped with product and office manuals. Streamline internal affairs tasks that require specialized knowledge, such as inquiries about product regulations and paperwork rules.

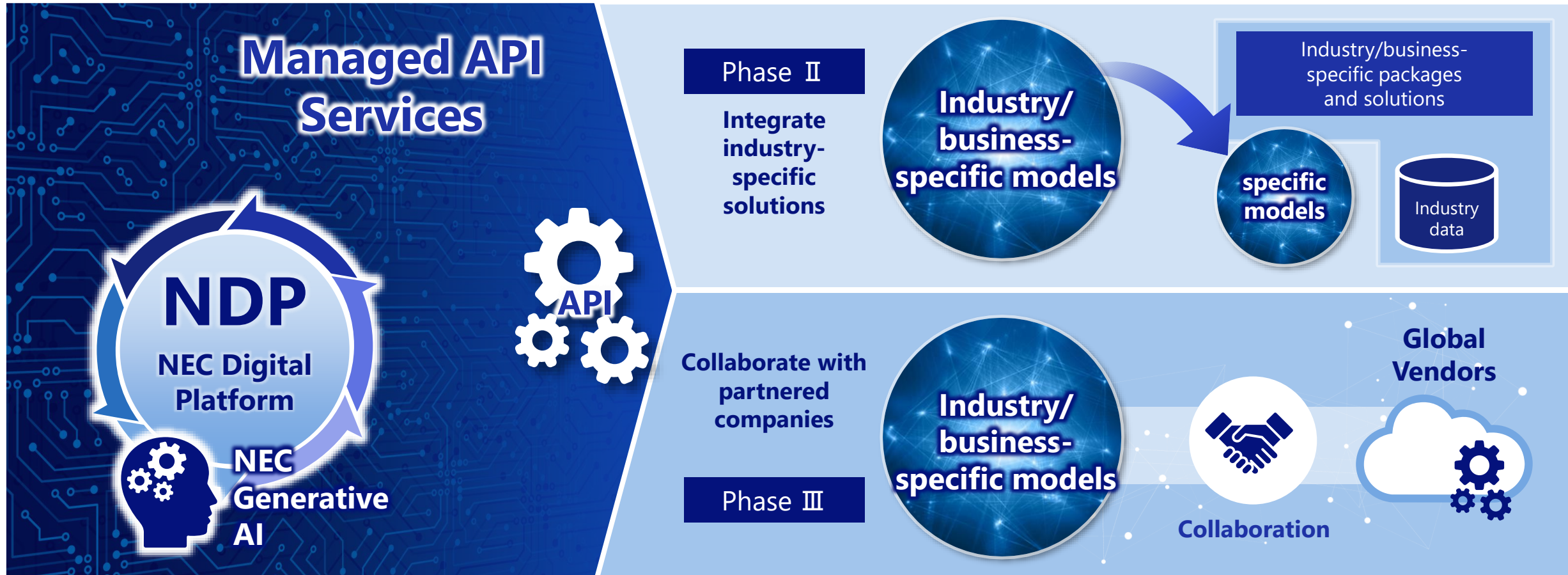
Sagamihara City



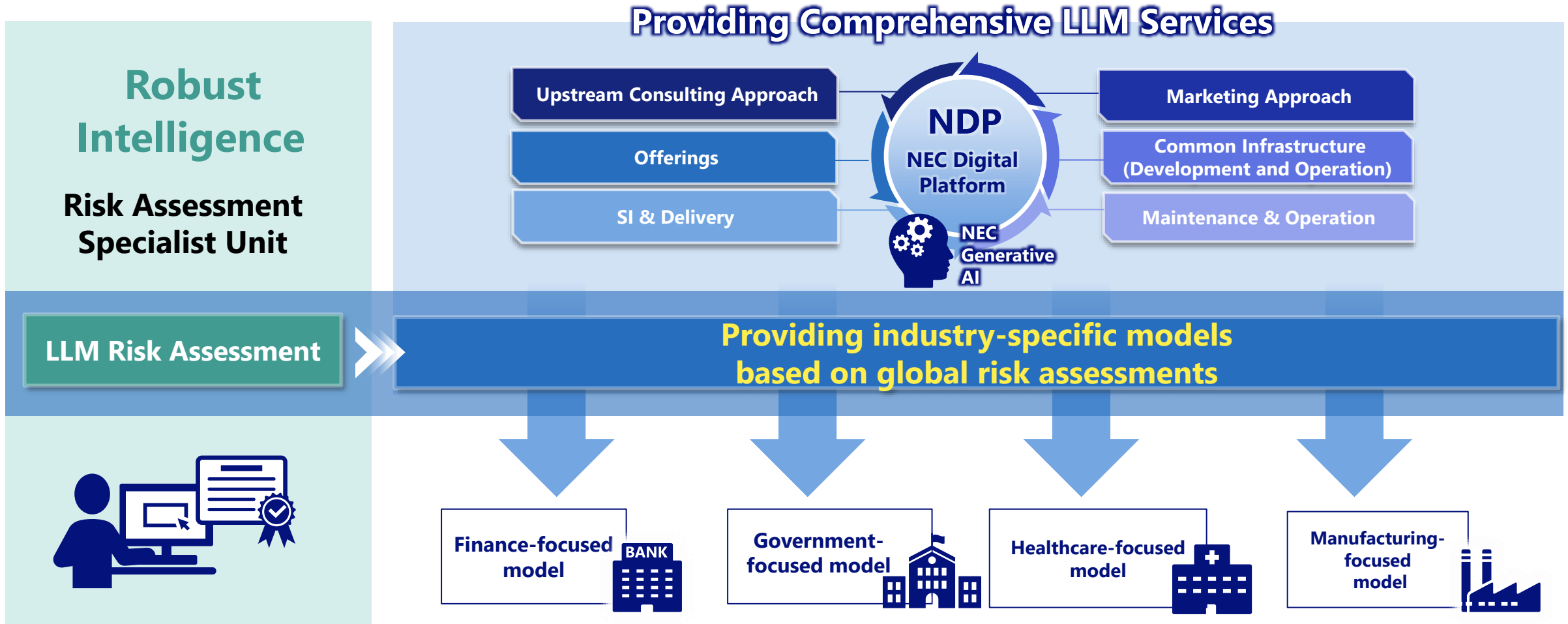
**Specialized Models
for
Local Governments**

Joint verification for the use of generative AI has begun. We learned from Sagami City's data and promoted verification of operational efficiency with LLM developed by NEC.

Drawing from NEC's extensive industry and business expertise, we are developing specialized models to establish a tailored environment for our customers. (Set to launch in Spring 2024)



In our effort to offer safe and secure LLM to our customers, we have partnered with Robust Intelligence to advance the LLM risk assessment project.

