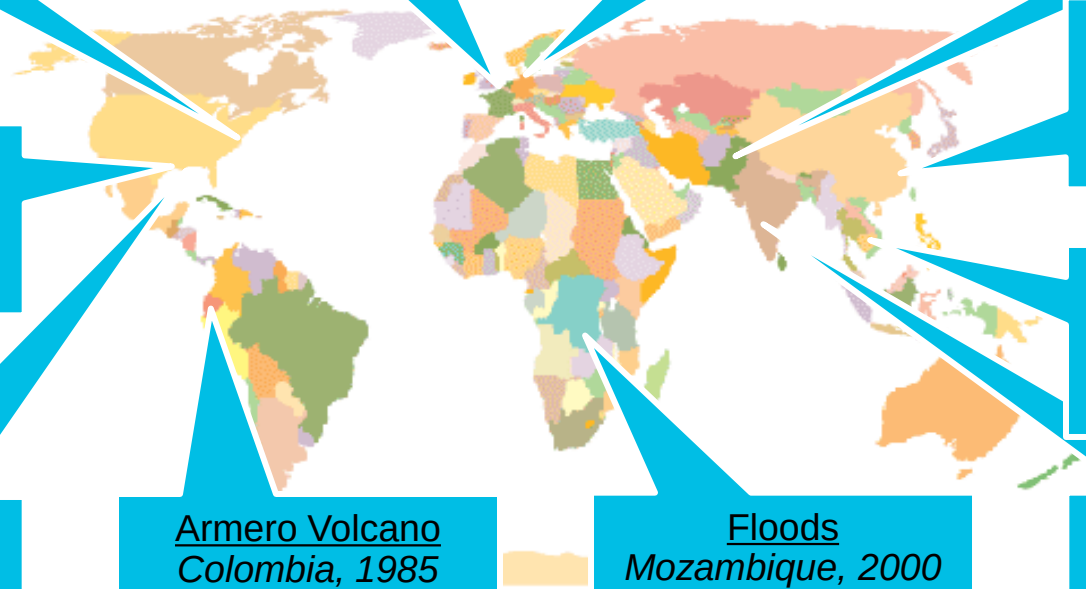
IBM Emergency Management Center

Rapidly-deployable, mission-based solution

Global impact – **USD288 billion**



SuperStorm Sandy
USA, 2012
USD53 billion

Floods
EU, Annually
USD4.3 billion

Storms
EU, Annually
USD3.6 billion

Earthquake
Pakistan, 2005
USD5.1 billion

Floods
China, 2010
USD19 billion

Hurricane Ike
USA, 2008
USD31 billion

Floods
Thailand, 2011
USD49 billion

Hurricane Katrina
USA, 2008
USD115 billion

Armero Volcano
Colombia, 1985
USD7.5 billion

Floods
Mozambique, 2000
USD424 million

Floods
India, 2005
USD701 million

Source: Barredo, 2009; Camp, 2010; Feyen and Walkiss, 2011; Moodys Analytics, 2011; NOAA/NCDC, Reuters, 2012; Swiss Re, 2006; World Bank.

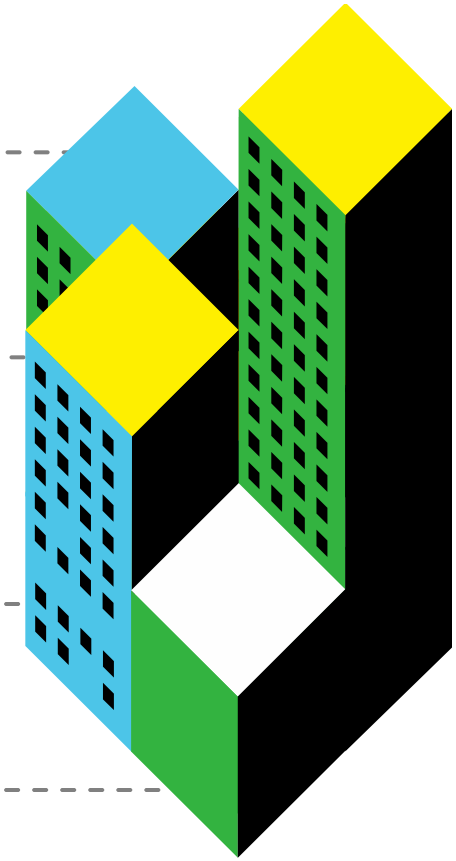
No populated region is exempt

Public protection is a top priority of cities and regional organizations

Societal protection has become more challenging as citizens demand more transparency via open data and mobile platforms

Governmental systems and processes struggle to transition from normal to extreme operations

Incident management is a not completely owned by any single entity



Real local challenges

What is happening in real-time?

