



Ministry of Public Safety and Security
National Disaster Management
Research Institute

Open Public Data Service

Raising Awareness of Disaster Reduction in Korea using ICT and Geo-Big Data

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Deputy Scientific Director / Ph.D.

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2016.9.27

Extremely Dangerous Society

Global Environment Changes

Climate changes,
Depletion of natural resources



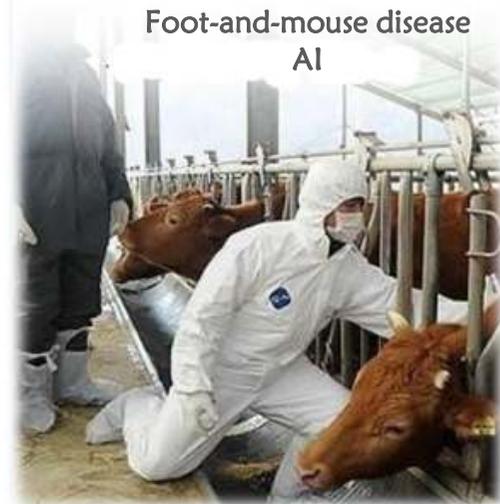
Unpredictable Social Threats

Difficulty of terror sensing

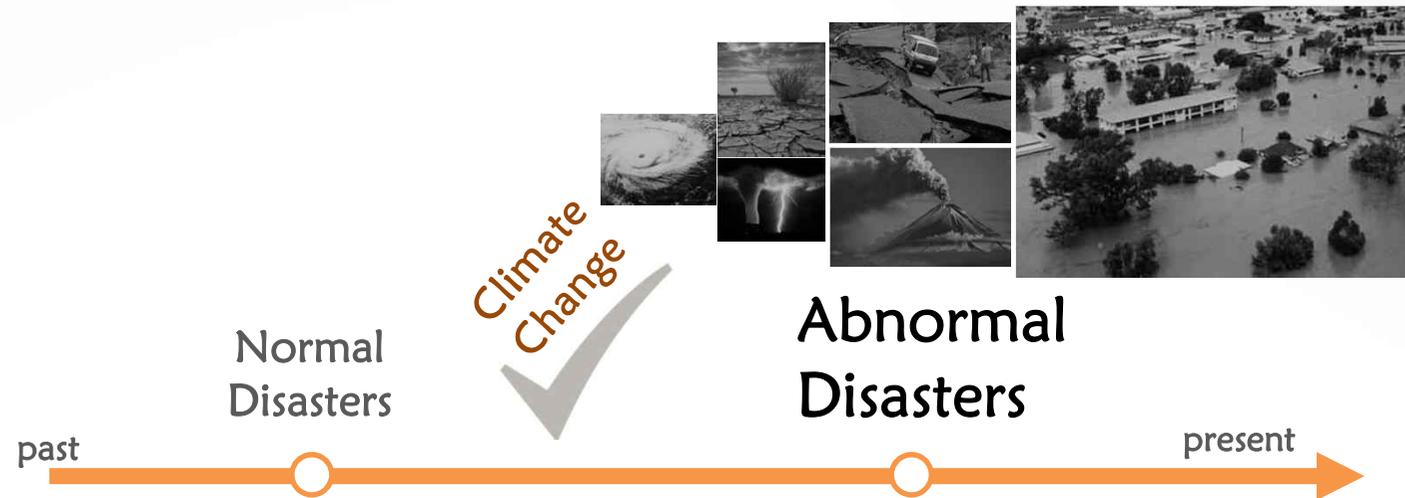


Cross-border Movement with Globalization

Foot-and-mouth disease
AI



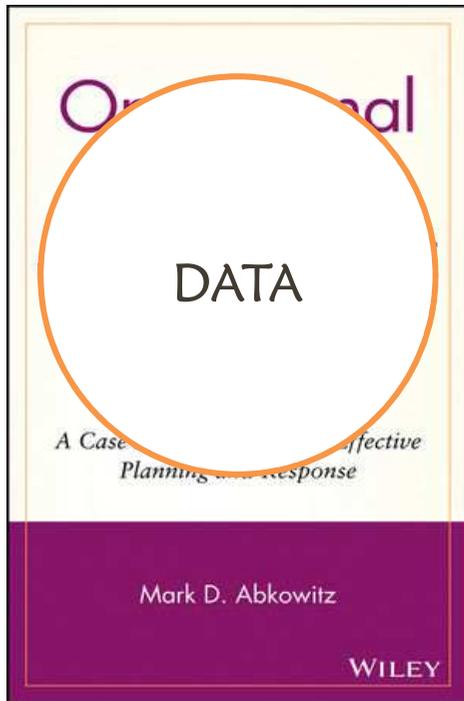
New Normal Era



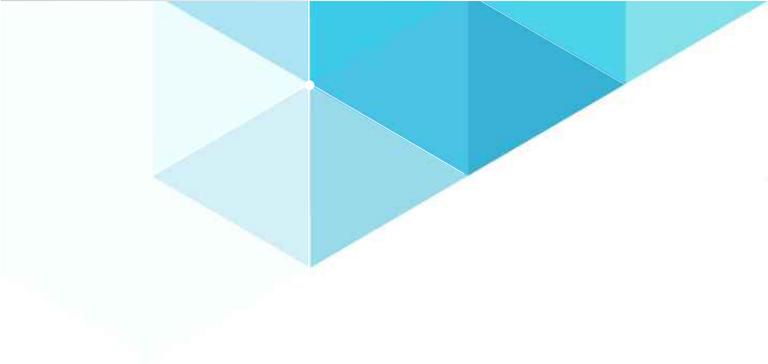
- Combined disasters
- Growth of disaster size
- Increase of frequency of disaster
- Increase of scale of damage

⇒ **Paradigm Changes** for disaster management
on risks and uncertainties

Wisdom of disaster management



01. No signs, no disasters
02. Failure of information sharing is a disaster
03. Excessive profit is to begin of disaster
04. Misjudgment of experts is short cut of disaster
05. Rushed measure is cause of disaster
06. Thorough ready is made even bad luck into a chance
07. Policy ignored disaster characteristics is a disaster
08. Incorrect politics upgrades disaster
09. Breaking rules is the catalyst for disaster
10. Lock the stable door after the horse is stolen
11. No disaster prevention, only decrease in disasters
12. Learning from real world disasters



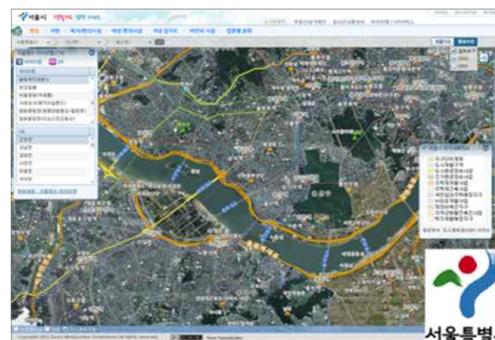
Social – Big Data

We need **data** utilization
for adapting paradigm
changes of disaster
management

Structured Data

- Application data in organization

Records and transactions stored in database in organization : weather, traffic, tide, landslide, ...



Unstructured Data

- Man-made data and machine-made data
 - Social Network data created by human and Stream data made by various sensors like CCTV
 - Velocity of unstructured data creation is **very fast** and volume is **very big**



Degree of Exploiting Organization's Data

80% ~ 90% of Big data is
Unstructured data

What degree do organizations exploit their data
for analysis and decision making purposes?

