

Empowered by Innovation

NEC



TABLE OF CONTENTS

01

Executive Summary

02

Introduction

04

Safety:
The Foundation
of a Livable City

06

Sustainability: Planning
for The Future

08

Seven Solutions for
Livable Cities

1

Emergency & Disaster
Management

2

Critical Infrastructure
Management

3

Law Enforcement

4

Citizen Services &
Immigration Control

5

Information Management

6

Inter-agency Collaboration

7

Public Administration
Services

13

Livable Cities
Powered by NEC

EXECUTIVE SUMMARY

As cities grow and flourish, they also face increasingly complex challenges, ranging from the immediate needs of their citizens to staying sustainable in the long term.

To deal with immediate concerns, city planners need to have robust emergency preparedness schemes and the capability to manage both physical and virtual crimes. But cities also need to take the long term view and plan for renewable energy, green buildings and waste reduction.

Technology can play a significant role in helping cities stay both safe and sustainable. The most attractive cities of the future will be those that have used technology to their advantage. NEC has identified seven areas of interest where technology can help build safe and sustainable cities:

- To respond to **emergencies and disasters** quickly, governments need on-demand systems to integrate information, analyze the data and communicate with first responders and the public.

• Automated surveillance systems will reduce the dependence on human labor and provide round-the-clock monitoring of **critical infrastructure** such as power, water and telecommunications services.

• Facial recognition systems and other predictive technologies could help shift **law enforcement** from reactive to proactive.

• Biometric identification systems, which have the potential to reduce human error and processing time at borders, will provide better **citizen services and immigration control**.
- Strong **information management**, through enhanced security measures and data protection schemes, will help institutions and corporations defend against cyber-attacks.

• Technology platforms can facilitate efficient collaboration between different branches of the government, enhancing **inter-agency collaboration**.

• Electronic security measures can protect sensitive **public administration services** from virtual risks, while data analytical tools can be used to predict disease outbreaks.

INTRODUCTION

Cities concentrate both human and capital resources, thereby promoting social and economic progress. In East Asia, the urban population produces 92 percent of the region's wealth. Generally speaking, urban populations tend to be better off than their rural counterparts, with greater access to public services such as transport, education and healthcare, as well as higher literacy rates and life expectancy.

Driven by these benefits, the global population has tended towards ever increasing levels of urbanization. As recently as 1990, less than 40 percent of the global population lived in cities, according to World Health Organization estimates. Presently, more than half the world's population lives in urban areas, and by 2050, this number will grow to 70 percent. Most of the growth in urbanization will come from developing countries, which are expected to double their urban population from 2.5 billion in 2009 to almost 5.2 billion in 2050.

Statistics such as these are necessary to give a sense of the scale of the challenges confronting governments and city planners. However, it is important to look beyond the statistics to address the people-centric question of what life will be like in these cities. In other words, the focus should not just be on how these future cities can be made possible, but how they can be made livable.

Each city may come up with a different answer to this question, based on its own unique set of geographical, economic or social circumstances. Articulating a vision of an ideal livable city often necessitates tough choices between competing or even conflicting aims. Nevertheless, there remain two foundational principles that form the basis of a livable city: the need to be both safe and sustainable.

“CITIES HAVE THE CAPABILITY OF PROVIDING SOMETHING FOR EVERYBODY, ONLY BECAUSE, AND ONLY WHEN, THEY ARE CREATED BY EVERYBODY.”

Jane Jacobs,
urban theorist.