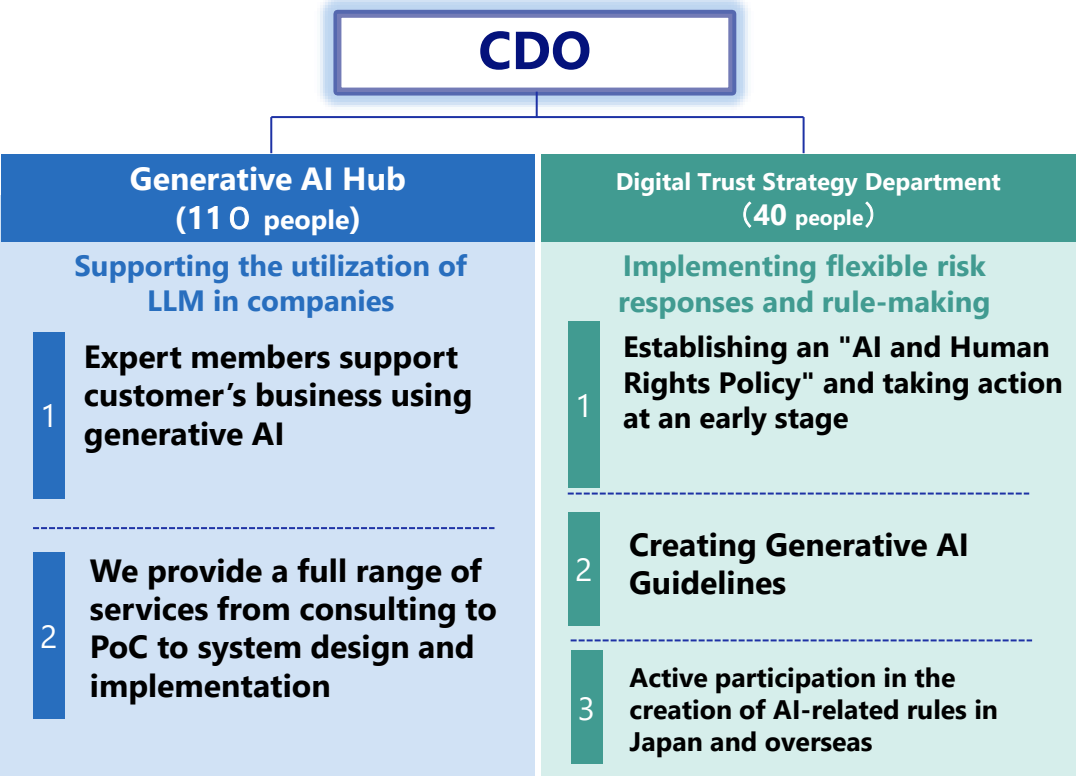


In addition to the 150-person LLM business advancement and risk management teams reporting directly to the CDO*, we have appointed ambassadors from various business divisions to introduce LLM solutions to customers across diverse industries

