

NEC Vision 2019

Safety
Security
Efficiency
Equality

Digital Solutions for Social Challenges

NEC is committed to creating social value with our partners.

Working together, we can create safer, more secure, more efficient and more equal societies, so that people around the world can lead better lives.

We are confident that our global leadership in information and network technologies will be an invaluable asset for achieving this meaningful goal.

Akihiko Kumagai

Senior Executive Vice President,
President of Global Business Unit



Orchestrating a brighter world

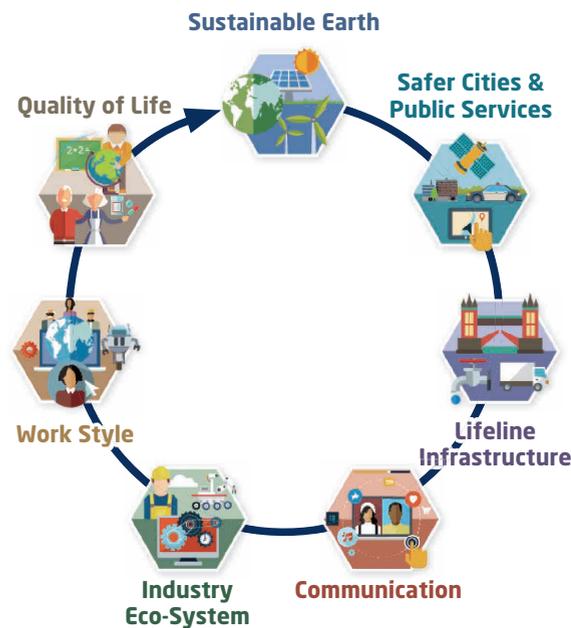


The Seven Themes for Social Value Creation

NEC is orchestrating innovative solutions for business and social challenges. We have devised seven themes for social value creation.

These themes are harmonized with the Sustainable Development Goals (SDGs) in terms of the establishment of goals based on social issues.

Focusing on these themes, we will work to realize safe, secure, efficient and equal societies, and enable people to lead brighter lives.





CITY MANAGEMENT IN A DIGITAL AGE

By 2050, the urban population will almost double to reach 6.3 billion. The movement of people and things will continue to increase as well. Existing infrastructure and resources will not be able to handle these growing demands. Meanwhile, the amount of data generated from technological advances will increase, too. Cities will be able to use this data to provide better and more efficient services, and develop attractive communities, while also making sure their city is safe.



01 | Safety and Peace of Mind

A city's safety is essential for maintaining comfortable daily lives for citizens, and promoting economic activity and employment. It provides citizens with peace of mind, and attracts tourists, businesses and events. Digital tools can greatly enhance safety, such as by reducing criminal activity and shortening the time it takes to solve crimes.



02 | Seamless Citizen Experience

Growing populations demand an ever greater number of services. Cities must not only provide these services more efficiently, but also create new and better experiences to make themselves more attractive to citizens and businesses. Empowered by digital technologies, administrators have begun doing just that, such as by offering more seamless access to transport or administrative services.

► NEC Safer Cities

NEC will leverage its AI and biometrics technologies to create cities that are safe, secure, efficient and equal, focusing on the three key fields below.



NEC the WISE

AI technologies from NEC
for enriching human intellect and creativity

“NEC the WISE” is a portfolio of over 20 cutting-edge AI technologies, many of which are one-of-a-kind or the best in the world.

Digital
Government



Public
Safety



Smart
Transportation



NEC biometric authentication

 Bio-IDiom

“Bio-IDiom” combines one-of-a-kind or world-class biometric authentication technologies that use the physical features of face, iris, ear, voice, palm and finger to identify individuals. Possible applications range from security to services.

Public Safety

Less Crime, Safer Communities

With the growing threat posed by terrorism and crime, cities need to enhance their situational awareness, optimize personnel allocation and quickly deal with incidents, while also balancing security with convenience.

NEC's public safety solutions make preventing and combatting crime more efficient, and citizens' lives safer. In addition, these solutions facilitate the provision of secure, smooth and even personalized services to citizens, thereby enhancing their everyday experience.

Improved Response Time

Facilitate quicker response by law enforcement with real-time alerts based on AI data analysis

Informed Policing

Enhance the situational awareness of law enforcement and city officials, enabling optimized use of limited resources

Predictive Policing

Allow law enforcement to take preventative measures against crimes by detecting early signs of threat

Safer and Happier Citizens

Enable citizens to lead safe and secure lives, empower them to verify their identity digitally with biometrics, and enhance efficiency

► Why NEC ?