Degree of Exploiting Organization's Data

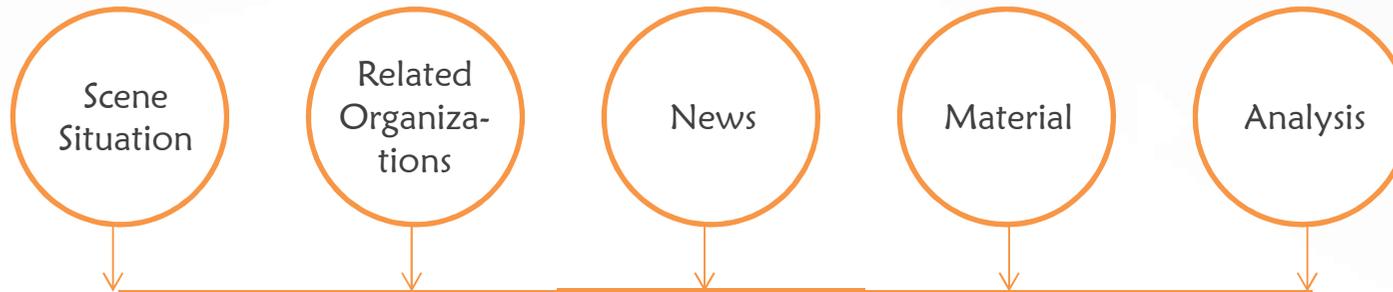
- Vulnerable to exploit unstructured data for decision making purposes
- Need for integration analysis of structured data and unstructured data



Current disaster management



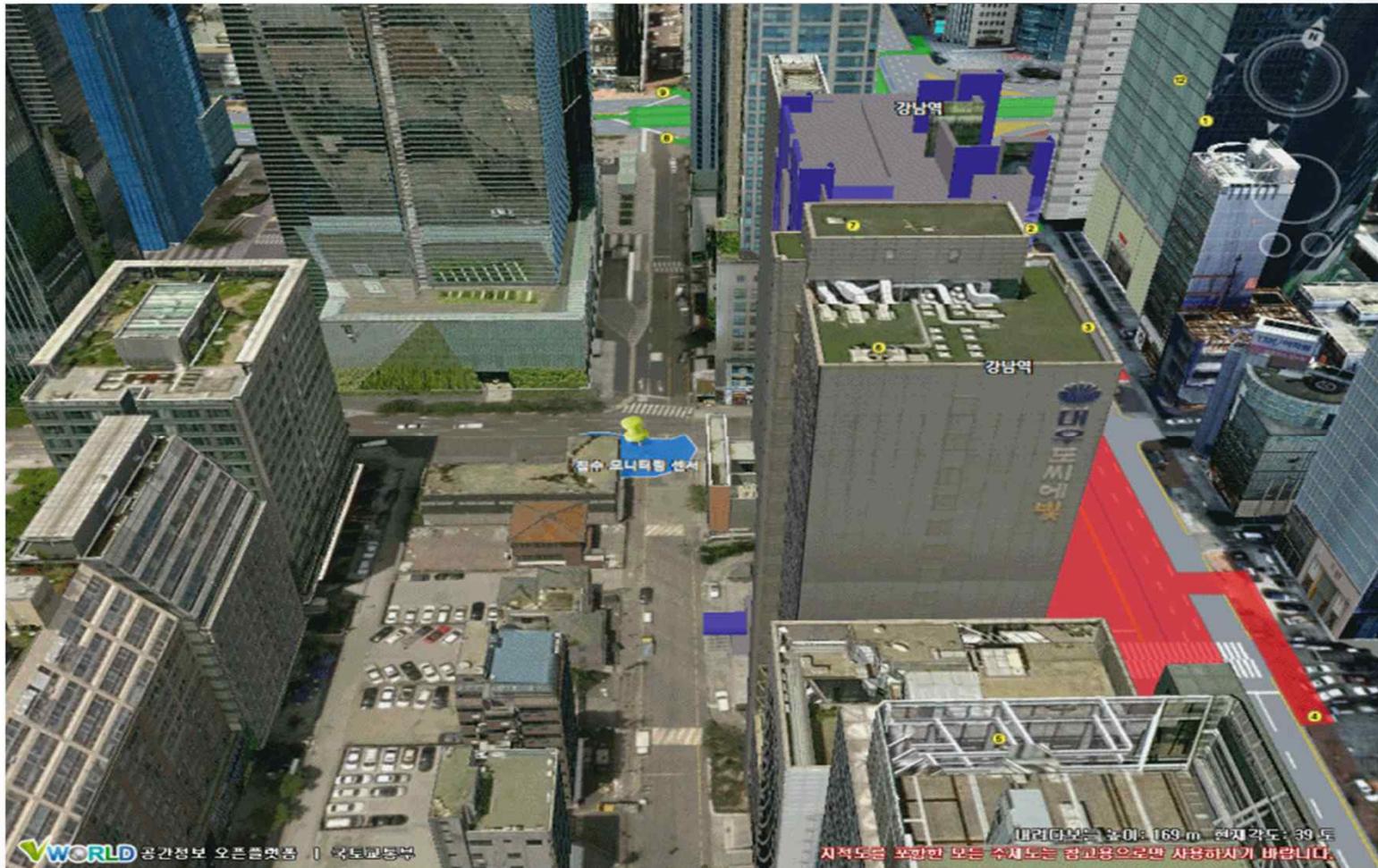
Disaster management 3.0



Integration & Sharing

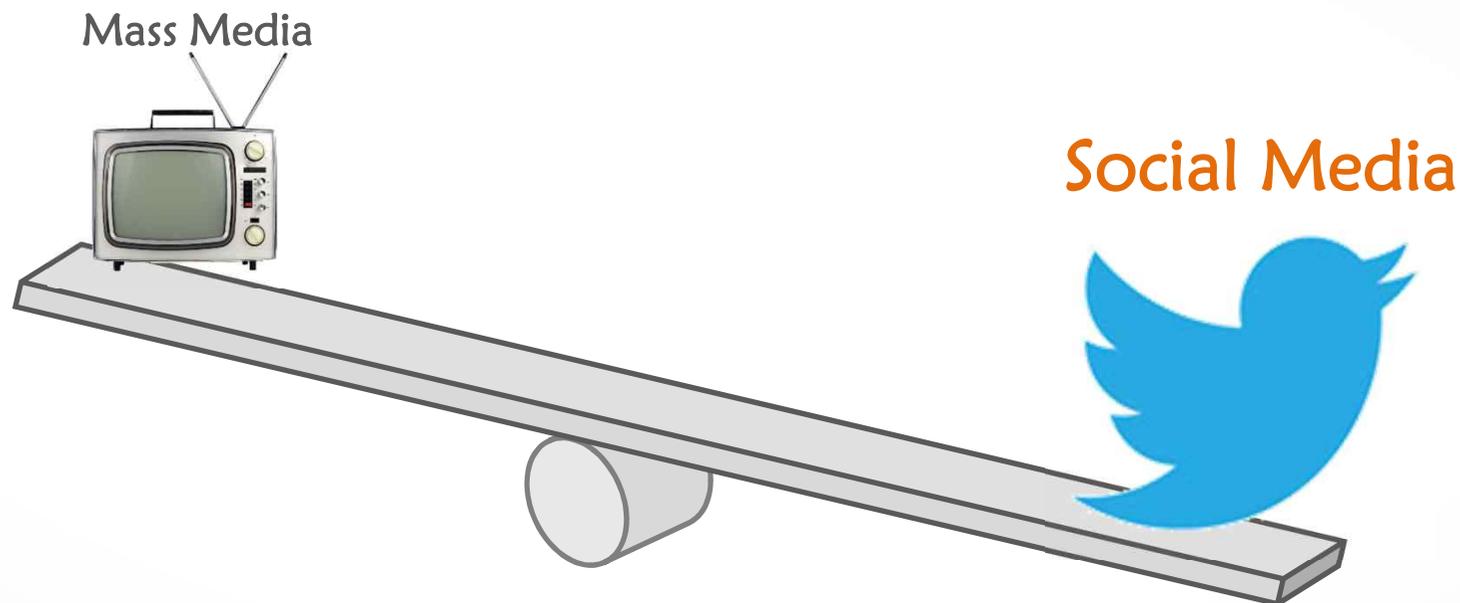


People customized disaster management



New Communication Channel, Social Media

- **Communication channel has changed to social media**
 - During a crisis, supporting backchannel communications, allowing for wide-scale interaction that can be collectively resourceful, self-policing, and generative of information



Disaster and Social Media

• Hurricane Sandy, USA(2012)

- The millions blackout in areas affected by Sandy have been struggling to find gas stations still open with resources.
- The innovative use of social media and mapping technology to make live fuel supply data was a solution to response this crisis