'EVENT' Management

Plan, Monitor, Review

Planned **Events** *(Non Emergency)*

Unplanned **Events** *(Non Emergency)*

How well are you prepared ?

'EMERGENCY' Management

Situational Awareness / Command & Control

Planned **Events** *(Emergency)*

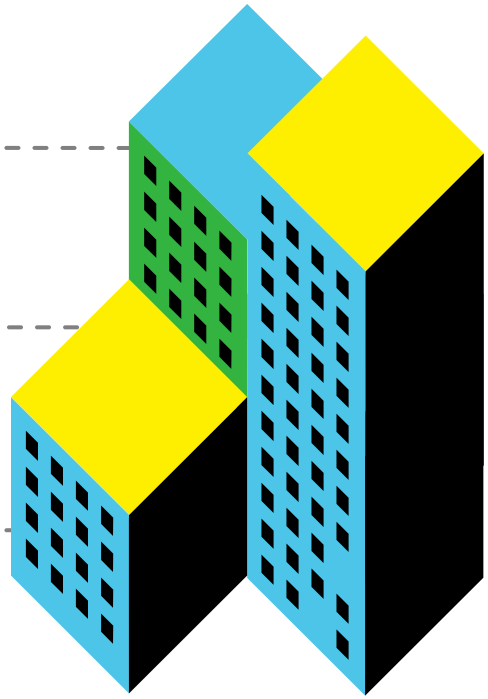
Unplanned **Events** *(Emergency)*

City leaders need forward-thinking emergency management

Solutions that can prepare, monitor and protect people and property from harm

Responses that are rapid and follow proven patterns for public safety incidents

Operational procedures that can continually improve to minimize the impacts of future events



"We believe that building a safer city will bring us one step closer to our ultimate goal of becoming a major growth pole in the international market."

—Sara Duterte-Carpio, Mayor of Davao City, Philippines

IBM's smarter approach to emergency management

- Helps ensure the city's infrastructure and residents are protected from harmful incidents
- Uses information to proactively identify potential incidents
- Provides an enhanced, appropriate and quicker response

Traditional approach	Smarter approach
Reactive	Proactive
Lack of coordinated response	Integrated response
Delivered by institutional memory	Well-proven and tested procedures
Poor operational picture	Near-real-time common operational picture
Custom solutions, hard to scale	Flexible industry platform, delivery models

IBM Emergency Management Center provides new ways to understand your environment

Integrate multiple data sources to provide a single, consolidated operational picture across the entire city or region