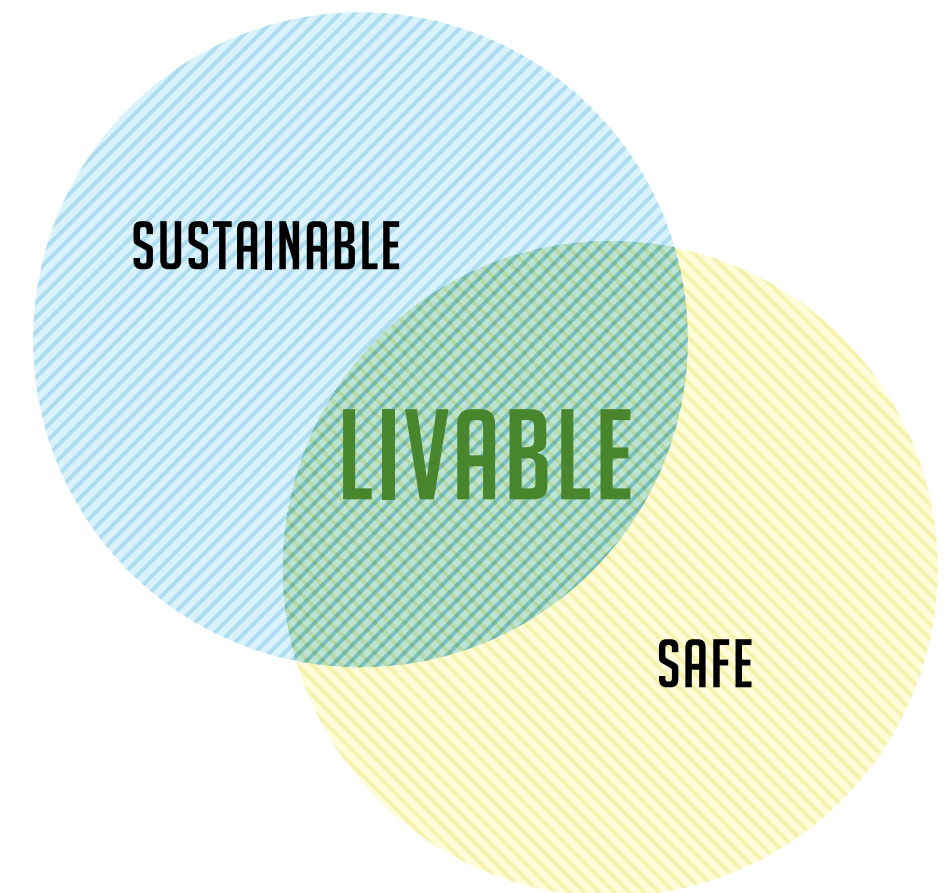
Livable cities: Safe and Sustainable

The foundation of a livable city is safety, upon which the other characteristics depend. Without a sense of personal and property security, institutions and businesses cannot function and society cannot flourish. Ensuring that citizens feel safe is a multidimensional task, and governments must prepare for disasters and provide effective law enforcement for both physical and virtual crimes.

While safety is an immediate concern to a city's inhabitants, cities need to remain sustainable in the longer term. The concept of a livable city is inseparable from sustainability. Resources must always be deployed with an eye to the future, placing long term goals over short term gains. The key areas which cities need to address are the use of renewable energy, green urban planning and waste reduction.

Recognizing that the “livability” of a city is a crucial issue, there have been several attempts to systematically understand the livability of cities, including the Economist Intelligence Unit's Livability Ranking and Overview and Mercer's Quality of Living Survey and Global Livable Cities Index. These rankings have been developed for corporate compensation packages for expatriate staff, and are therefore useful for estimating an individual's quality of life in each country.

But the yearly rankings focus on existing infrastructure and institutions, rather than the qualities that make cities more livable in the future. What they provide is a snapshot in time, not how these cities will evolve. For cities trying to identify growth strategies and plan for the future, they must engage the right team of government agencies and build cities that can withstand the test of time.



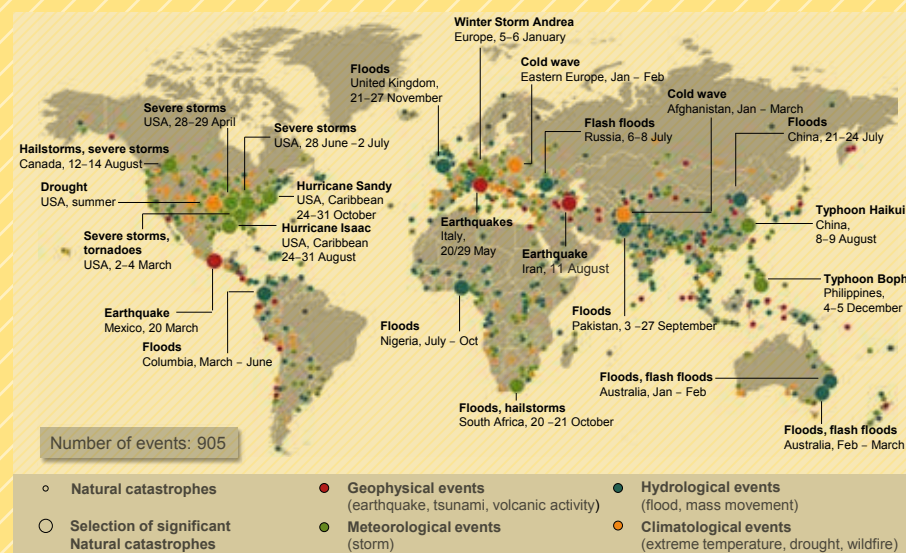
SAFETY – THE FOUNDATION OF A LIVABLE CITY