50 + years

50+ years of R&D and business experience

World **no. 1**

No. 1 fingerprint, face and iris ID technologies by NIST benchmark tests

700 + systems

Installed 700+ systems in 70+ countries



Case Study Metropolitan Police Service

Transforming Policing in London

The Metropolitan Police Service (MPS) will use CONNECT, a technology platform supplied by Northgate Public Services, a wholly-owned subsidiary of NEC.

CONNECT will support the MPS in transforming and enhancing the way it prevents crime and supports victims. With CONNECT, the MPS will be able to manage all information on intelligence, investigations, custody and prosecution in one integrated system. This information can also be accessed remotely, anytime and from any device.

CONNECT will enhance the situational awareness of the MPS and its officers, allowing them to make informed decisions on the frontline and refocus resources to where they are needed the most. It will support faster investigations, more accurate intelligence, safer custody processes and more successful prosecutions, making London safer and more comfortable for citizens.

Customer testimonial

“The technology will greatly support investigations and our work in keeping the public safe and bringing offenders to justice.”

Duncan Ball
Deputy Assistant Commissioner, MPS

Case Study Ladies Professional Golf Association

Safer and More Enjoyable Events for All LPGA Stakeholders

As Official Technology Partner of the Ladies Professional Golf Association, NEC provides biometric solutions during select events to improve the safety, security and overall event experience of pro players, golf fans, event staff and media across the United States.

NEC’s Enhanced Video Analytics (EVA) identity verification enables fast and safe event entry, by matching faces and behavior to an LPGA Watch List, and alerting security as needed. Meanwhile, NEC NeoFace® Express protects professionals in “Players Only” locker rooms, limiting entry to only the approved. NEC biometrics has also been used to improve media verification and credential management, simplifying and safeguarding registrant access.



Customer testimonial

“NEC’s strategic partnership brings innovations that enhance the fan experience, and provides an expanded level of safety and security for players and fans alike.”

Jon Podany
Chief Commercial Officer, LPGA



Digital Government

Better Service, Improved Citizen Experience

Paper-based processes can be time-consuming and complex, both for governments and citizens. They are also susceptible to clerical errors or even fraud.

NEC's digital government solutions make administrative operations more efficient and enable easy analysis for detecting potential problems. Citizens also benefit from more convenient public services, increasing transparency and trust between governments and citizens.

Optimized and Secure Operation

Optimize services for citizens, and reduce fraud and errors for more efficient operations

Stress-Free Public Services

Provide citizens with more control over their personal information, and make applications and processing for public services easier



Case Study Unique Identification Authority of India

Biometric Identification for Over 1 Billion People

In 2010, the Unique Identification Authority of India (UIDAI) launched the Aadhaar Program, one of the largest national identification systems in the world with over 1.2 billion members. As with any identification system, it is essential to prevent duplicate registrations and to stop people from impersonating others. With so many citizens, simplifying registration procedures, and ensuring accuracy and efficiency are also a must.

By using NEC's biometric identification system, which utilizes multiple biometrics such as fingerprints, face and iris, UIDAI achieved all of these goals. NEC is known for its technological superiority, with its fingerprint, face and iris identification technologies ranking first in benchmark tests by the US National Institute of Standards and Technology.

► Why NEC ?

30 + years

30+ years of experience in developing administrative systems

20 %

Technology used in ID systems covering almost 20% of the global population

Cutting-Edge AI

Powerful data analysis capabilities of "NEC the WISE"

Smart Transportation

Smooth Transport Experience

Public transport congestion is a critical issue in urban areas. More efficient and stress-free transport modes are urgently needed.

NEC's smart transportation solutions offer a smoother experience, safer and more efficient operations, and increased revenues for transport operators. They also increase the overall accessibility and connectivity of cities, contributing to thriving local communities and economic activity.

Accessibility

Offer transport services that are easily accessible for everyone

Optimized Performance

Advanced transportation for safer, more efficient and more comfortable service

Case Study

Citybus & NWFB /
NEC Laboratories Singapore

Intelligent Bus Service for Urban Customer Satisfaction

NEC is helping bus operators to enhance processes and customer service. In Hong Kong, NEC has set up a system for fleet management, interfacing with automatic fare collection and automatic bus stop announcements for Citybus & NWFB. The system frees bus captains from additional manual operations, and provides multilingual information to passengers via displays and announcements. Furthermore, data transfer between buses and the backend can also be configured to transmit over the air in real time.