*Chief Digital Officer

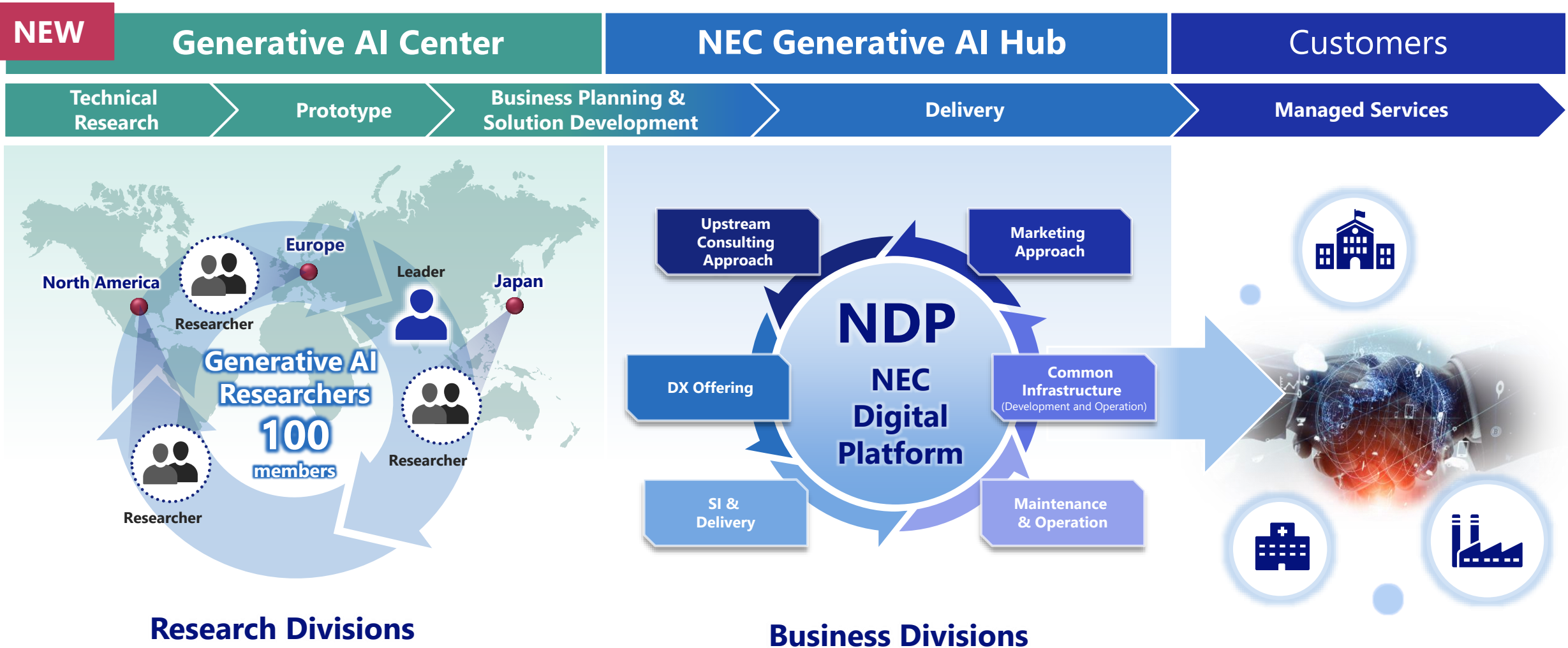
LLM advancement team under CDO

NEW Business Division Ambassadors

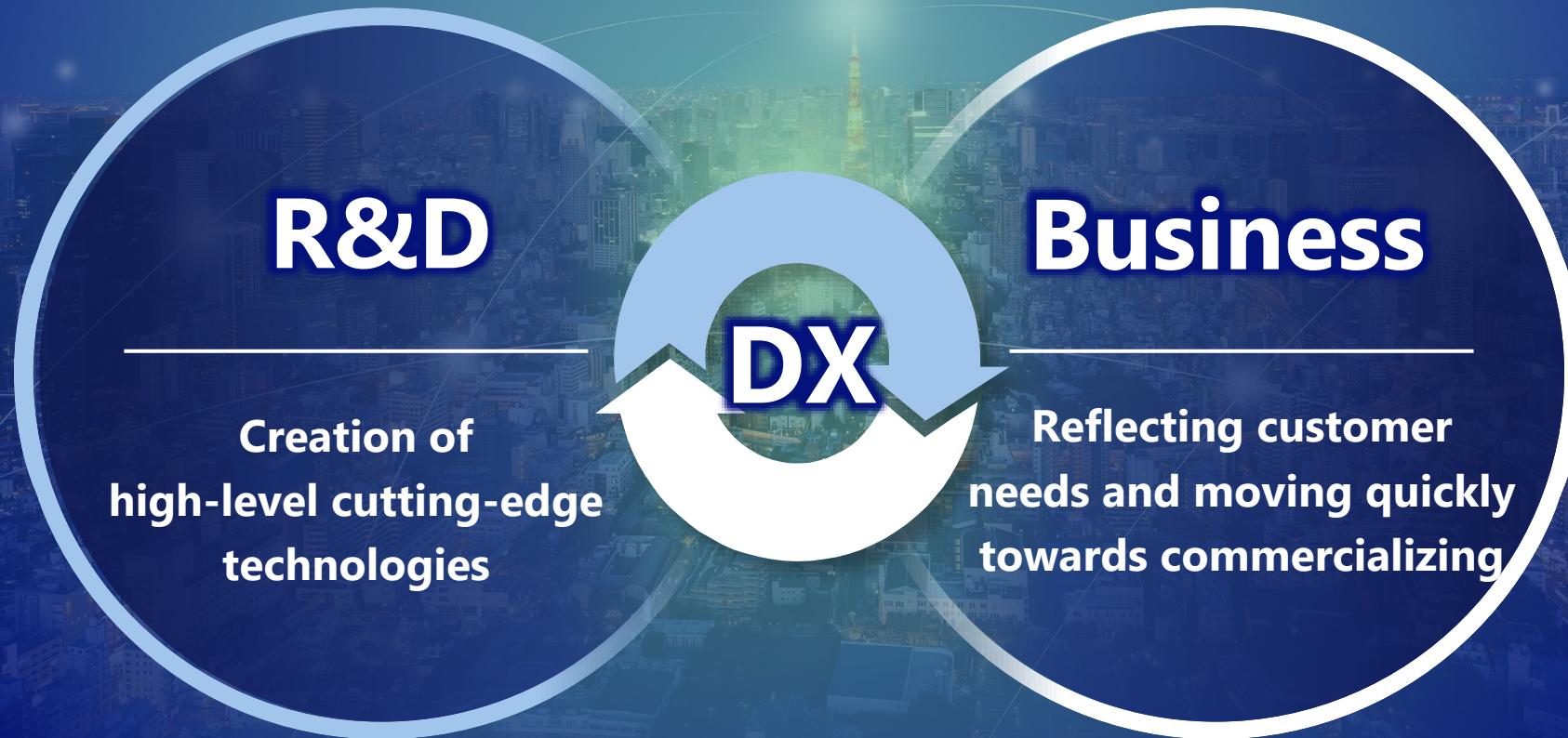


| Collaboration between research and business |

Seamless collaboration between R&D and business accelerates the commercialization of generative AI research results



Through seamless collaboration between R&D and business, we will support the DX of society and customers as a speedy and optimal strategic partner.





Biometrics Authentication

Progress in NEC's Face Recognition Business

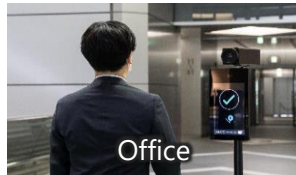
Domestic

No.1 market share*1

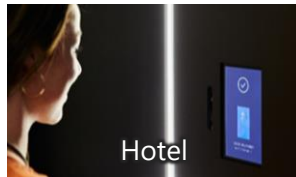
Purpose of Introduction

Representative Use Cases

Multi Domain



Industry Issues



Business Issues



Track record

Biometrics Authentication
More than
1 million cloud users

In-store security deployment
Approximately
1500

PC Login
More than
1,000 companies
200,000 licenses

*1 Fuji Chimera Research Institute Digital ID/Authentication Solutions Business Market Research Handbook 2022

Global

In about 45 countries and regions

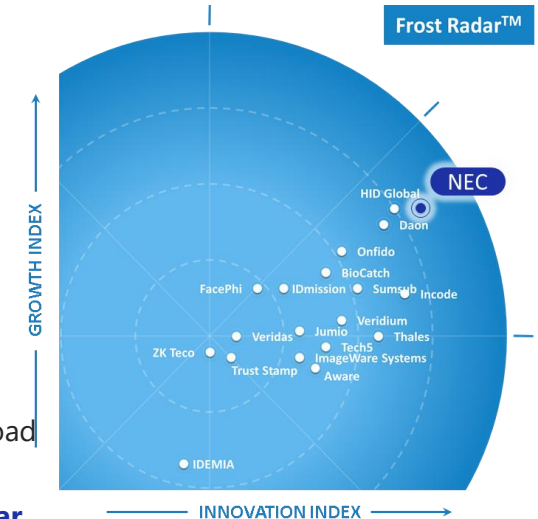
Business valuation by a global research firm

Frost & Sullivan

Global No.1*2
(Compared with more than 100 companies worldwide)

*2 2022 Biometrics in Security Market Research

- **Second consecutive Market Leader rating** following the 2020 survey
- NEC continues to bring innovation to its broad portfolio of Biometric Authentication, **maintaining leadership in both Frost Radar and market share.**



Airport
Approximately
80 airports
Immigration, Boarding procedure
*Including domestic airports

National ID
Approximately
1.6 billion
India, Vietnam, etc.
*Total population of introduced countries

Public Safety
Adopted by law enforcement agencies in Europe, the U.S., and other countries around the world

Evolving Biometric Technologies

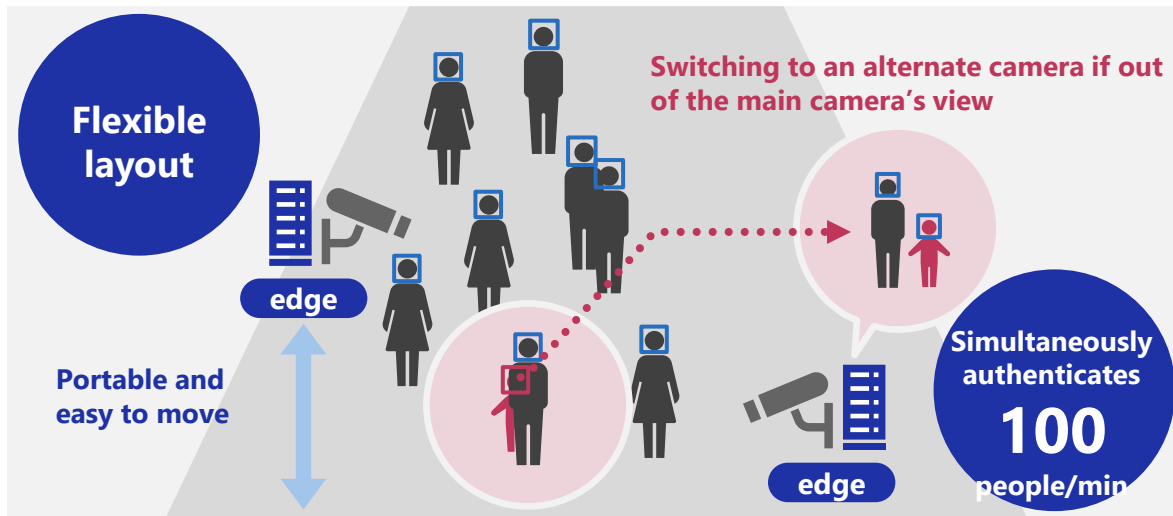
Exhibit

Biometrics

R&D

Gateless access control system using biometric recognition

- With lighter edge processing, gateless biometric authentication can handle up to 100 people per minute on portable devices.
- This technology is expected to be used in places like event venues and construction sites, where the ability to easily modify layouts is essential.