< Mapper service for reporting gas stations >

Disaster and Social Media

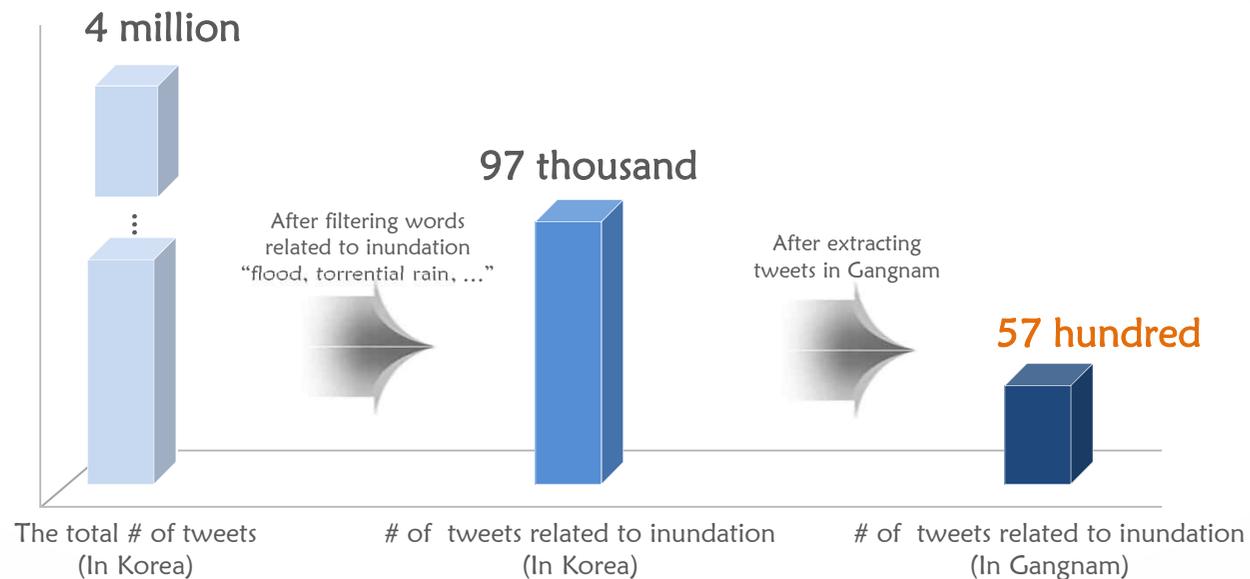
- Earthquake(2011), Fire(2009), Riot, ...
 - There were many cases using social media and community mapping for response of a disaster : Earthquake in Japan and Haiti, Fire in Australia, Riot, and so on

The image displays a collage of disaster response maps and the Ushahidi website interface. On the left, a map of Japan shows an earthquake epicenter with a popup: "Earthquake: eastern Honshu, Japan Magnitude: 6.2 Date and time: 2011-3-15 13:31:46 UTC". In the center, a map of Australia shows fire locations with red and green pins. On the right, another map shows riot locations with red and green pins. Below these is a screenshot of the Ushahidi website's "Products" section, featuring "The Ushahidi Platform", "The SwiftRiver Platform", and "Crowdmap".

Social Media is Human Sensor

- Gangnam Inundation damage in Korea(2011)

- Since social media can also be constructed as a form of **collective wisdom** which is **prompt**, **accurate**, and **well-formed information** with a high propagation capacity
- It has a big potential power on a disaster area. Especially It can be used like a **Human sensor**



Social Media is Human Sensor

- Asiana aircraft accident in San Francisco(2013)

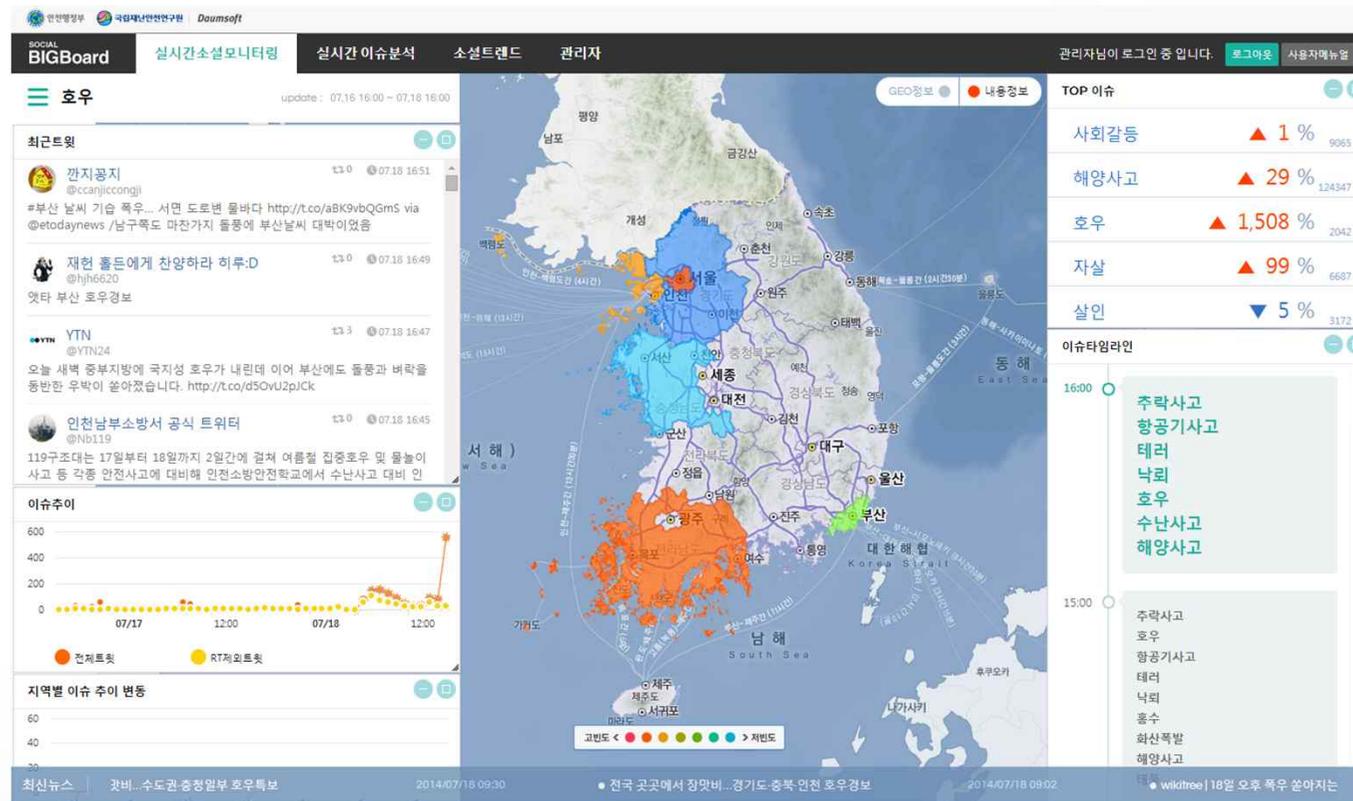
- The first report to inform the accident occurred by a passenger's tweet after 1 hour
- This tweet was faster than any media



⇒ Social media is a sensor **to report** the occurrence of disasters **initially** and the situation of disasters **promptly** in the scene

Social Big Board

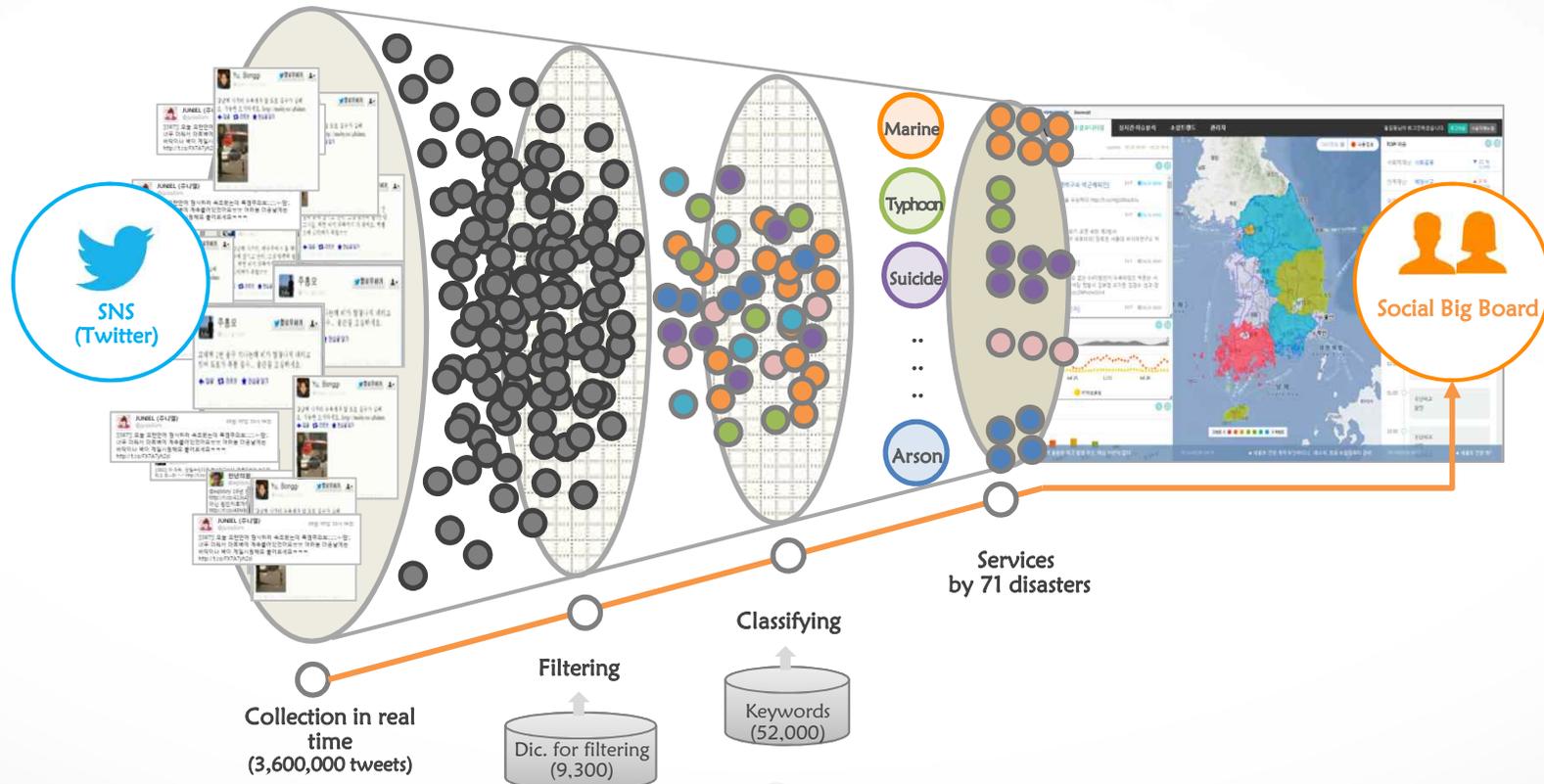
- Real-time Monitoring System of Social Big Data
 - For disaster management, developed in 2013 by NDMI