As another example, NEC Laboratories Singapore and NEC Laboratories Europe have developed a Smart Command Centre that combines more accurate, AI-assisted arrival prediction and schedule optimization tools. This enables bus operators to quickly address operational issues, for better KPIs and greater customer satisfaction.



► Why NEC ?

200 + customers

200+ customers in approximately 20 countries

30 + years

30+ years of experience in public transportation technologies

World-Class R&D

Global R&D network, with labs in Singapore, Germany and Japan



ADAPTING TO A HYPER-CONNECTED AGE

Advances in network technologies have been transforming all industries, giving rise to new consumer experiences, services and businesses, such as those utilizing the Internet of Things, or augmented or virtual reality. At the same time, as sectors, businesses and even things become increasingly inter-connected, this will produce ever greater volumes of data and network complexity. The role of networks is now more important than ever before.



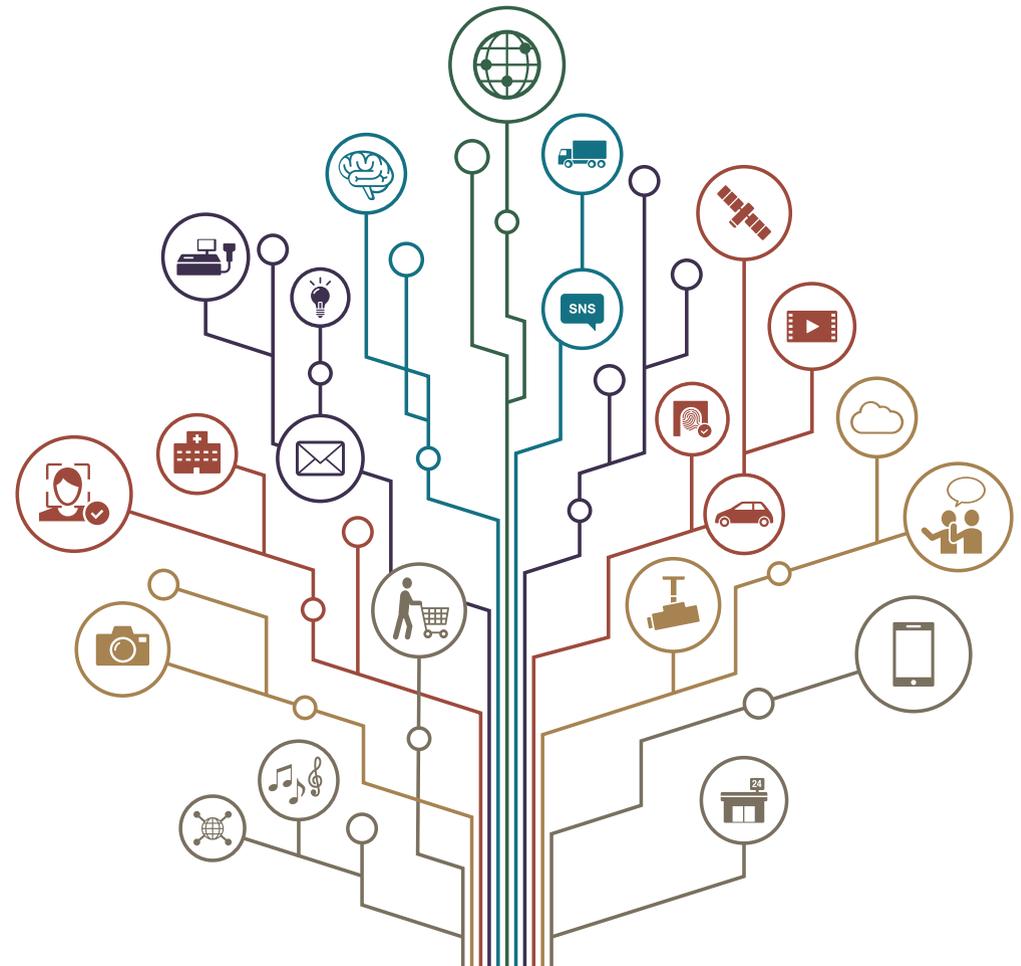
01 | Digital Transformation

As industries are being transformed digitally, businesses must adapt or be left behind. They need to change not only their business models and services, but even the networks they use. Networks are at the very heart of the digital revolution.