Deployment Ready
Hardware—Software—Services

Video analytics

Sensors

Citizen collaboration

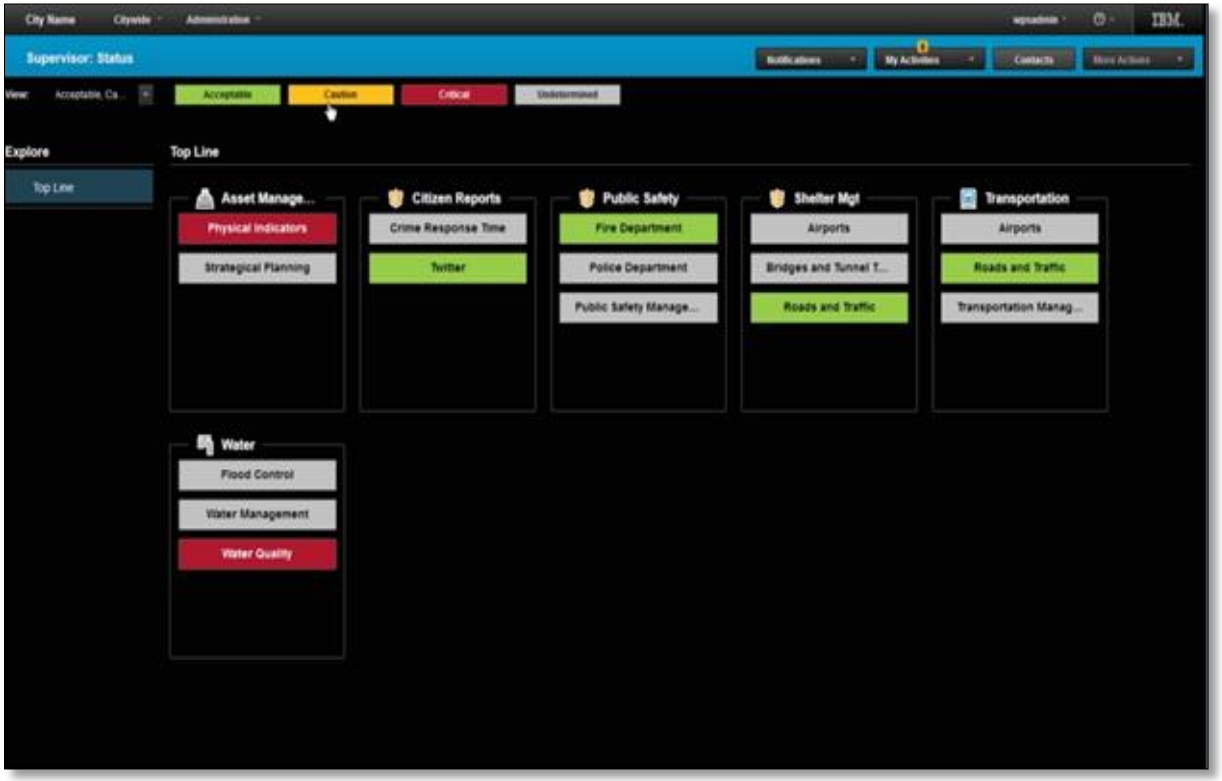
City events

Social media analytics

Correlation

Prediction

Executive Dashboard



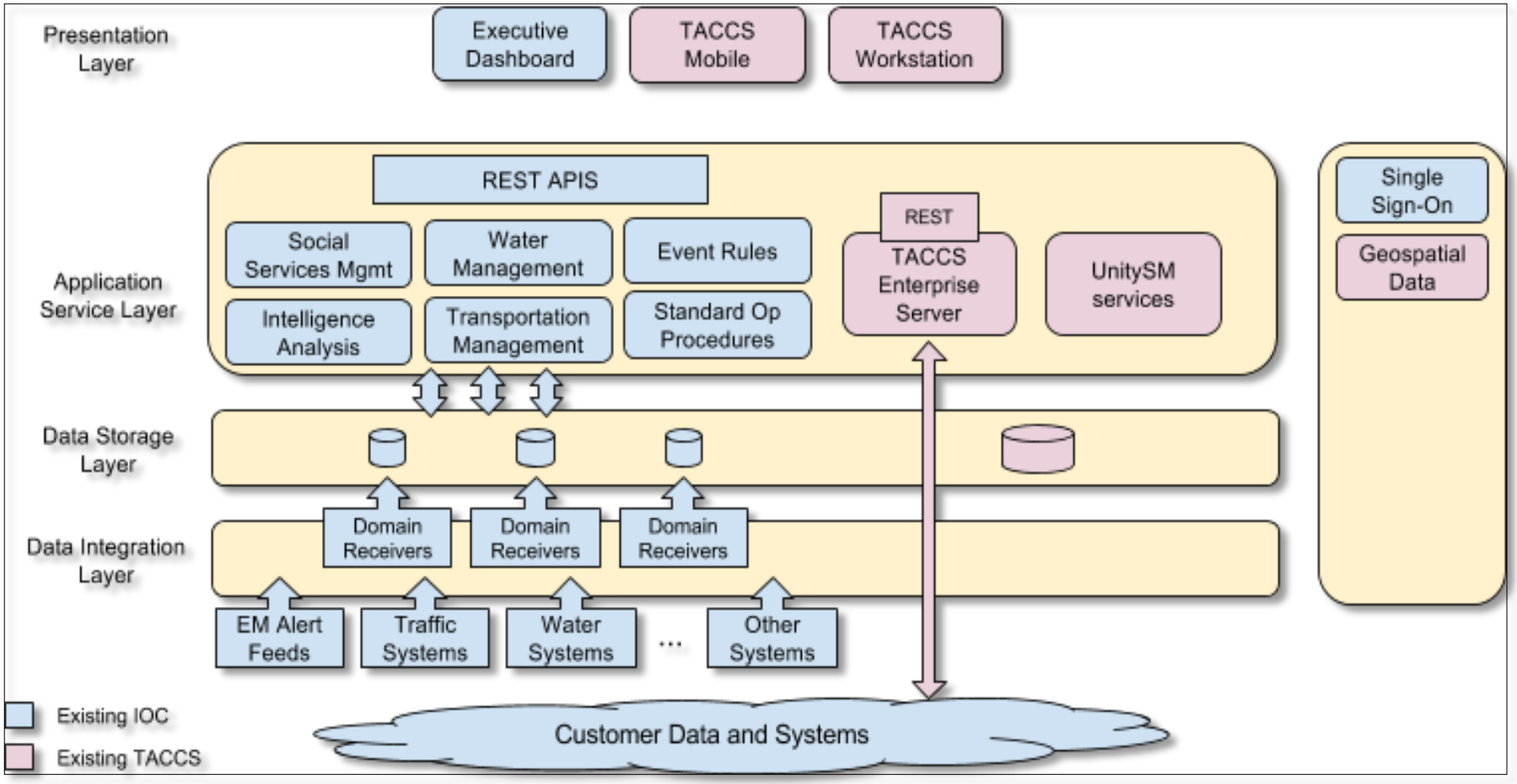
The IOC has individualized interfaces for different levels of users. Executives see the familiar IOC Dashboard displayed on a tablet or a PC