Exhibit

Vital Estimation Technology

R&D

Estimating vital signs from facial images

- NEC's biometric authentication technology can estimate vital information, such as pulse rate, SpO2, respiratory rate from facial video on a smartphone.
- Understanding daily health condition and supporting behavioral changes

Note: This system is under research and development. This system is not a medical device and cannot be used for medical examination nor medical treatment.

The advertisement features a woman's face on a smartphone screen, displaying various vital signs. The text includes 'CES INNOVATION AWARDS 2024 HONOREE', 'Face & Facial Parts Monitoring System', 'NEC's Biometric Information Health Data Platform', and 'Announced November 17, 2023'. The vital signs shown on the screen are: Pulse Rate (86.1), PRV (66.4), Concentration (0.89), Stress, SpO2, and RR.

The CES Innovation Awards are based upon descriptive materials submitted to the judges. CTA did not verify the accuracy of any submission or of any claims made and did not test the item to which the award was given.

A complex network diagram with numerous nodes and connecting lines, rendered in a light blue color against a dark blue background. The nodes are of varying sizes and are interconnected by thin lines, creating a web-like structure that fills the entire frame.

Contribution to current businesses through global No.1 technologies

① Contribution to the IT Service Business

② Contribution to the Social Infrastructure Business

Safe, secure, high-speed, high-capacity communications that support social infrastructure

6G/Beyond 5G

R&D

40 GHz band distributed MIMO

- Successful verification experiment with 40 GHz band distributed MIMO technology for high-speed, high-capacity wireless communications (NTT, NTT DOCOMO, NEC)
- Beam Forming technology at the base station maintains the same transmission capacity as when stationary even when moving and ensures signal quality in blocked environments.



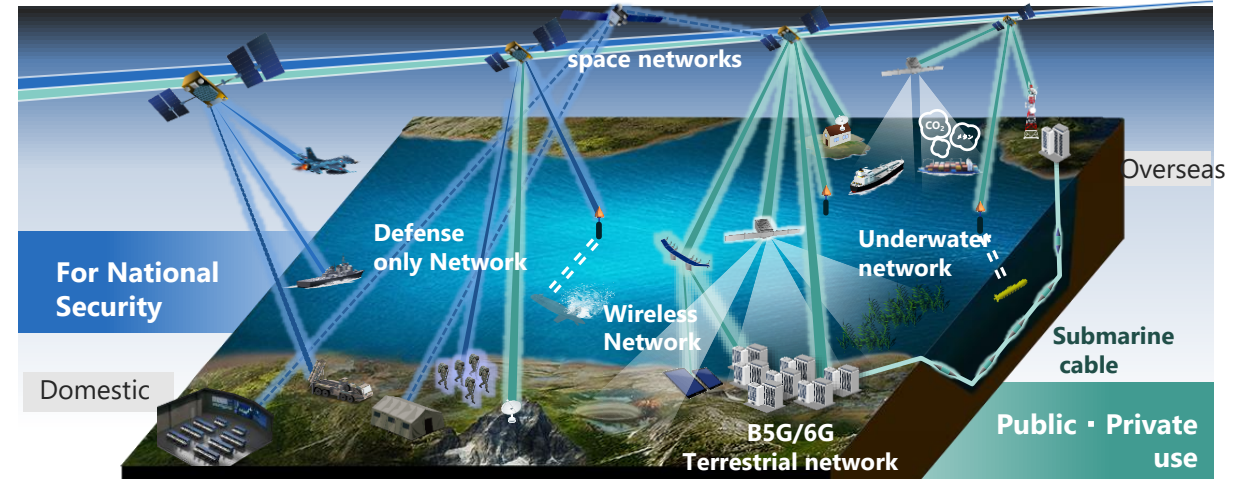
Announced October 31, 2023

6G/Beyond 5G

R&D

Space-Air-Ground Integrated Network

- Established "Space Integration Network and Resilient DX Co-Creation Institute" in collaboration with Tohoku University. Integrate optical, wireless, and space networks.
- By establishing and commercializing new network technologies starting from the Beyond 5G network, we aim to realize a resilient society that integrates space, air, and ground.



Announced November 1, 2023

Optical and quantum cryptography communication enhances societal sophistication, security, and safety

Optical communication

Increasing the capacity of optical submarine cables with multicore fiber

Product

- Google adopts world's first multicore fiber cable for its Taiwan-Philippines-U.S. submarine cable system
- By doubling the number of cores, this technology enables higher capacity transmission at a lower cost per bit



Quantum cryptography

Homegrown quantum cryptography enhances communication security for critical systems

R&D

- As part of the expansion of the NICT*¹-operated Tokyo QKD Network,*² BB84 quantum key distribution (QKD) devices will be delivered this fiscal year
- NEC is the only Japanese company developing both the conventional BB84 method and the next-generation CV-QKD method

BB84 QKD system scheduled for delivery



*1 National Institute of Information and Communications Technology (NICT)

*2 Testbed for the Quantum Key Distribution (QKD) network that NICT is constructing and operating in the Tokyo area.