Expecting the unexpected

While it may be difficult to predict exactly when a disaster will strike, it is certain that natural and man-made disasters are increasing in both frequency and cost. According to a UN report on disaster impacts for 2000 to 2012, 1.7 million people died in disasters, and an estimated US\$1.7 trillion of damage was sustained. A 2013 study by insurance provider Swiss Re estimates that up to 864 million people will be affected by floods, earthquakes, storms and tsunamis in the near future.

As the map of natural catastrophes in 2012 below shows, no continent is left untouched by natural disasters (Figure 1). As the human population continues to grow and make further demands on existing natural resources, the resulting climate change might exacerbate the frequency and severity of future natural disasters. The UN Office for Disaster Risk Reduction (UNISDR) considers a high degree of urbanization to be a risk factor for more severe disaster outcomes. However, greater risk exposure need not mean greater vulnerability, as much depends on how cities are managed.

Figure 1. Natural catastrophes around the world in 2012



Source: Munich Re.

Disaster risk management is especially important for cities. The 2011 Great East Japan magnitude nine earthquake and the subsequent Tohoku tsunami severely tested Japan's highly advanced warning system, seawalls and evacuation plans. The tragedy cost an estimated US\$150 billion and took 18,000 lives, or four percent of the population located in the inundation area. In contrast, the 2004 Indian Ocean tsunami resulted in over 20 percent fatalities in the inundation area. While no technology or plan can completely prevent a disaster from happening, Japan's disaster preparations nonetheless can be said to have saved the lives of many and limited the extent of damage done.

Apart from protecting human lives, anticipating disasters and taking preventive measures could also result in substantial savings. A study of flood prevention measures in Bangladesh concluded that approximately US\$40 was saved for every dollar invested in the regional forecasting and warning system. Similarly, communities in the Democratic Republic of Congo on a small-scale water management project saved US\$46 for every dollar invested by the humanitarian agency USAID. In addition, the efforts of the project participants managed to reduce cholera prevalence by 90 percent.

Physical and virtual crimes

While city dwelling confers benefits such as better policing and closed circuit television (CCTV) monitoring of public spaces, population density is also positively correlated with crime rates. According to a 2011 study by the UN Office on Drugs and Crime (UNODC), the most densely populated areas had the highest homicide rates, with homicide rates increasing as a function of population density.

In addition to homicide, overall victimization for a number of different crimes is increased in urban environments. For example, inhabitants of densely populated areas in European Union countries were found to be more than twice as likely to experience crime as inhabitants of intermediately populated areas, and almost three times as likely to experience crime compared to those living in sparsely populated areas. The failure to tackle crime can hinder or even completely paralyze the economy. For example, the high rates of violence and insecurity in Kingston, Jamaica and Nairobi, Kenya have brought their once thriving tourist sectors to a standstill.

Aside from physical crimes such as homicides, governments increasingly have to contend with virtual or cybercrimes. The Internet has become an indispensable part of everyday life, as both a means of communication and entertainment. From personal computers to mobile phones and tablets, it is now impossible for many to imagine a functioning world without it. Adopting the Internet and information technologies in general can lead to immense economic growth. The World Bank estimates that a ten percent increase in broadband penetration in low and middle income countries would result in a 1.38 percent in GDP growth. Apart from economic growth, the Internet also gives remote communities access to vital services such as education, healthcare and e-governance.

Yet Internet use is not without its dark side; cybercrimes have risen in parallel with the explosive growth of Internet users. While the rate of physical crimes such as burglary, robbery and car theft is under five percent, the rates of cybercrimes such as online credit card fraud, identity theft, phishing attempts and unauthorized access to an email account vary between 1 and 17 percent of the online population.