Operational Dashboard

With a touch or a click of a mouse, IOC Dashboard users can examine the reasons for degraded conditions using Priority5

'Two' Views – 'One' Common Operating Picture

Overall Solution Architecture



Planned **Events**
(Non Emergency)

How well are you prepared ?

Unplanned **Events**
(Non Emergency)

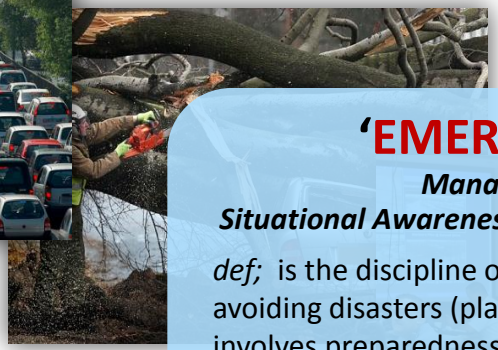
'EVENT'
Management
Plan, Monitor, Review

def; application of project management to the creation and development of festivals, events, conferences, public gatherings etc.

Parade, Festival, etc.

Major Congestion

Planned **Events**
(Emergency)

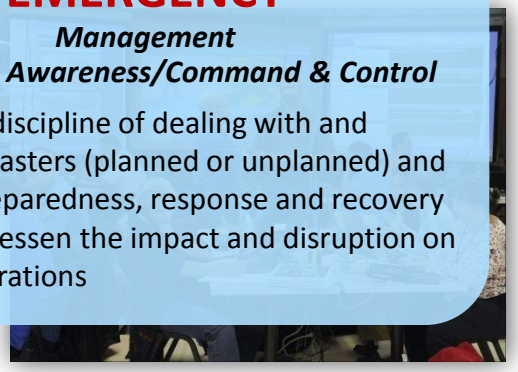


Extreme Weather

Unplanned **Events**
(Emergency)

'EMERGENCY'
Management
Situational Awareness/Command & Control

def; is the discipline of dealing with and avoiding disasters (planned or unplanned) and involves preparedness, response and recovery in order to lessen the impact and disruption on normal operations



Building Collapse due to Extreme Weather

Information loaded by Event Managers is then immediately shared and managed by Emergency Managers

What is 'happening in real-time'