Creation of new growth businesses

1 Commercialization of the IP licensing business

2 Expanding Business innovation
including Healthcare & Life Science



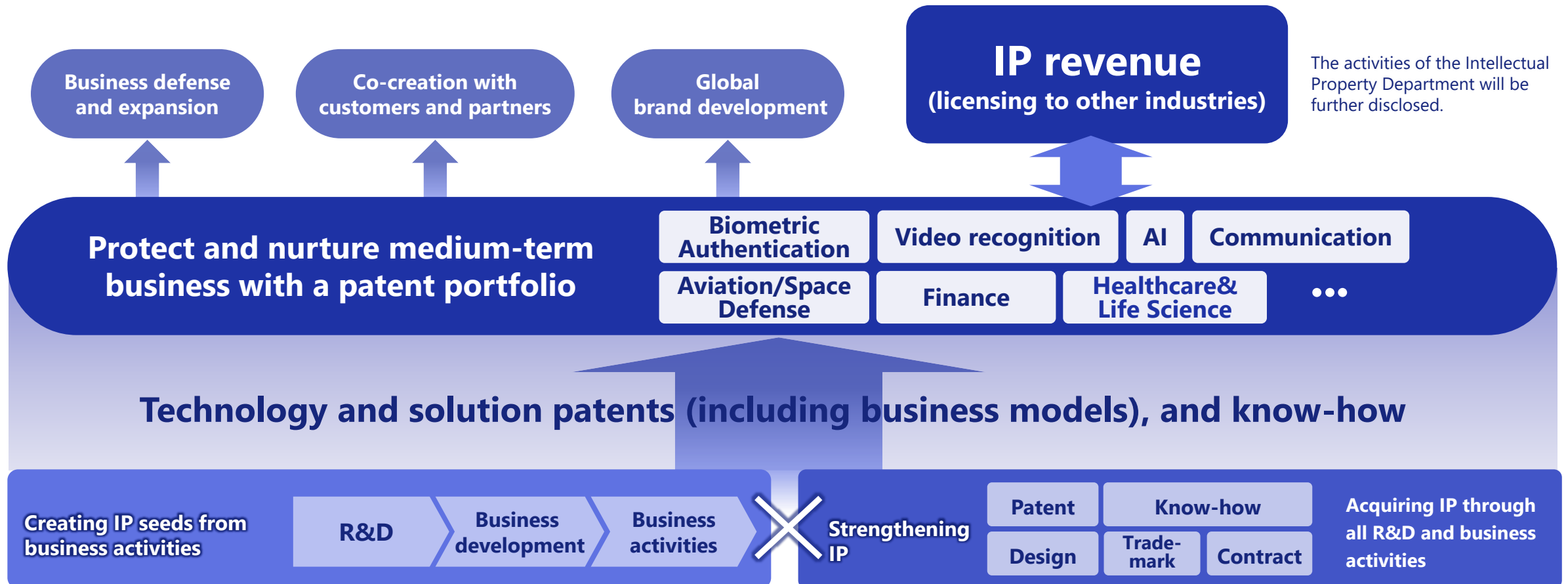
Creation of new growth businesses

- ① Commercialization of the IP licensing business
- ② Expanding Business innovation including Healthcare & Life Science

Boosting revenue through IP*

To adapt to the widespread use of ICT technology IP across various industries, NEC is revamping IP creation and utilization processes, focusing on business defense and expansion, co-creation with customers and partners, global brand development, and strengthening the intellectual property revenue business

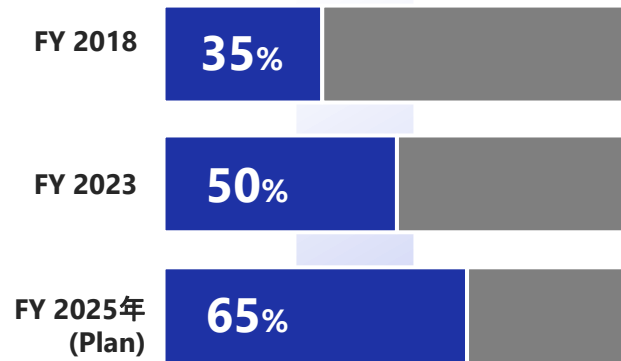
*IP : Intellectual Property Rights



Expand opportunities to utilize NEC's technology and IP

NEC is boosting its patent portfolio in growth/new business areas and core technologies, expanding IP revenue by licensing to various industries in line with growing utilization opportunities, and actively pursuing market co-creation with startups through leverage from IP

Increase percentage of patents owned in growth/new businesses and core technologies



Core technology (example)	AI	Biometric authentication	Video recognition	Wireless communication
Growth/new businesses	Focus area in the mid-term management plan		Healthcare & Life Science	

Expansion of opportunities for utilizing IP

Expanding utilization opportunities of core technologies (Utilizing various licensing structures such as NEC X, BIRD, JV, etc.)

Markets expected to expand

AI 100 trillion yen @'27 (CAGR 40%)*1	Biometric Authentication 17 trillion yen @'27 (CAGR 15%)*2	Autonomous Vehicle 100 trillion yen @'27 (CAGR 40%)*3
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In the era of cross-industry utilization of ICT/AI

Licensing to other industries through patent pools

(Example)

- AVANCI
- VIA LICENSING
- Access Advance
- MPEG LA

Source *1 : Statista(Next Move Strategy Consulting), <https://www.statista.com/statistics/1365145/artificial-intelligence-market-size/>

*2 : Statista(ReportLinker, MarketsandMarkets), <https://www.statista.com/statistics/1048705/worldwide-biometrics-market-revenue/>

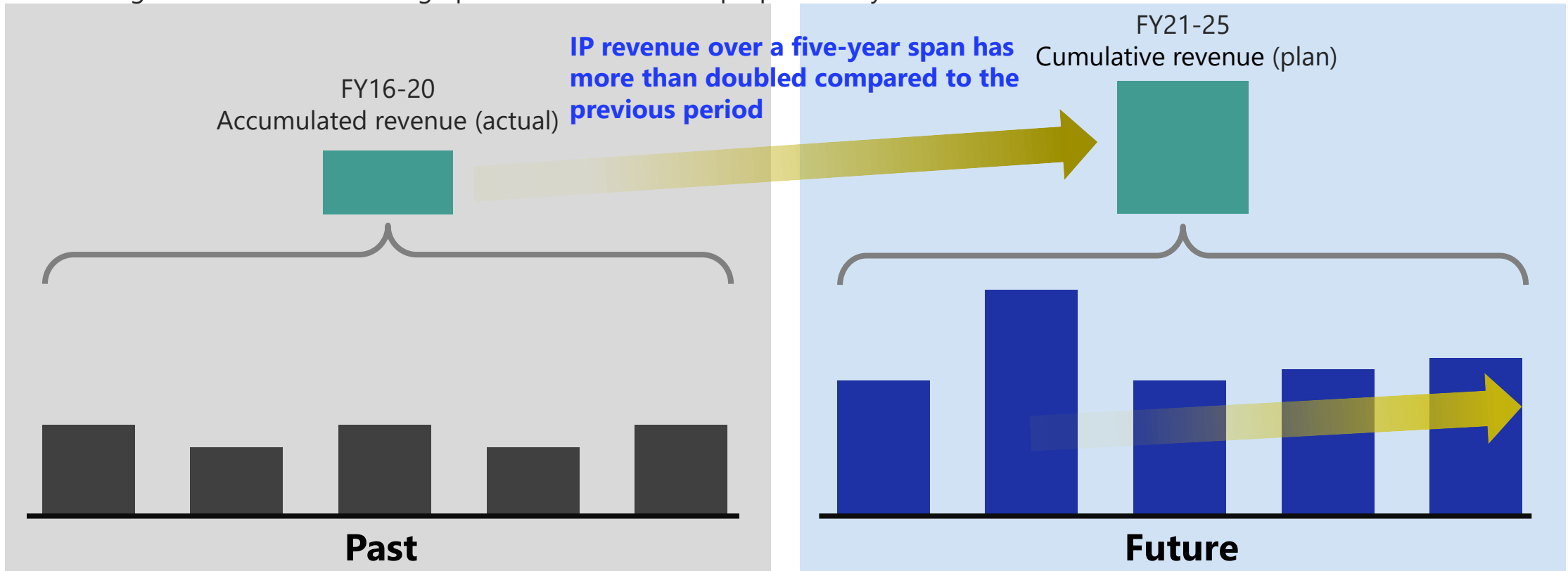
*3 : Statista(Next Move Strategy Consulting), <https://www.statista.com/statistics/1224515/av-market-size-worldwide-forecast/>

Toward sustainable and stable IP revenues

IP revenues in the Mid-term Management Plan 2025 has progressed to more than double that of the previous five years (FY2016-2020). Going forward, we aim to stabilize IP revenue over fiscal years and focus on creating and expanding new markets by fully utilizing IP assets.