While nearly all law enforcement agencies report an increasing or strongly increasing number of cybercrime acts, including hacking, identity theft and the production, distribution or possession of child pornography, only the most serious cases are reported. One UNODC survey of almost 20,000 individual Internet users in 24 countries showed that only 21 percent of respondents who had been the victim of cybercrime reported the act to the police. Another UNODC study found that online consumer credit card fraud alone was more than 80 times greater than total police recorded computer-related fraud and forgery in the same country. These figures suggest that law enforcement agencies have yet to confront the true depths of cybercrime.

SUSTAINABILITY – PLANNING FOR THE FUTURE

Climate change, which is arguably this century's greatest challenge, is the collective result of billions of people acting in a self-interested manner, across different continents and different circumstances. Cities are the biggest consumers of resources and also most likely to be impacted by the climate change that result from overconsumption of the same resources. Up to 75 percent of global energy consumption and a similar proportion of all waste come from cities.

Due to historical and practical reasons, many cities are located along coasts. This means that a mere one meter rise in the sea levels will endanger many major cities, including Rio de Janeiro, Shanghai and New York. Furthermore, heat waves, air pollution and an increase in infectious disease are all threats that are exacerbated by climate change. Clearly, reducing the environmental footprint of cities will continue to be a high priority for governments around the world.

Sources of renewable energy

In 2010, 1.3 billion people were without electricity. As the population increases and electricity coverage is extended, electricity consumption and generation is expected to rise by up to 150 percent, from 21.5 billion MWh in 2010 to 53.6 billion MWh in 2050. Renewable sources of energy such as solar, wind and biofuels are expected to play an increasingly important role in meeting the growing global demand for energy, contributing an estimated 30 percent of the energy mix in 2050, up from 15 percent in 2010.

Reducing dependency on traditional energy sources like coal and oil is not just a matter of encouraging the adoption of green technologies. The energy generated from renewable sources needs to be integrated into the existing supply grid without destabilizing the system. This is complicated by the fact that renewable energy, especially wind energy, is variable, necessitating expensive storage. When power-grids are unable to handle a surge in energy supply, the energy is dumped in a process known as curtailment.

For cities that have begun to adopt renewable energy sources, the energy balance can be managed more reliably and efficiently using smart grid technologies, which monitor, store and distribute energy across many different sectors. When deployed effectively, smart grids can save energy through peak load management and reduce system losses through the integration of large-scale, variable renewable power generation.

Green urban planning

A truly sustainable city is not only concerned with energy use, but with how the whole city is planned. Densely populated, more compact cities can actually be better for the environment than large urban sprawls, as transport times are reduced and environmentally damaging activities contained. Supplying water, sewage and electricity lines to low population density areas means that resources have to travel over a longer distance to serve relatively fewer people.

However, beyond a certain point, a high population density can begin to exert negative effects that exceed the benefits provided. Overcrowding can lead to congestion, pollution and a loss of green space, which ultimately lower the quality of life. An excessively high population density can also increase the cost of doing business as cost of land increases and as the lack of space restricts new infrastructure from being built.

Consciously including green spaces in urban environments has numerous benefits, including the sequestration of carbon dioxide, reduction of solar heat gain and prevention of floods and other natural disasters. Furthermore, increasing public green spaces also improves the quality of life for citizens, making cities more attractive to live, work and play in.

City planners should also develop and execute plans that mitigate climate change, such as by implementing stormwater management infrastructure in anticipation of floods. However, challenges arise as the action on sustainability issues often requires the coordination between many different government agencies and a collective approach. This is in addition to the challenges of brokering public private partnerships and engaging the community at the national and local levels. Nonetheless, adopting a reactionary approach to the impacts of climate change may lead to increased costs when dealing with the fallout later.