Social Big Board

Collection & Analysis Process

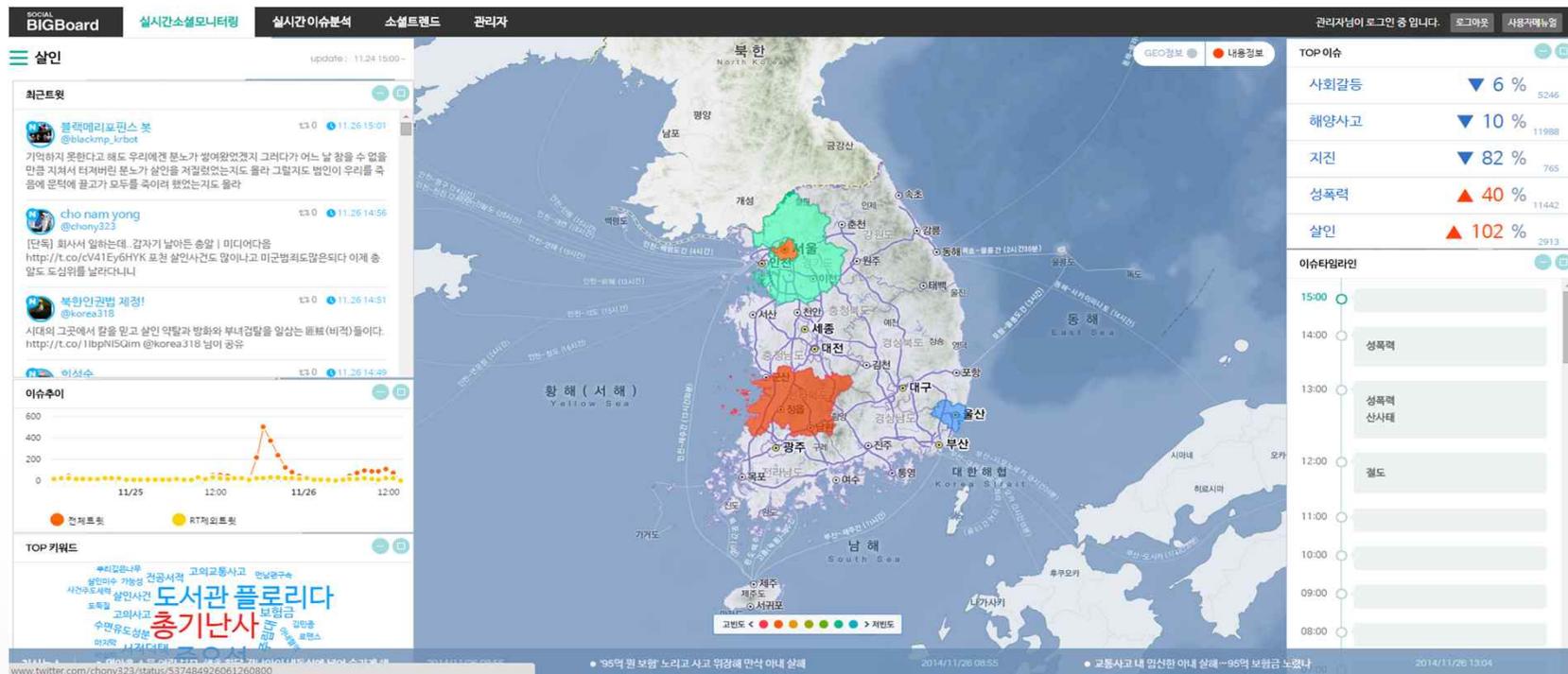
- Collecting 36 hundred thousand tweets daily average and Filtering disaster related tweets
- Classifying tweets into 71 types of disasters and analysing disaster issues by types of disaster



Social Big Board

- Real-time monitoring service

- to provide disaster issues based on disaster relevance of tweet in real-time
- Tweet text, frequency trend, related words, issue time-line, and frequency fluctuation of 71 types of disasters



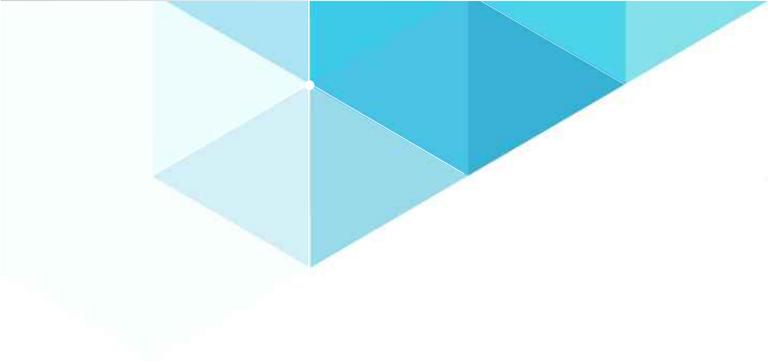
Social Big Board

• Real-time Issue analysis service

- to retrieve user defined criteria for more detail awareness : keywords, period, region, sorting, and RT or not

The screenshot displays the Social Big Board interface with the following components:

- Navigation Bar:** Includes 'SOCIAL BIGBoard', '실시간소셜모니터링', '실시간 이슈분석', '소셜트렌드', and '관리자'. A user login status '관리자님이 로그인 중입니다.' is shown on the right.
- Search Filters (탐색 조건):**
 - 01 키워드입력: 포함어 | 아이티, 제외어 | [검색]
 - 02 기간: 2014/11/01 15:07 ~ 2014/11/26 15:07
 - 03 지역: 선택
 - 04 미디어: 트윗, 뉴스, 이미지, 동영상
 - 05 경향기준: 최신순, RT순
 - 06 RT여부: RT제외
- Trend Chart (추이):** A line graph showing the number of tweets over time from 11/03 to 11/24. The Y-axis ranges from 0 to 1,500. Two series are shown: '현재트윗' (red line) and 'RT제외트윗' (yellow line). A significant spike in '현재트윗' is visible around 11/24, reaching approximately 1,200.
- Main Content (주요원문):** A list of tweets with user avatars, names, and content. Several tweets are highlighted in blue, indicating they are selected or important.
 - 진부령 (김자양):** @kaya8046. Tweet about AI-related funding and competition.
 - 애묘마왕:** @kaya8046. Tweet about AI-related funding and competition.
 - 애묘마왕:** @kaya8046. Tweet about AI-related funding and competition.
 - 솔트 #언론부역자격결:** @halo1440. Tweet about AI-related funding and competition.
 - Daechi-dong trumpets:** @DaechiDongTrumpets. Tweet about AI-related funding and competition.
 - 국민이불났다:** @mrblus_c. Tweet about AI-related funding and competition.
 - Daechi-dong trumpets:** @Schalom1004. Tweet about AI-related funding and competition.
 - 클라라 clara:** @yulnclara. Tweet about AI-related funding and competition.
 - 내 머릿속 지우개:** @mylovesal. Tweet about AI-related funding and competition.