IP revenue

* The heights of the bars in these graphs are for illustrative purposes only



3

Creation of new growth businesses

- Commercialization of the IP licensing business
- Expanding Business innovation including Healthcare & Life Science

NEC's Business Innovation Process

Develop various measures to expand entry and exit points for business creation, while putting into practice a systemized process for new business development.

Business Idea

NEC Group

Partner companies

Silicon Valley entrepreneurs

Startup Discovery (CVC)
NEC Orchestrating Future Fund

NEC Innovation Challenge
(Open Contest)

Proposals
from general companies and research institutes

Systematized process for new business creation

GENERATE

IDEATE

DEVELOP

LAUNCH

Process

Define the overall process based on the Lean Startup methodology

Investment
Decisions

Set up a stage gate to determine whether or not to invest

Project
Evaluation

Third-party assessment of maturity and business value

HR
Development

Operate a mutual learning and information-sharing community for business development personnel



"NEC's industry-leading 4 keys to successful innovation in one book with explanations and cases"

Commercialization form

Establishment of
new business within NEC

Commercialization within the company
that makes a proposal
(BIRD)

Business Alliances

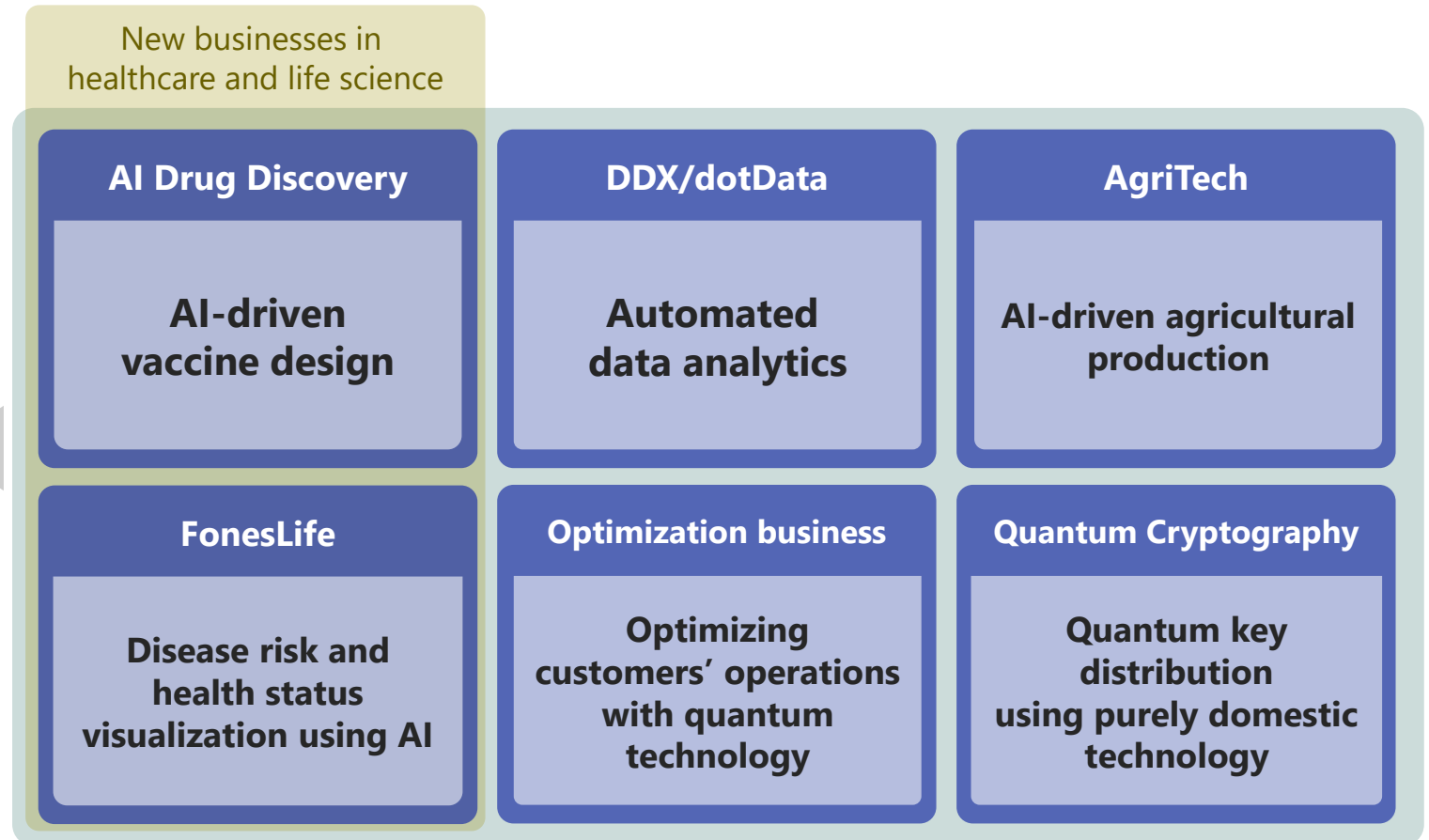
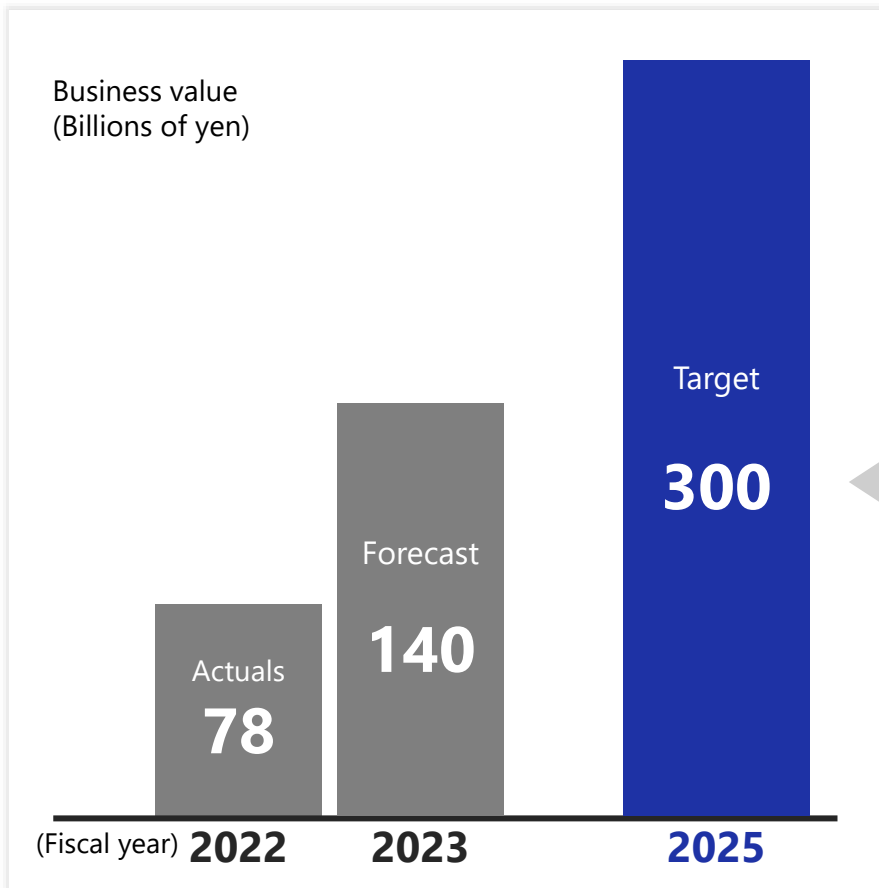
Establishment of JV

Startup

Creating a business value of 300 billion yen by fiscal 2025

AI technology contributes to 80% of our business value

Rapid new business creation is underway in healthcare and life sciences, while our data-driven DX initiatives continue to show strong growth.