**“CITY GROWTH HAS
CAUSED CLIMATE CHANGE,
BUT THAT GROWTH IS
ALSO WHAT’S GOING TO
GET US OUT OF IT.”**

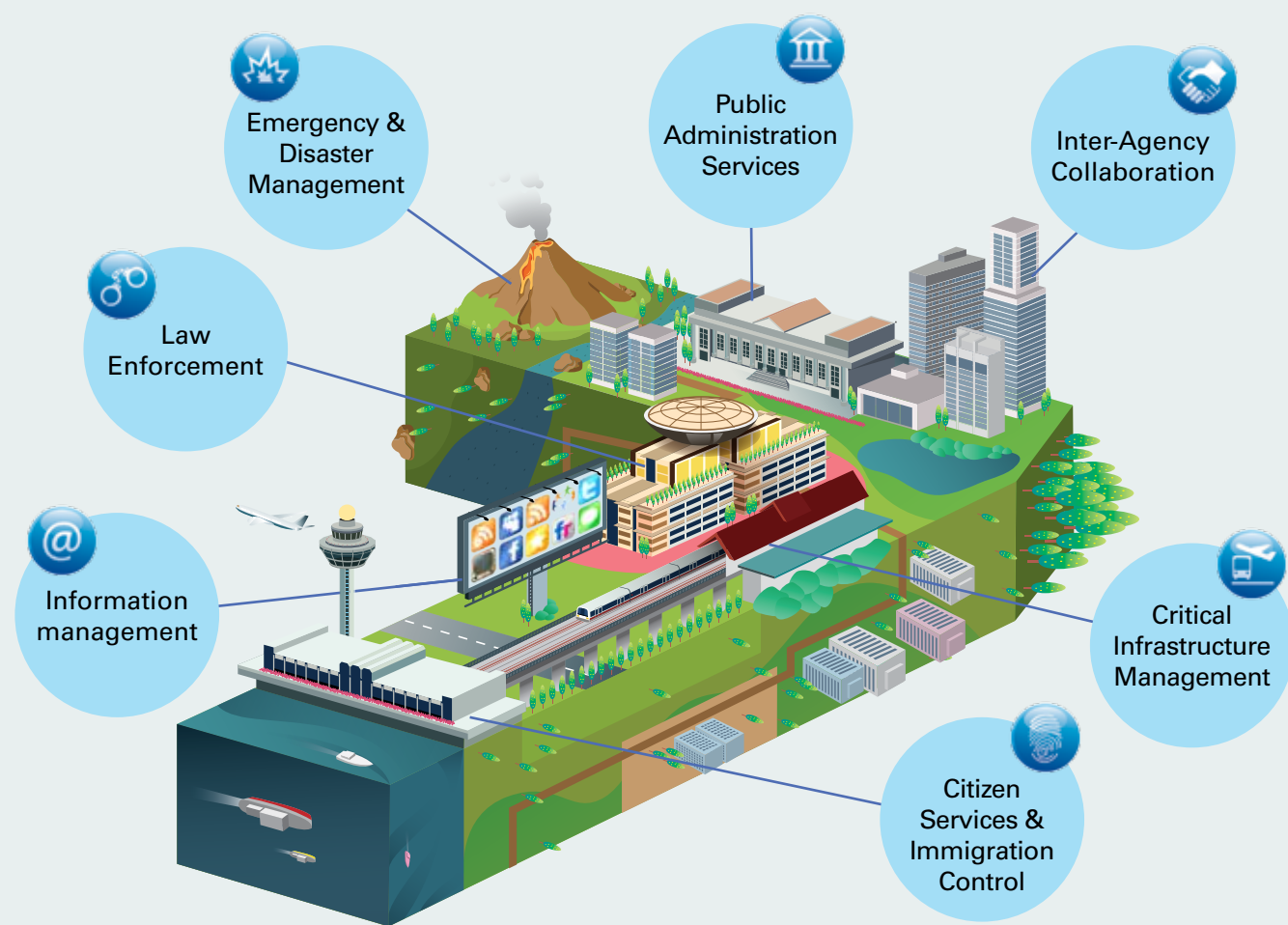
**Matthew Kahn,
Economist from the
University of California,
Los Angeles**

SEVEN SOLUTIONS FOR LIVABLE CITIES

While it may be impossible to anticipate every eventuality, it is prudent for governments to plan for adverse events. Technology can play a significant role in identifying and managing risks, ultimately making cities safer and more sustainable.

Governments all over the world have relied on NEC's expertise in infrastructure and identity management to provide solutions for livable cities, with ten percent of the world's population captured under NEC's identity management system. Informed by our global reach and experience, NEC has identified seven key areas where technology can make an impact on the delivery of public services.

Figure 2: Seven solutions to livable cities



In each of the seven key areas of concern, NEC has developed specific technologies that can address them. Many of these solutions have been successfully implemented in real world situations, ranging from facial recognition technology for the Pennsylvania Justice Network (PNET) in the United States to the energy storage system for Enel Distribuzione in Italy.