Geo – Big Data



Cholera Occurrence in London, 1854

CHOLERA

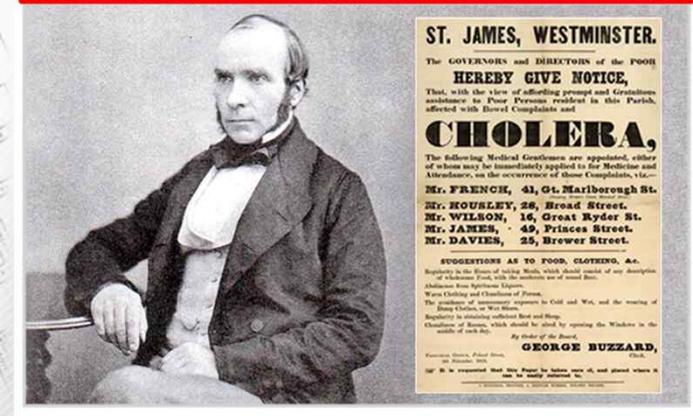
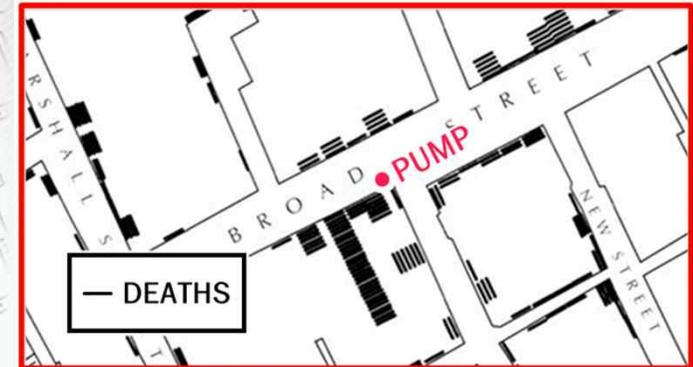
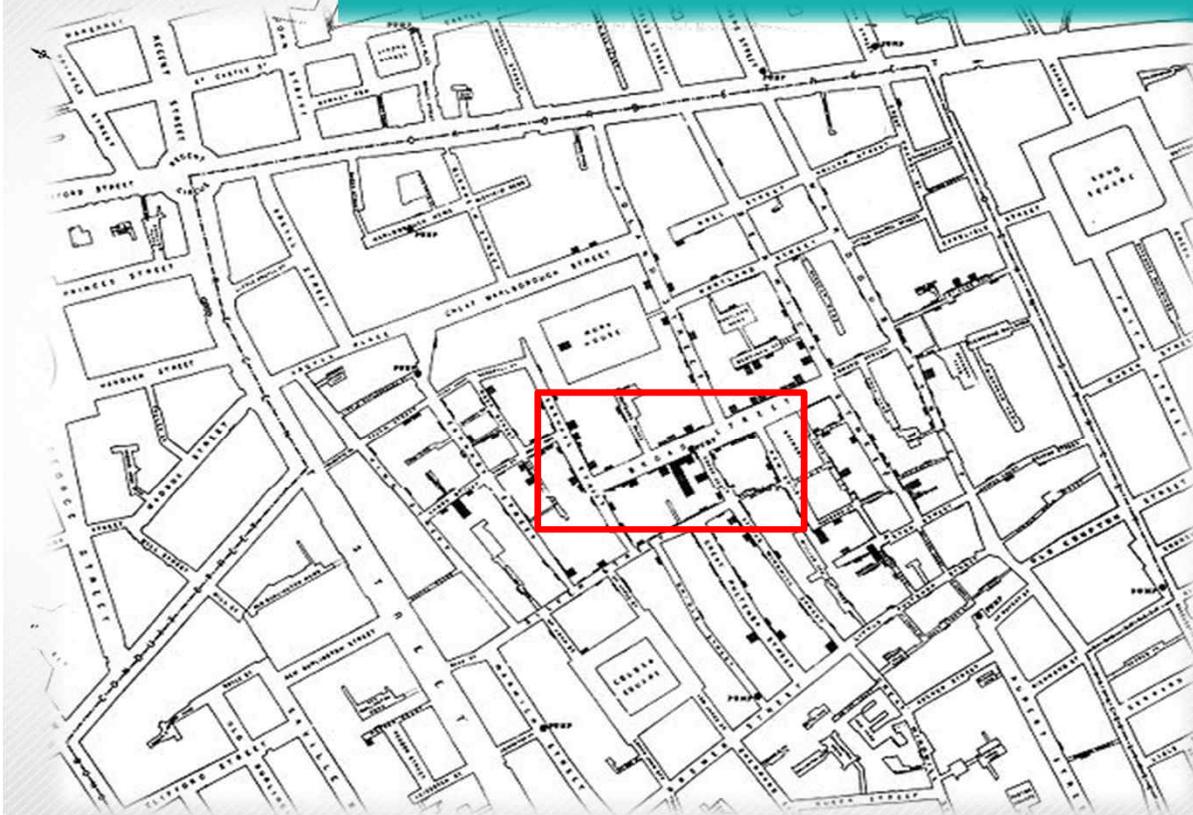
- 19 Broad St London
- 128-3 Broad St London
- 33 Broad St London
- 14-17 Old Broad St London
- 78 Bishopsgate London
- 26 Throgmorton St London
- 55 Bishopsgate London
- 23 Austin Friars London

⋮

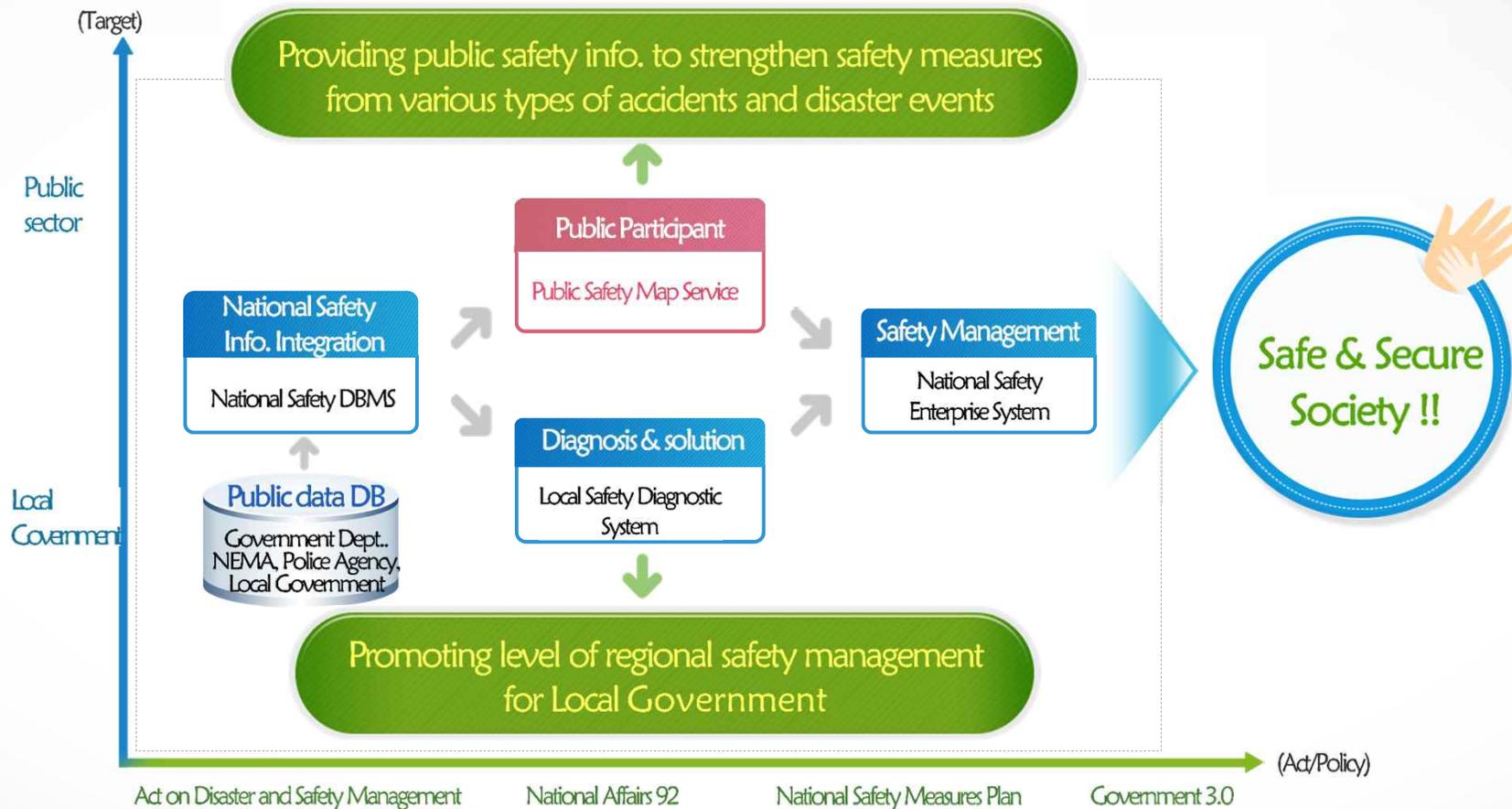


Map, Solution for Understanding Social Problems

An Easy, Simple and Powerful Tool, MAP!!