02 | Network Resiliency

In a hyper-connected age, where everything is linked, networks and other social infrastructure permeate all aspects of society and our lives. More and more is expected of such infrastructure, and it needs to be highly resilient, and able to support seamless and comfortable access at all times.



Smart Connectivity

Networks for a New Age

Customers constantly demand faster, newer and better services. They also expect to be able to connect effortlessly to services at any time. The only way for any service provider to meet these needs and achieve profitable growth is to leverage the power of networks.

NEC provides end-to-end orchestration of network environments, eliminating the burden of managing complex networks, and satisfying end users. Our experience and highly reliable technologies enable consumers to seamlessly access new services at all times and lead better lives.

Borderless Creativity

Generate new, cross-sectoral services and businesses, and achieve profitable growth, using next-generation network infrastructure

Always Connected

Maintain customers' trust and peace of mind, with highly-reliable and always-connected network environments

Flexibility and Efficiency

Provide wide-ranging services quickly and flexibly, for both customer satisfaction and efficient operations

► Why NEC ?

Global players

Extensive track record co-creating new services with leading global players

20+ years

Implemented management solutions for 250+ companies over 20 years

170 countries

Installed network systems in approximately 170 countries



Frank DeTraglia

Chief Sales Officer
Netcracker Technology



Shigeru Okuya

Senior Vice President
NEC

Enabling Customers to Fast-Track Cloud B2B Service Initiatives, Eliminating Time, Cost and Complexity Barriers

NEC and Netcracker, a subsidiary of NEC, are focused on helping service providers offer next-generation, virtual connectivity and digital services to their enterprise customers. By offering a cloud-based, as-a-service model, we provide customers with a game-changing alternative to building their own telco cloud infrastructures, enabling them to deploy new services in a matter of weeks, not years. The Netcracker Business Cloud is the industry's first full-stack, cloud-based SDN/NFV solution as a service, providing dramatic reductions in time-to-market, while opening disruptive business models that enable service providers to introduce differentiated B2B services and deliver more personalized customer experiences. We empower service providers to seize new opportunities and grow their businesses by supplying *Smart Connectivity* in the 5G era.

Case Study **Bechtle AG**

Multi-Cloud Service-Based Platform for the Enterprise Market

In 2017, Bechtle AG, one of Europe's leading IT integrators and service providers, sought to launch a new cloud-based portal and marketplace to host a range of digital enterprise applications for its business customers across Europe. It selected Netcracker, a wholly-owned subsidiary of NEC, to be its partner based on Netcracker's expertise and established track record.

Leveraging Netcracker's comprehensive business support system (BSS) and digital marketplace solution, Bechtle has been able to generate additional revenue streams by provisioning new services and incorporating a flexible pricing model. Furthermore, by expanding its portfolio of cloud services, Bechtle is providing greater diversity of products, services, options and delivery methods to enterprises across Europe.

Customer testimonial

"Our investment in a new, next-generation cloud platform gives our customers added flexibility when procuring software and IT infrastructure services."

Harald Weickert
CTIO, Bechtle AG





Case Study New South Wales Police

Core Technology in NSW Police's Dedicated Radio Communications Network

The New South Wales (NSW) Police Force operates a dedicated emergency services communications network for first responders covering the whole of NSW. Critical to this network is NEC's ultra-compact microwave communications system. Though small and light-weight, it also has high capacity and environmental resilience, thereby reducing installation and operational costs. The system is also ideal for rural and remote areas, thanks to its low power consumption.

NEC's technology provides NSW Police and its 20,000 staff with reliable service and enhanced coverage in a cost-effective manner for a more secure and resilient communications infrastructure. Equipped with improved communications and situational awareness, NSW Police is able to further enhance public safety.

Customer testimonial

"The new iPASOLINK platform is underpinning our critical radio communications network, essential to the protection of NSW's seven million people."

David Brogden
Commander, Wireless Technology, NSW Police Force

Case Study Amazon Web Services, China Mobile International and Facebook

Submarine Cable Directly Connecting Asia and the USA

Driven by social media and booming e-commerce, the demand for digital capacity continues to grow. This is especially true between Asia and the United States, where network traffic has doubled every two years and is expected to continue on this trend.