EMERGENCY & DISASTER MANAGEMENT

Gathering information, automated analysis and quick communication

No city is immune to disasters. Even regions fortuitously protected from earthquakes and volcanoes could face natural disasters such as hurricanes, floods and tsunamis or man-made disasters such as train collisions or terrorist attacks. In the event of an emergency, pre-existing preparedness measures and the rapid execution of post-emergency plans could make the difference between life and death for those affected.

Governments must quickly collect information, process it to reach an optimal response, and disseminate the decision. NEC has solutions that cover the various sensors needed in gathering information on disasters and emergencies, such as surveillance cameras, water level gauges, rain gauges and seismometers. All these data can be seamlessly integrated at a command center, and then rapidly distributed to various agencies such as the police, army and hospitals.

Case study: Great East Japan Earthquake

The Challenge

The Great East Japan earthquake in 2011 highlighted the need for real-time information and quick communication. The emergency response system had to deal with dynamic conditions, including the damage to key infrastructure.

The Benefits

In such a fully integrated system, the flexibility in route rearrangement conferred robustness. The centralized consolidation of diversified data allowed for a prompt and accurate understanding of the disaster situation. Ultimately, accurate data in the hands of the first responders reduced damages and loss of life.

The Technology

NEC provided a full range of information gathering sensors, including seismometers and satellites which swung into action during the earthquake. These sensors were embedded in a two way communication system, allowing for timely data analysis and decision making, and the relaying of information to the public.

CRITICAL INFRASTRUCTURE MANAGEMENT

*Safeguarding power, water
and telecommunications*

Providing secure electricity, water and telecommunications services is the mandate of any city planner. These essential services keep society running behind the scenes, any disruption to them could bring the economy to a standstill. How can these vital installations be protected to ensure that life can continue to flourish in cities?

Threats may come from anywhere, requiring constant monitoring and surveillance. It is here that automation can make a significant impact. NEC has multiple tried and tested technologies including video analytics and harbor monitoring systems that provide reliable and sensitive protection.

LAW ENFORCEMENT

*Identifying criminals and
exonerating the innocent*

The perceived safety of a city is a major contributor to the livability of that city and a significant consideration for both individuals and businesses alike. However, crime rates tend to increase as the size of cities grow. The link between crime and population density could be due to social factors such as increased segregation or poverty, or other factors that encourage criminal behavior such as a higher number of affluent targets and the lower risk of being recognized and arrested. The challenge for governments is to ensure that citizens feel safe while continuing to enjoy the benefits of city life.

Biometrics is one way that technology can improve law enforcement. This is an area in which NEC has many decades of experience working with the police, prisons, and judicial systems around the world. NEC's automated fingerprint identification system (AFIS) is deployed in over 30 countries and has been validated as the best in the industry through comprehensive testing by the US National Institute of Standards and Technology. In combination with NEC's patented facial recognition system, NeoFace®, enforcement officials can better manage physical access, identify criminals and exonerate the innocent.

Case study: Pennsylvania Justice Network

The Challenge

The Pennsylvania Justice Network (JNET) is an online environment that allows law enforcement agencies and state offices to access criminal justice information. The heritage system had labor-intensive data entry methods and cumbersome user access, and more importantly, outdated facial-recognition technology with low matching accuracy.

The Technology

NEC's NeoFace® facial recognition matching algorithm and FACE Plus integrated facial recognition system from DataWorks Plus were selected to overhaul JNET. The updated system integrated facial recognition technology with an identity access management portal.

The Benefits

NEC analyzed the existing database of over 3.5 million criminal booking photos and devised a customized algorithm for JNET. This resulted in faster, more accurate identification matching that had the ability to work with poor quality and low-pixel count images. User access was made simpler and yet highly secure while remaining fully compatible with the existing system. The JNET Facial Recognition System received Laureate and 21st Century Achievement Awards from International Data Group's Computerworld Honors Program in 2012.

Opportunities and threats alike thrive in today's globalized world. Air travel is now ubiquitous and millions of people move across borders each day. Countries need to manage their borders well, ensuring that undesirable elements are kept out while creating a pleasant experience for business or leisure travelers.

Border control agencies deal with a high volume of human and goods traffic across checkpoints. Over many years of experience, NEC has developed a wide breadth of manual and automated border control solutions leveraging on its proprietary leading-edge biometric technologies. NEC has been entrusted with over ten percent of the world's population, or 700,000 people, underscoring their utility to governments around the world.