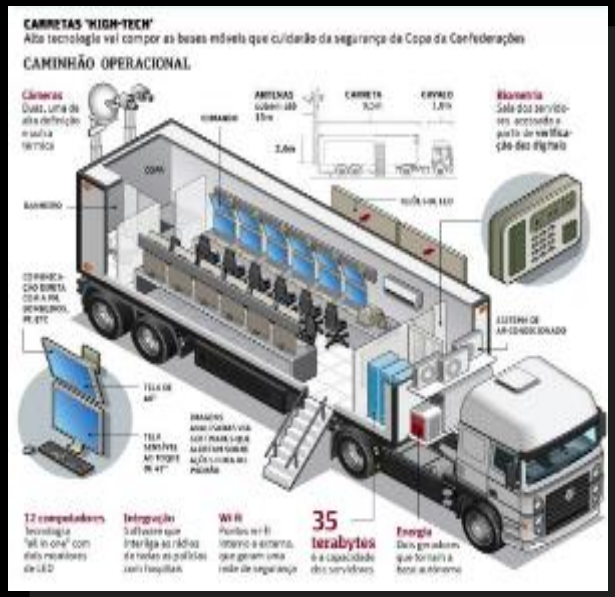
Innovative leadership in Rio de Janeiro transformed emergency and incident management

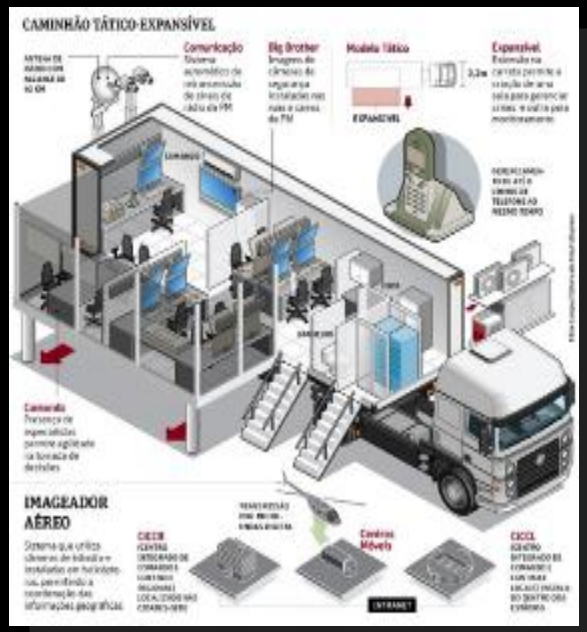
- Initial focus - prevent deaths from annual flooding and mudslides now expanded to all emergency response issues
- Advanced weather forecasting enables up to 49 hour early warning of potential issues and triggers proactive processes
- 30 city departments integrated into processes
- Increased efficiency in resource deployment and coordinating all agencies in response
- Inspired Mobile Command Centers for each of the 20+ FIFA World Cup Football venues

"With our emergency response system, we can react and respond to disasters faster and more efficiently. It's helping us save lives."

~ Eduardo Paes, Mayor, City of Rio de Janiero

Mobile Command Centers & Video Analytics for Brazil's World Cup Safety and Security





Davao's enhanced Public Safety Command Center

The city government of Davao anticipates coordinating cross-agency emergency response efforts with unprecedented speed and efficiency using a system that consolidates and analyzes data from multiple agencies to deliver a near-real-time view into city happenings

Gains

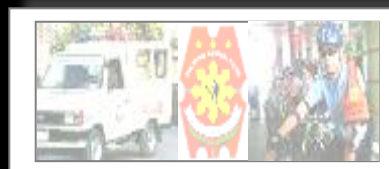
ability to anticipate impending crises and plan and prepare proactively

Increase

significantly situational awareness about city events and crises expected

Speeding

response to public safety incidences foreseen



CRIME & SAFETY AGENCIES

TRAFFIC MGMT. AGENCIES

DAVAO PUBLIC SAFETY COMMAND CENTRE

Intelligent Operations Centre

EMERGENCY RESPONSE AGENCIES

TERRORISM MGMT AGENCIES

Office of Mayor & Vice-Mayor

Other related offices in Davao City Govt & External Agencies

Philippines National Disaster Management Center

Manila, Philippines – 29 May 2014: The Department of Science and Technology (DOST) and IBM today unveiled a new intelligent operations center to provide a central point of command for disaster management. The new center will help the Philippine government better manage ongoing and future disaster response and recovery efforts following Typhoon Yolanda in 2013.