Project Overview



1. The Public Safety Map (<http://www.safemap.go.kr>)

World's first portal site of the safety map

Online

- 국민안전처
NDMS
- 국토교통부
National GIS
- 통계청
SGIS
- 경찰청
GeoPros·UTIS
- 국토교통부
국토지리정보원
Internet Map
- KoROAD
도로교통공단
Traffic information system
- 산림청
Forest Disaster Control



127 safety information from 20 agencies

Off line

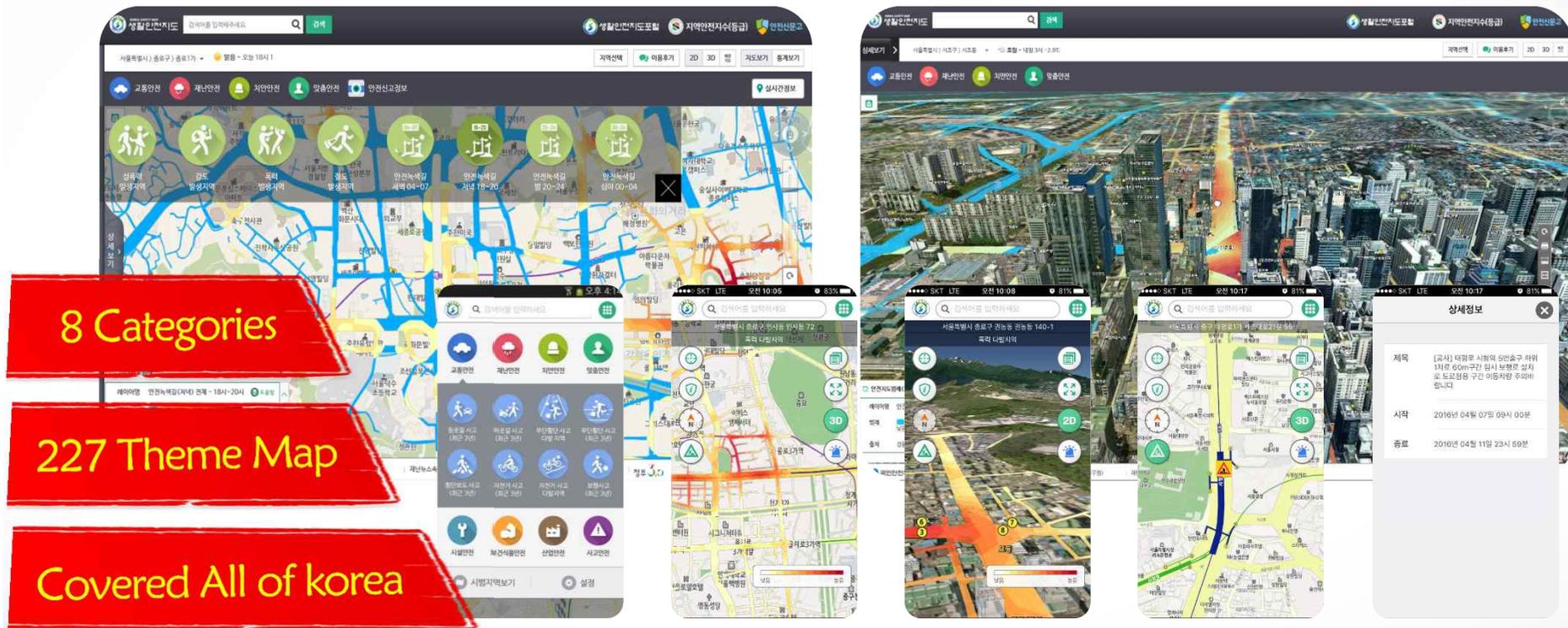
- Crime Statistics
- Construction
- Accident
- Old building
- Disease outbreak
- ...

Real-time links

- 한국환경공단
Korea Environment Corporation
Pollutant Index
- Nitrogen Dioxide
- UV Index
- Ozone
- Dust
- Ultrafine Particles
- 한국원자력안전기술원
KINS KOREA INSTITUTE OF NUCLEAR SAFETY
Radioactivity Information
- KoROAD
도로교통공단
Traffic Accident

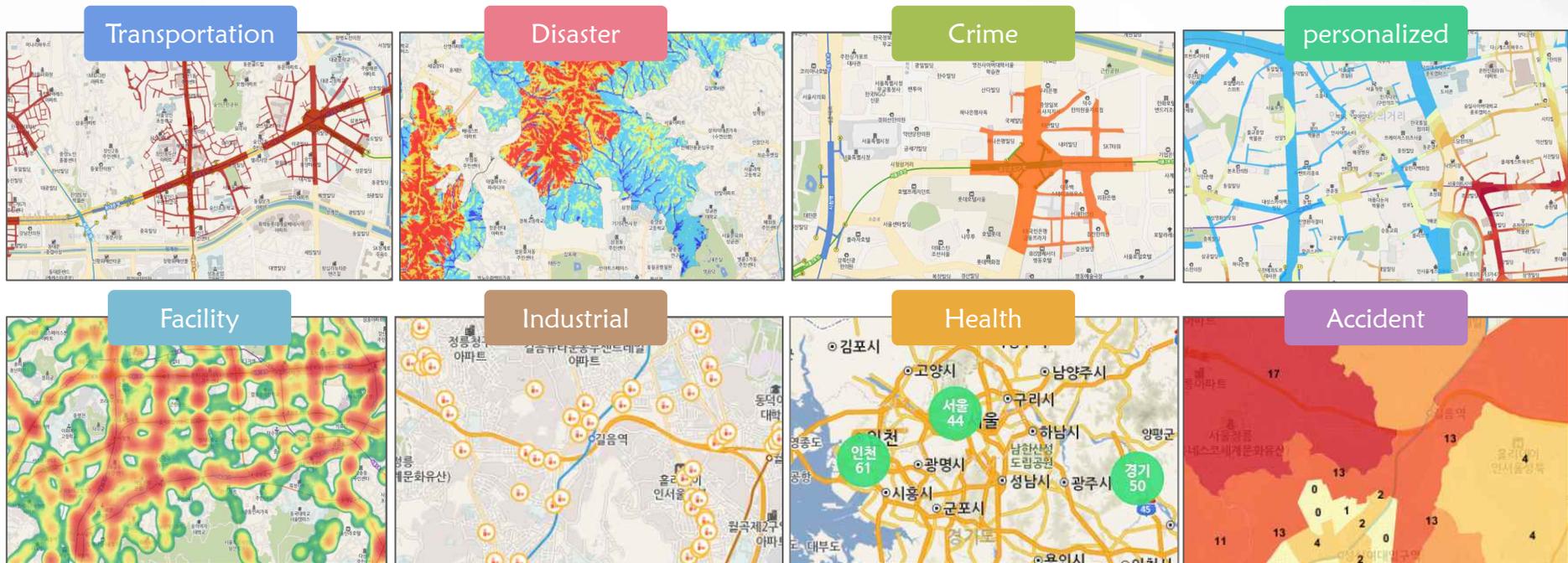
1. The Public Safety Map (<http://www.safemap.go.kr>)