As more and more people and devices join the Internet, the number of potential targets for cybercrime increases. The world is also moving towards an "Internet of Things," where objects such as appliances, vehicles, power meters and medicines are assigned an Internet protocol (IP) address. The 2013 Norton report commissioned by Symantec Corporation found that as many as 38 percent of smartphone users had been a victim of cybercrime in the past year. Globally, cybercrime amounts to US\$130 billion in direct costs, including losses due to fraud and repairs.

Governments need to be able to collect and make sense of the large volume of data that inundates the cyberspace. This calls for big data analytics as well as more traditional security measures such as firewalls, intrusion-detection sensors and intrusion prevention measures. NEC provides a "bring your own engine" plug and play platform, facilitating partnerships across different environments and allowing governments to quickly update their systems as technologies evolve. NEC also has extensive experience in securing networks against hacking or virus attacks.

CITIZEN SERVICES & IMMIGRATION CONTROL

*High volume, high accuracy
screening at border controls*

INFORMATION MANAGEMENT

*Defense against
cyber threats*



INTER-AGENCY COLLABORATION

*Preventing silos and
facilitating efficient
collaboration*

Many of the challenges that city planners face require the cooperation of different branches of the government. The scope of the problems that cities face necessitates the involvement of diverse groups of people who may have conflicting practices or agendas. In order to launch a coordinated response, different arms of the government, with different levels of access, must contribute their own sets of data input. The issue at hand is essentially one of identity access management, an area in which NEC has considerable expertise.

Here, technology can be used to facilitate cross-agency collaboration. In the aftermath of a disaster, NEC has a suite of solutions that facilitate such collaboration, enabling governments to swing quickly into the recovery stage. Aside from application in crises, NEC's solutions can also be applied in energy management, to prevent wastage of resources and where governments would like to incorporate renewable energy sources into the grid.

Case study: The Safe City Test Bed In Singapore

The Challenge

The safety of a city requires the cooperation of many government agencies, which may sometimes have differing or even conflicting practices. The Singapore government has sought to harmonize the emergency services (the police and civil defense) with those in charge of environmental utilities (the National Environment Agency and Public Utilities Board) and transport (the Land Transport Authority).

The Benefits

NEC's solutions are expected to help the different agencies to overcome infrastructural and technical barriers to inter-agency collaboration, optimize the use of manpower, and improve situational awareness and anticipation of security threats.

The Technology

The Safe City Test Bed aims to develop state-of-the-art technology for use in improving public safety. In 2013, a consortium led by NEC Asia Pacific was one of the four selected to develop the Safe City Test Bed in Singapore. NEC's proposition is to build a complete, end-to-end inter-agency collaboration framework that uses technologies such as advanced data analytics, risk analysis and relationship modeling to allow agencies to integrate disparate information from various sources.

PUBLIC ADMINISTRATION SERVICES

*Protecting public services
from shocks and predicting
outbreaks*

Governments are increasingly moving many of their services online for a number of reasons, including increased convenience for its citizens, better transparency and cost efficiency. As the government holds sensitive personal information such as tax information and national identification numbers, the move to e-government needs to be accompanied by enhanced security measures.

In addition to virtual risks, governments also need to protect their populations from disease outbreaks resulting from an increased population density. As seen in recent outbreaks of bird flu and SARS, infectious diseases can cripple countries, exacting a high toll on human health and the economy.

NEC's technologies and platforms can help governments respond to both these challenges with a suite of customized solutions.

LIVABLE CITIES POWERED BY NEC

As the world rapidly urbanizes, the challenges confronting city planners are huge; but so are the opportunities to make life better for their citizens. In a highly globalized world, cities will need to compete with each other to attract both human and capital resources. The most attractive cities of the future will be those that make full use of technology to provide a safe and sustainable environment for their citizens. In contrast, cities that do not actively plan for the future are likely to be left behind.

Each city has a unique set of circumstances, such as different urbanization rates, geographical circumstances and socio-political issues, and will necessarily come up with different ways of meeting the diverse challenges faced. Determining the ideal level of urbanization and the most appropriate strategies for achieving a reliable level of safety and sustainability is a task that requires considerable public consultation and social engagement. A three-way dialogue among politicians, planners and the public needs to take place throughout the urbanization process.