A global consortium including Amazon Web Services, China Mobile International and Facebook is planning the first optical fiber submarine cable, which will directly connect Singapore and Hong Kong to San Francisco. This cable will enable high-capacity data transmission directly across the Pacific Ocean, and improve network redundancy and flexibility. NEC, one of the top-three vendors of optical fiber submarine cables with over 50 years of experience, has been selected to be the full turn-key system supplier.





Lifeline
Infrastructure

SMART ENERGY

Efficient, sustainable and cost-effective power is critical for a safe and secure society. As variable electricity generation like wind and solar increases, however, this becomes harder to provide.

NEC is enabling the digital transformation of the electricity sector through cost-effective and reliable energy storage systems, combined with an advanced energy enterprise platform.

► Why NEC ?

400 megawatts

Over 400 MW of energy storage systems installed, under construction or awarded

14 countries

Implemented projects in 14 countries

10 + years

10+ years of experience in grid energy storage

Develop New Business Models

Realize new revenue and business models in electricity markets being transformed by renewable energy and energy storage

Less Expensive, More Secure Operations

Use energy storage to reduce demand charges and shift consumption to less-expensive times, as well as to provide backup power



Case Study ► Eneco and Mitsubishi Corporation

Europe's Largest Lithium-Ion Battery System

Stabilizing grid frequency is essential for a secure power supply. In Europe, this is becoming more challenging, as more electricity is produced through variable generation using renewable sources. Recently, fast-operating and non-polluting battery energy storage systems have emerged as much more effective options for grid stabilization than conventional fossil fuel generators.

NEC Energy Solutions has provided Eneco and Diamond Generating Europe, a wholly-owned subsidiary of Mitsubishi Corporation, with a grid storage solution, installing a 48 MW single lithium-ion battery system, Europe's largest, in Germany. Operational since June 2018, it can also optimize wind power output and supply, thereby reducing wasted wind energy.

Co-Creating the Future Laboratories and New Activities

NEC's global network of research laboratories is working together with customers to co-create the future. At the same time, we are constantly taking on other new and innovative challenges as well.

dotData

Accelerating Data Science with AI

dotData, Inc. is a Silicon Valley-based startup carved out of NEC Corporation. dotData simplifies and automates enterprise data science by utilizing its proprietary AI technologies. dotData's product has been proven to drastically shorten turnaround time for a typical data science project from months to days. Moreover, it enables anyone in an organization to execute data science projects, further accelerating enterprise data science.

Silicon Valley
(Cupertino, Santa Clara)

Princeton

Murcia

London

Heidelberg

Beijing

NEC Central
Laboratories
(Japan)

Mumbai

Singapore

NEC X

Accelerating Business Development in Silicon Valley

Located in Silicon Valley, NEC X is capitalizing on the local startup ecosystem and NEC Central Research Laboratories' technologies to accelerate the development of new businesses that contribute to creating new social value. It is actively seeking to collaborate with local startups and venture capital firms to generate new business ideas enabled by state-of-the-art technology.

Advanced Centre for Experimentation

"Living Lab" for Co-Creation of Solutions for Societies

NEC's Advanced Centre for Experimentation (ACE) in Singapore leverages NEC's core technologies and solutions to create new value and contribute to safer and smarter societies. ACE allows co-creation of solutions for social challenges, and serves as a "Living Lab" for proof-of-concepts for advanced solutions that help customers and partners, including governments and enterprises.

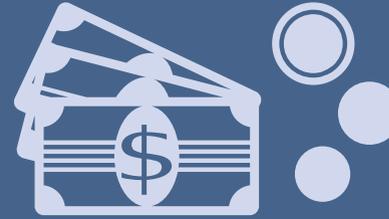




Establishment

Established

1899



Sales

Over

US\$26B

in annual revenue (FY2017)

NEC by the Numbers



Global Networks

303 group companies,

169 countries & territories

Employees

Over **100,000**

employees



Awards

2018 Thomson Reuters

Top **100**
global technology leaders

Tech Leadership

1 of only **5** Platinum Members
of the FIWARE Foundation worldwide

Patents



Approximately

51,000
patents as of March 2018

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<https://www.nec.com/en/global/about/vision/notice.html>

Other

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©NEC Corporation 2018 Printed in Japan Cat.No18110095E

NEC Vision

Website

Introduces NEC's vision for social value creation and our initiatives for realizing this vision.



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