World's first portal site of the safety map



2. Web / Mobile service

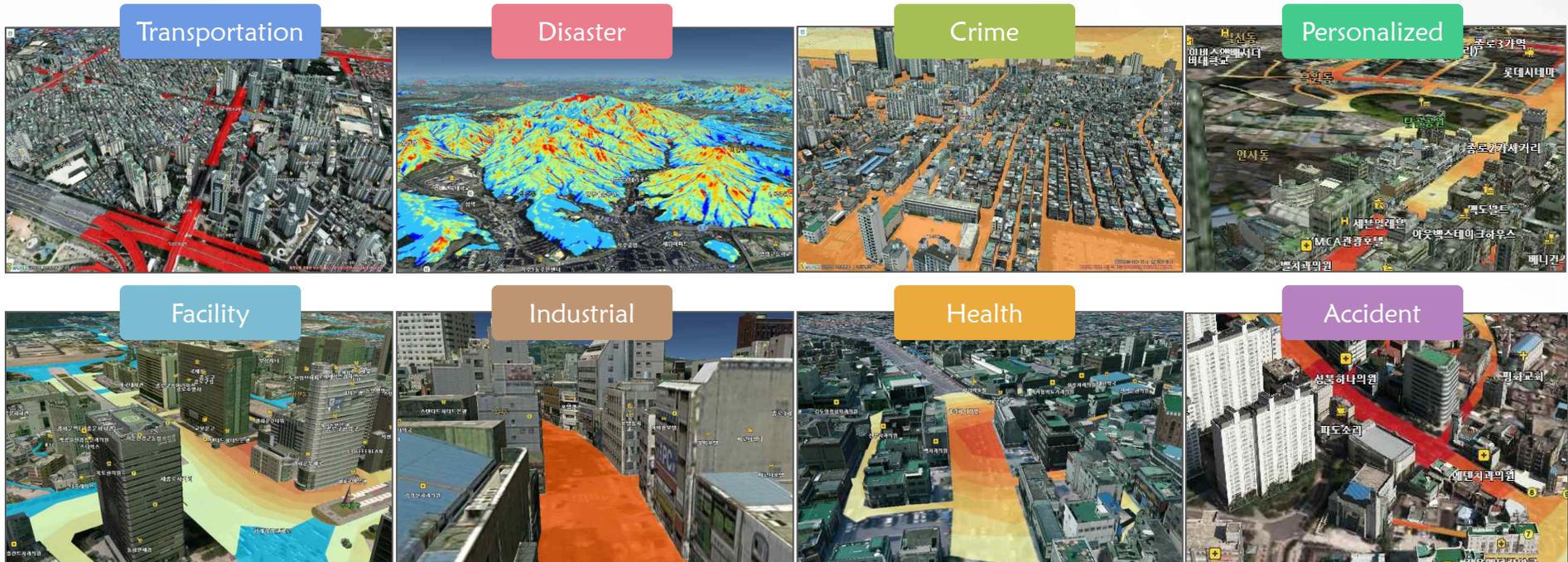
8 Specialized services for safety(2D)



provides safety information in a variety of ways

2. Web / Mobile service

8 Specialized services for safety(3D)



the public safety map provides Real 3D based.

2. Web / Mobile service

Communicating with people

안전신문고

안전모니터봉사단

REPORT DATA

신고번호	신고제목	신고일자	신고장소	신고내용	처리정보
92,766	도로파손	2015-10-09	서울특별시 마포구 연희동	도로 파손 정비요망	경비원료
2,806					국민안전처 (안전신문고, 안전모니터봉사단)
89,960					

Reported by the people

44,699 information

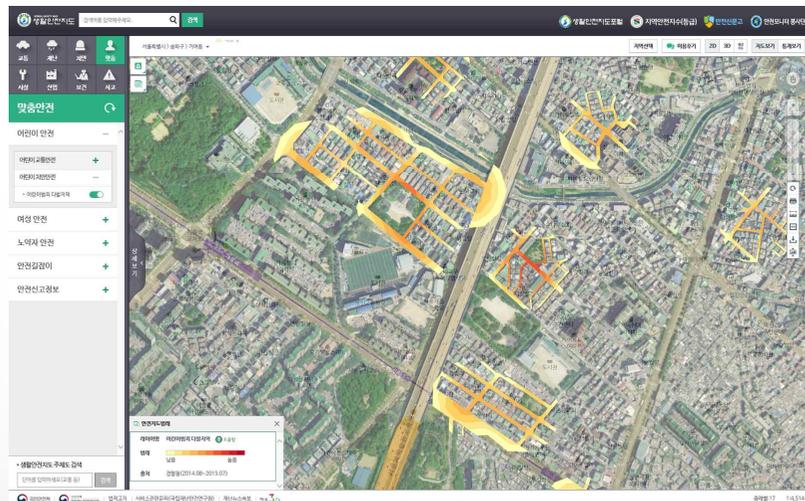
provide the map of safety information that reported by the People