There has been great interest in developing the capabilities of smart cities, but technology alone does not a livable city make. What is important is how technology plans are executed, and how they are received by the people that they are supposed to help. Large-scale urban transformation projects require the cooperation of many stakeholders within a single government, and a comprehensive framework is necessary to guide their actions.

Whether a city is looking to improve its emergency response capabilities or use its energy resources more wisely, NEC has solutions to help. To prepare for disasters, NEC has helped governments develop early warning systems and robust emergency response protocols, including command and control centers. To help cities stay secure, NEC is at the forefront of biometrics technology, ranging from automated border controls to biometric software and online security solutions. To reduce wastage and manage scarce resources, NEC is a strong proponent of the smart pooling of energy, especially for renewable sources. In addition, NEC has also introduced technologies that enhance inter-agency collaboration, breaking down silos and strengthening teamwork.

Nonetheless, NEC recognizes that creating a livable city is much more than the adoption of the latest technology. With our experience of working closely with city planners from more than 30 countries around the globe, NEC is committed to provide useful, satisfying solutions that are sensitive to the local context.

**“NO URBAN AREA WILL
PROSPER UNLESS IT
ATTRACTS THOSE WHO
CAN CHOOSE TO LIVE
WHEREVER THEY WISH.”**

**Jonathan Barnett,
Emeritus professor of city
and regional planning,
PennDesign.**

REFERENCES

- "Mind the Risk: A Global Ranking of Cities Under Threat", Lukas Sundermann, Oliver Schelske, Peter Hausmann, Swiss Re, 2013.
- "National Catastrophes 2012 World Map", Münchener Rückversicherungs-Gesellschaft, Geo Risks Research, NatCatSERVICE, 2013.
- "Extended-Range Probabilistic Forecasts of Ganges and Brahmaputra Floods in Bangladesh", Peter J. Webster, Jian Jun, Thomas M. Hopson, Carlos D. Hoyos, Paula A. Agudelo, Chang Hai-Ru, Judith A. Curry, Robert L. Grossman, Timothy N. Palmer, AR Subbiah, Bulletin of the American Meteorological Society, 91(11):1493-1514, 2010.
- "Economics of Disaster Prevention: Measuring the Costs and Benefits of Disaster Risk Reduction", Center for Strategic and International Studies (CSIS), 2011.
- "Global Study on Homicide: Trends, Context, Data", United Nations Office on Drugs and Crime (UNODC), 2011.
- "State of the World's Cities 2012/2013", United Nations Human Settlements Program (UN-HABITAT), 2012.
- "Comprehensive Study on Cybercrime – Draft", United Nations Office on Drugs and Crime (UNODC), 2013.
- "Hidden Cities: Unmasking and Overcoming Health Inequities in Urban Settings Report", World Health Organization, The WHO Centre for Health Development, Kobe, and United Nations Human Settlements Programme (UN-HABITAT), 2010.
- "World Energy Scenarios: Composing Energy Futures to 2050", World Energy Council, 2013.
- "The Norton Report", Symantec, 2013.

About NEC Global Safety Division

NEC Global Safety Division, a business division within NEC Corporation, spearheads the company's public safety business globally. The Division is headquartered in Singapore and offers solutions in the following domains: Citizen Services & Immigration Control, Law Enforcement, Critical Infrastructure Management, Public Administration Services, Information Management, Emergency & Disaster Management and Inter-Agency Collaboration. Leveraging on its innovative solutions, the Division aims to help government and business make cities safer.

NEC Global Safety Division

Global Headquarters: No.1 Maritime Square #12-10, HarbourFront Centre, Singapore 099253 For enquiries, please contact safety@gsd.jp.nec.com

nec.com/safety



The information contained in this white paper is the proprietary and exclusive asset of NEC unless otherwise indicated. No part of this white paper, in whole or in part, may be reproduced, stored or transmitted without the prior written permission of NEC. Unauthorised use or disclosure may be considered unlawful. It is intended for information purposes only, and may not be incorporated into any binding contract. This white paper is current at the date of writing only and NEC will not be responsible for updating the reader of any future changes in in circumstance which may affect the accuracy of the information contained in this white paper.

Copyright © NEC Corporation 2013. All rights reserved. NEC and the NEC logo are registered trademarks of NEC Corporation.