- Total business value of ongoing business development projects.
- Selecting the most appropriate evaluation method according to project characteristics. (e.g., discounted cash flow method, comparable multiple valuation method (multiple), and others)

Healthcare & Life Science Business

Consolidated HLS-related internal organizations to develop growth businesses leveraging our strengths in AI
Started with making profit due to our strong business foundation around EMR

Exhibit

Medical Care

Electronic Medical Record/Hospital DX

Hospital management and healthcare quality improvement by AI

2023 PoC for medical documentation support using generative AI

Medical Accounting System

1,400 facilities

Electronic Medical Record (EMR)

1,000 facilities

DX Services

120 facilities

Exhibit

Lifestyle Support

Health Promotion and Testing Services

Visualizing Disease Risk and Health Status with AI to Improve Lifestyle



2023 Additional test items:
Prediction of risk of developing dementia within 5 years

Measurement Services

Order from major
9 Japanese pharmaceutical companies

Test and Intervention Services

Domestic

Arao City

Cooperation with local governments

Overseas

Order received in Hong Kong

Expanding to Middle East/ASEAN

Life Science

AI Drug Discovery

Personalize/Universalize Vaccines with AI

2022 First Japanese group company to receive a grant from CEPI *1
2023 First IT company to be selected by SCARDA's*2 call for applications

Universal Infection Disease Vaccine

Nagasaki University

Launch of joint research on tropical infectious diseases

Personalized Cancer Vaccine

AACR2023*3/ASCO2023*4

Promising clinical efficacy and immune response data were presented at prestigious conferences

*1 CEPI: Coalition for Epidemic Preparedness Innovations *2 SCARDA: Strategic Center of Biomedical Advanced Vaccine Research and Development for Preparedness and Response *3 AACR: American Association for Cancer Research *4 ASCO: American Society of Clinical Oncology

Developing a new business to generate future business value

Data Driven DX Business : 98% CAGR growth in past 5 years, 50%+growth projected

Quantum Computing : Transitioned to business optimization services and doubled operational support

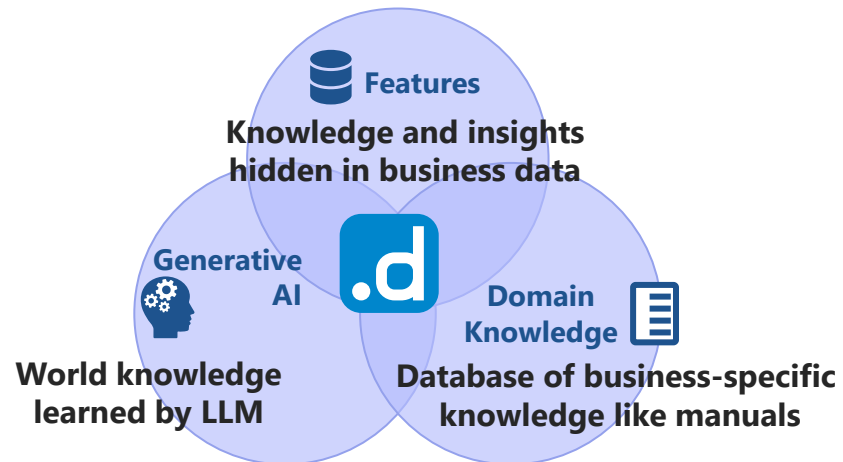
Exhibit

Data Driven DX Business

- CAGR98%@ FY18-22(track record), 57%@ FY23-28(projection)
- Strong demand for roadmap planning, predictive analysis, and talent development services
- Developed/expanded industry-specific templates for data-driven DX, started PoCs

Announced on December 6, 2023

dotData Insight

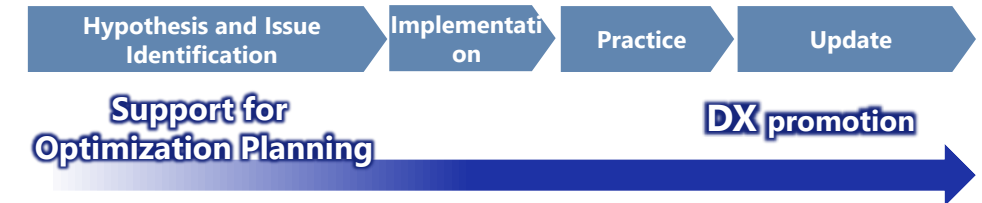


Generative AI and features transform business analytics

Business Optimization Service (Quantum computing technology applications)

- NEC Platforms boosted equipment utilization by 15% and reduce production planning efforts by 90%
- SI partnership with Gurobi Optimization
- Doubled support infrastructure to boost overall customer digital transformation