Big data turned into intelligent executive dashboard

Standard operating procedures capture institutional knowledge

Modeling and Prediction for improved Air Quality in Beijing

Pollution Challenge

- Air Pollution has become a top-priority in China and the government has made a strong commitment to tackling it

4% *GDP damage from air pollution*

3.6M *death affected by air pollution*

- Chinese Premier Li Keqiang: "We will declare war against pollution and fight it with the same determination with which we battled poverty"
- Beijing will invest nearly $160B to reduce PM2.5 (KPI of Air Pollution) from 90 to 60 μg/m3 by 2017

Beijing Air Quality Project Objective

- Predict Air Pollution in advance with high resolution
- Identify pollution sources and distribution
- Decision support for close-loop control

Beijing Environmental Protection Bureau & IBM Collaborate on supporting APEC Event

- 72 hours ahead air pollution forecasting with high resolution (1km*1km)
- Mid-term and long-term air pollution dispersion trend forecasting (up to 10 days ahead)
- Analytics decision support to improve Beijing air quality during APEC summit and other important events

Modeling and Prediction for prevent Denque Fever in Singapore

Dengue Fever Analysis

- Spatio-temporal statistics for mosquito population, spread of disease coupled with epidemiological models to examine the impact of policy actions
- Model disease spread over island, understand impact of proposed prevention measures

Hawker Food Center Monitoring

- Video analytics to monitor hygienic conditions using camera (cleanliness, crowds etc)
- Air flow modeling (aka data center modeling) to understand temperature and air quality in a hawker center

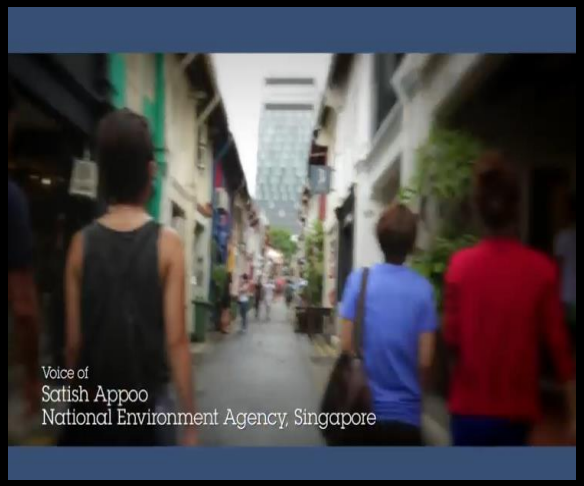
Benefits

- Increase the notification time for predicated air-quality incidents
- Enable the early prediction of extreme weather conditions and the more timely and efficient response of emergency personnel
- Improve prediction of where and when Dengue fever outbreaks are likely to spread, allowing for a faster and more focused response

"By developing new ways to enhance our effectiveness and responsiveness as an agency, we will be better able to anticipate and respond to environmental challenges as they arise, which will improve public safety as well as the quality of life in Singapore."

Satish Appoo, director of the strategic development and transformation office at the Singapore National Environment Agency

NEA: Prevention made with data



https://www.youtube.com/watch?v=aEEr_a61_X4

Looking back to see ahead - Tohoku Disaster Archive, Japan

- Archive of information related to 2011 earthquake and tsunami - joint project between IBM Japan and Tohoku University.
- Intended to memorialize the disaster as well as provide information resource for future disaster planning and mitigation, education and so on.
- Integrated into archives and operations of towns in the region.
- Very large body of data based on documentation, computer records, photographs, video, SMS, Twitter etc.
  - All machine-read and machine-sequenced and annotated.

"Those who don't know history are doomed to repeat it." (Edmund Burke)

Resilience Scorecard – Assessment tool to help cities implement Disaster Risk Reduction actions

- **Resilience Scorecard is a quantitative, self-assessment tool to construct multiyear "blue print' for actions to improve preparedness.**
- **Developed by IBM and AECOM based on UNISDR's "Ten Essentials" of disaster mgmt**
- **Core Intellectual Property (the scorecard content) will be placed in the public domain**
- **Currently in draft form**

The UNISDR's Ten Essentials

1. **Organization and Coordination**
2. **Assign a Budget**
3. **Prepare Risk Assessments**
4. **Critical Infrastructure That Reduces Risk**
5. **Safety of All Schools and Health Facilities**
6. **Realistic, Risk-compliant Building Regulations and Land Use Planning Principles…**
7. **Education Programs and Training**
8. **Protect Ecosystems and Natural Buffers**
9. **Early Warning Systems and Emergency Management**
10. **Needs of Affected Population Are Placed at The Center of Reconstruction**

http://www.unisdr.org/campaign/resilientcities/

Tamas Vahl
IBM CEE
Smarter Cities