From clarifying issues to implementation



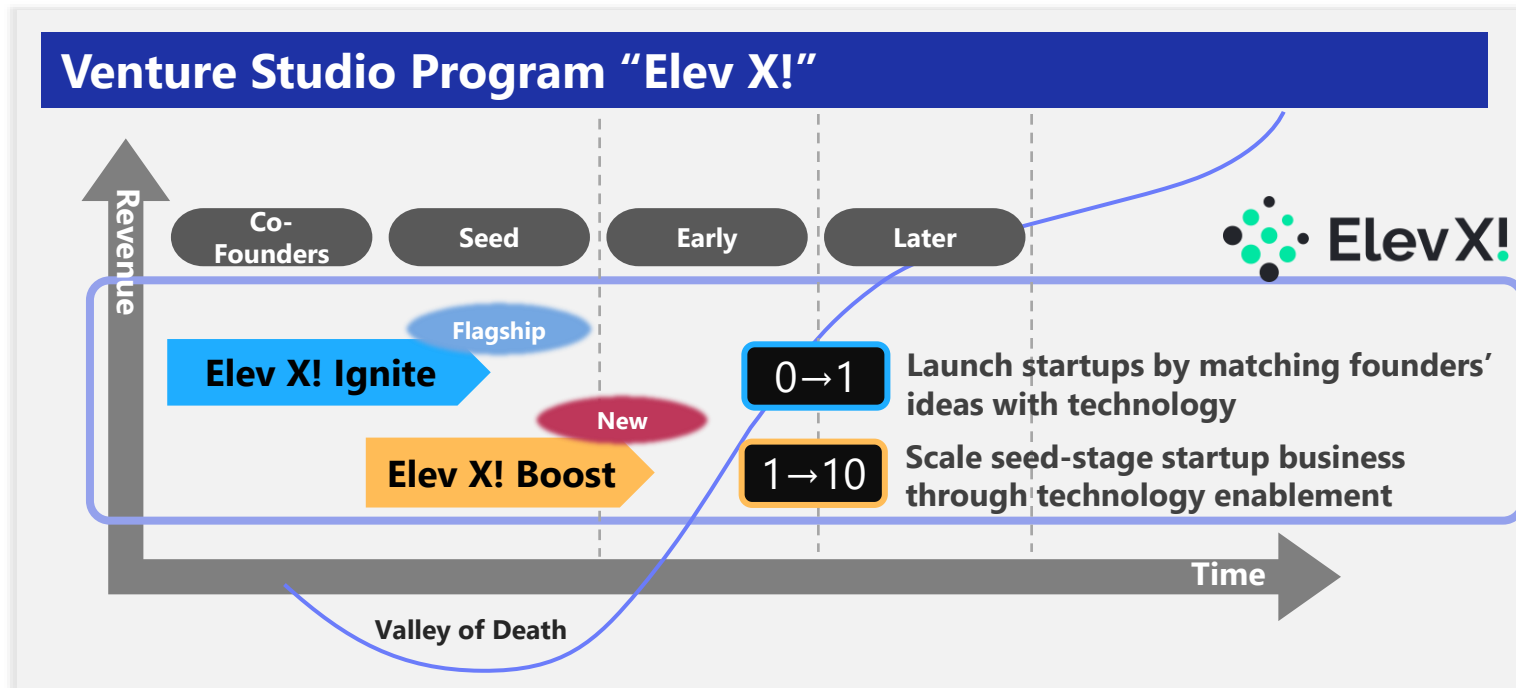
Business Support

Technical Support



NEC X : Using NEC's IP for North American market ventures

Building on our flagship "Ignite" program, we have launched the "Boost" program to assist existing startups in scaling up. This initiative aims to attract promising startups, fast-tracking their development and growth, with 10 successful launches since 2021.



**5th anniversary event - FutureFusion Forum
(Co-hosted with MIT ILP on 9/14)**

250+ investors and entrepreneurs participated, serving as an opportunity for new investments and program participation.



Keynote by Shintaro Matsumoto, CEO of NEC X



Keynotes Dr. John Carrier and Dr. Aude Oliva of MIT



Panel Discussion



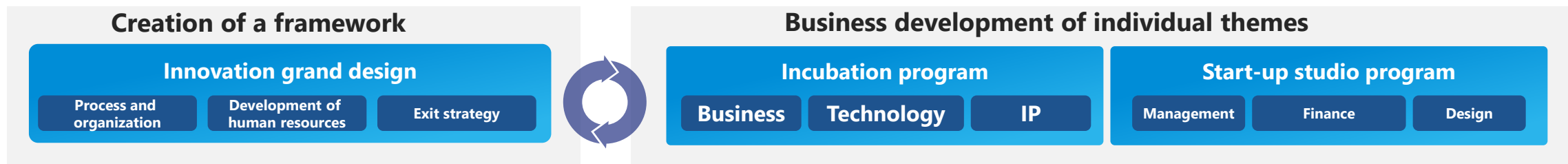
Overview of the venue

Major launched startups



BIRD INITIATIVE : Collaborative R&D Business

Create innovation by combining technology, assets, and human resources of large corporations with external funds, human resources, and cutting-edge IT
Accompanying as an innovation partner, provide services from applied research to business launch



Achievements

April 2023 Participation of DRONE FUND

Accumulation of new business consulting **63** Cases ← 34 cases

Carve-outs in 2023

2 (since 2023)



Raised 200 million yen by three companies
Drones / automated driving
Operation control

Automatic negotiation AI × drone



BitQuark

Plans to raise 230 million yen by five companies
Optimization of the logistics
Industry with CN * support and
LLM implemented

Process simulator

Goal

6 Carve-outs by 2025

through enhanced consulting and
generative AI ecosystems



Truly Open, Truly Trusted -This is NEC.

Realize a world where benefits are shared by all

Truly Open

Accelerating open innovation

Leading open ecosystems

Truly Trusted

Supporting mission-critical systems

Harnessing technology for social good



\Orchestrating a brighter world

NEC

Cautionary Statement with Respect to Forward-Looking Statements

This material contains forward-looking statements regarding estimations, forecasts, targets and plans in relation to the results of operations, financial conditions and other overall management of the NEC Group (the "forward-looking statements"). The forward-looking statements are made based on information currently available to the Company and certain assumptions considered reasonable as of the date of this material. These determinations and assumptions are inherently subjective and uncertain. These forward-looking statements are not guarantees of future performance, and actual operating results may differ substantially due to a number of factors.

The factors that may influence the operating results include, but are not limited to, the following:

- adverse economic conditions in Japan or internationally;
- foreign currency exchange and interest rate risks;
- changes in the markets in which the NEC Group operates;
- the recent outbreak of the novel coronavirus;
- potential inability to achieve the goals in the NEC Group's medium-term management plan;
- fluctuations in the NEC Group's revenue and profitability from period to period;
- difficulty achieving the benefits expected from acquisitions, business combinations and reorganizations and business withdrawals;
- potential deterioration in the NEC Group's relationships with strategic partners or problems relating to their products or services;
- difficulty achieving the NEC Group's growth strategies outside Japan;
- potential inability to keep pace with rapid technological advancements in the NEC Group's industry and to commercialize new technologies;
- intense competition in the markets in which the NEC Group operates;
- risks relating to the NEC Group's concentrated customer base;
- difficulties with respect to new businesses;
- potential failures in the products and services the NEC Group provides;
- potential failure to procure components, equipment or other supplies;
- difficulties protecting the NEC Group's intellectual property rights;
- potential inability to obtain certain intellectual property licenses;
- the NEC Group's customers may encounter financial difficulties;
- difficulty attracting, hiring and retaining skilled personnel;
- difficulty obtaining additional financing to meet the NEC Group's funding needs;
- potential failure of internal controls;
- potentially costly and time-consuming legal proceedings;
- risks related to regulatory change and uncertainty;
- risks related to environmental laws and regulations;
- information security and data protection concerns and restrictions;
- potential changes in effective tax rates or deferred tax assets, or adverse tax examinations;
- risks related to corporate governance and social responsibility requirements;
- risks related to natural disasters, public health issues, armed hostilities and terrorism;
- risks related to the NEC Group's pension assets and defined benefit obligations; and
- risks related to impairment losses with regard to goodwill.

The forward-looking statements contained in this material are based on information that NEC possesses as of the date hereof. New risks and uncertainties come up from time to time, and it is impossible for NEC to predict these events or how they may affect the NEC Group. NEC does not intend to update or revise any forward-looking statements, whether as a result of new information, future events or otherwise.

Note: In this presentation, the accounting periods of the fiscal years for March 31, 2022, 2023, and 2024 were referred as FY22/3, FY23/3, and FY24/3 respectively. Any other fiscal years would be referred similarly.