2. Web / Mobile service

Customized for vulnerabilities

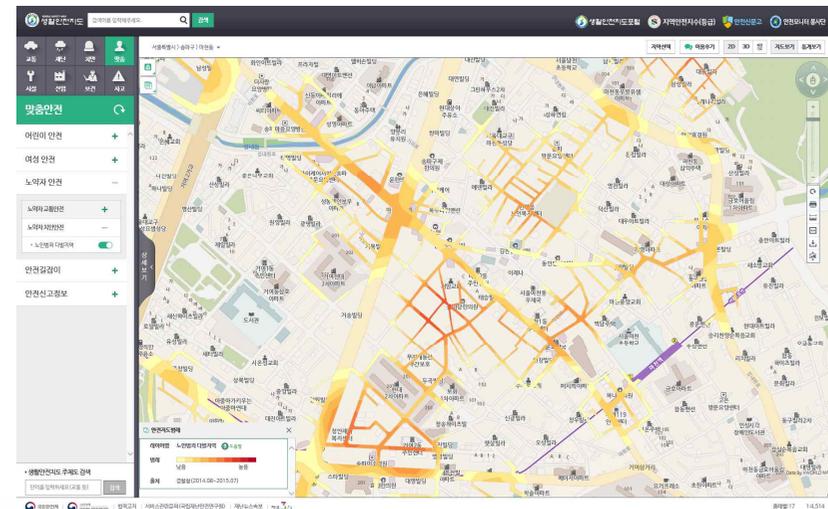
Children

Information of crime against children
Provided by police department



Old and infirm

Provide information about
Crime against old and infirm

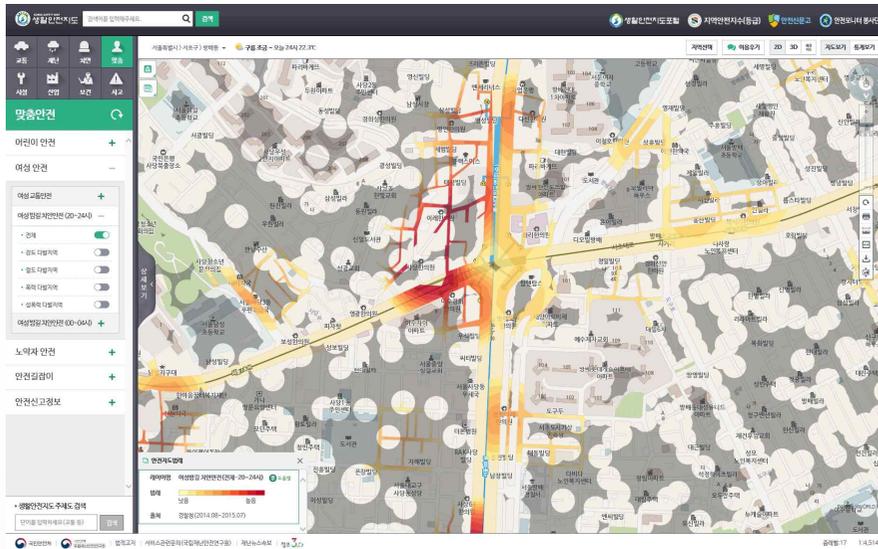


2. Web / Mobile service

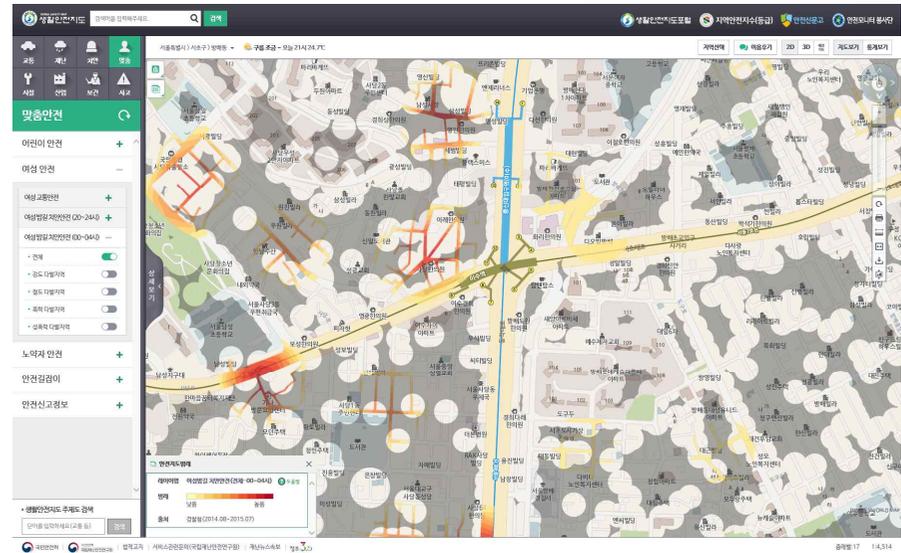
Customized for vulnerabilities

Service for Women

Information of crime against women & Safety Place



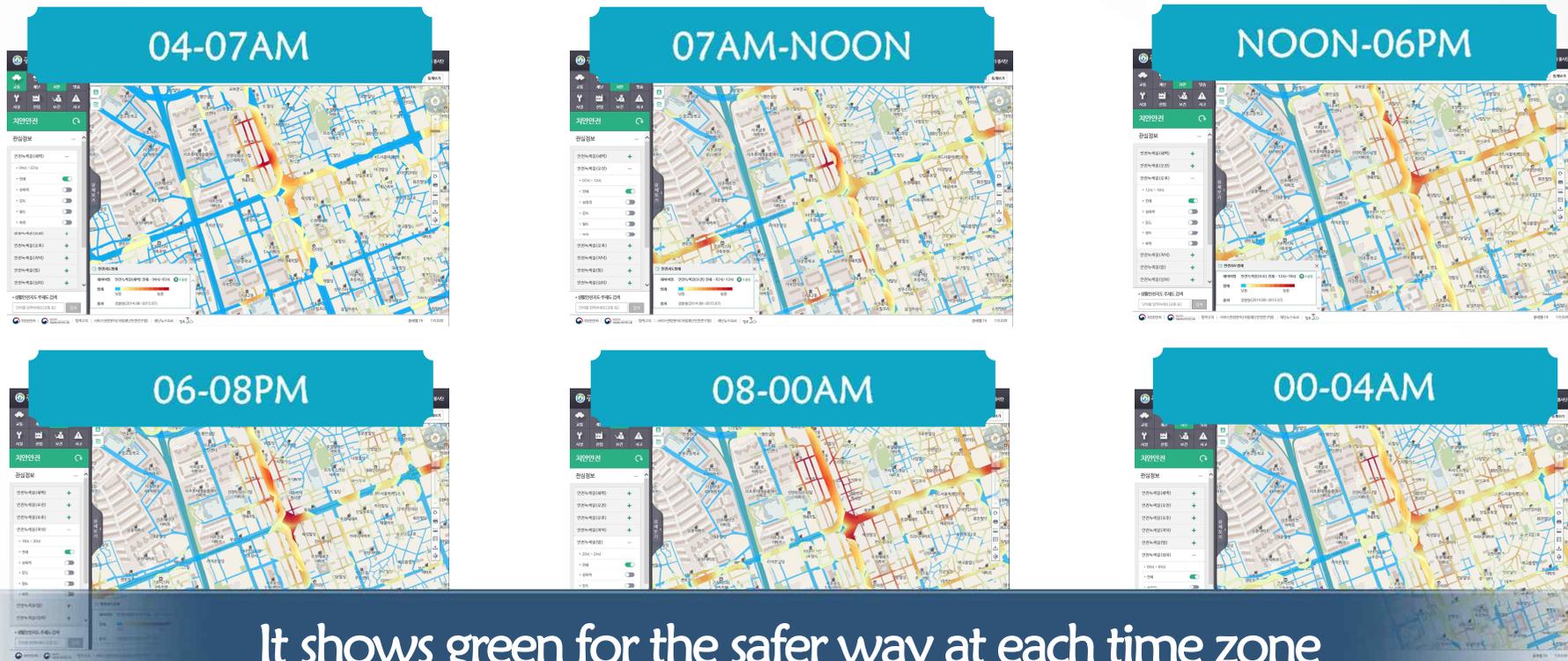
Night road(8-12PM)



Night road(0~4AM)

2. Web / Mobile service

Customized Safety Map(Safe Green way)



It shows green for the safer way at each time zone

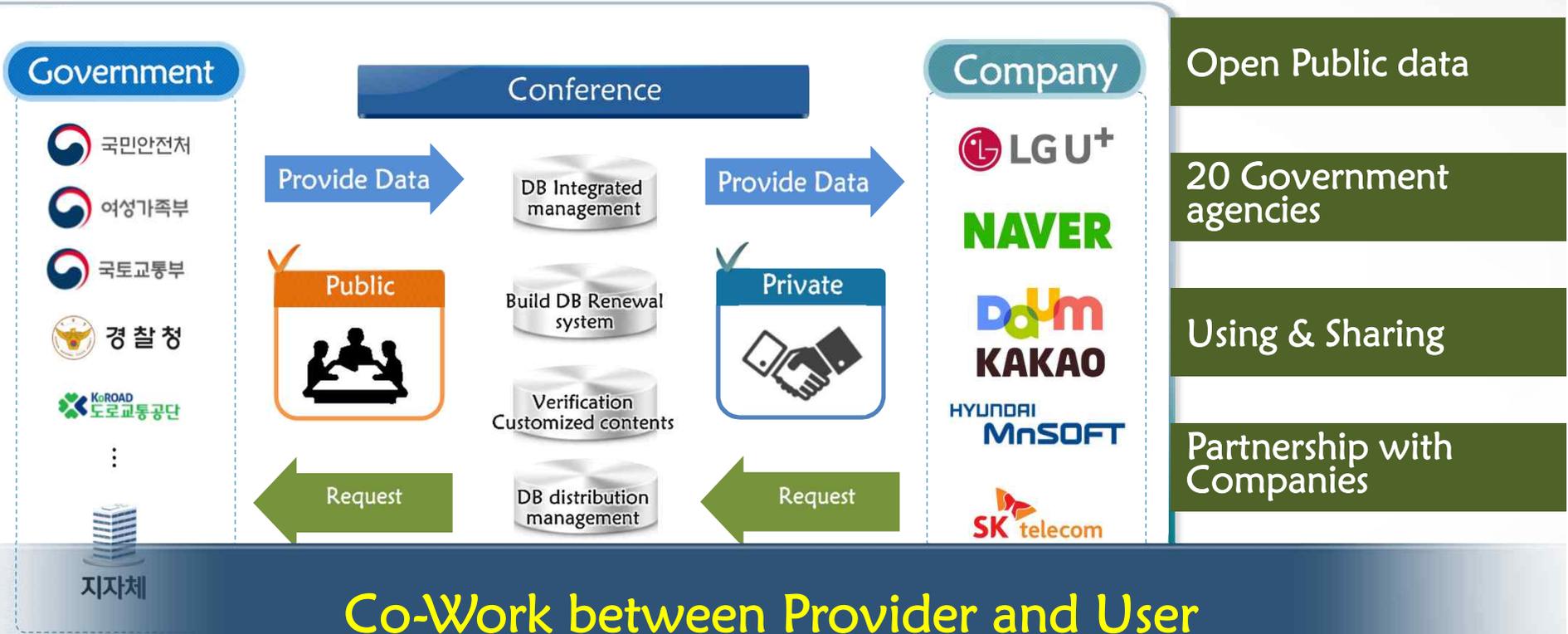
2. Web / Mobile Service

3D Mobile Service Just like Real



3. Open Public Data Service

The Public Safety Map Consultative Group



3. Open Public Data Service

The Public Safety Map API 132 references

 College

Seoul National
University
KCIST

12

 Government

Gwang-Ju Metro City
Cultural Heritage
Administration
...

22

 Private

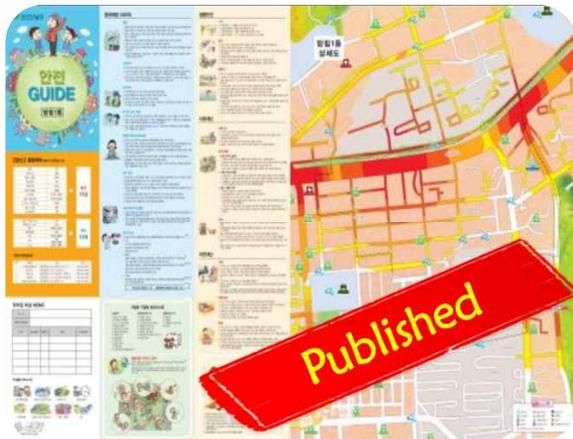
LG U+
Hyundai MN soft
Soho companies

98

3. Open Public Data Service

Expanding Localized Safety Map

[Gwang-Ju' Community map]



[Jeollabuk-do "Public Life Map"]



[Gyeongsangbuk-do "Alimi"]



Provide 16 local government agencies

3. Open Public Data Service

City of Gwang-Ju 'Community safety map'



Community map

Critical zone
Safety facilities

Emergency Plan

Leaflet form map for the senior citizen who can't use IT devices

3. Open Public Data Service

Jeollabuk-do 'Public Life Map'

전라북도 지도로보는 전북 공공생활정보지도

전라북도 한국속의 한국, 사랑하는 전라북도 공공생활정보지도

공공생활지도 분류 검색

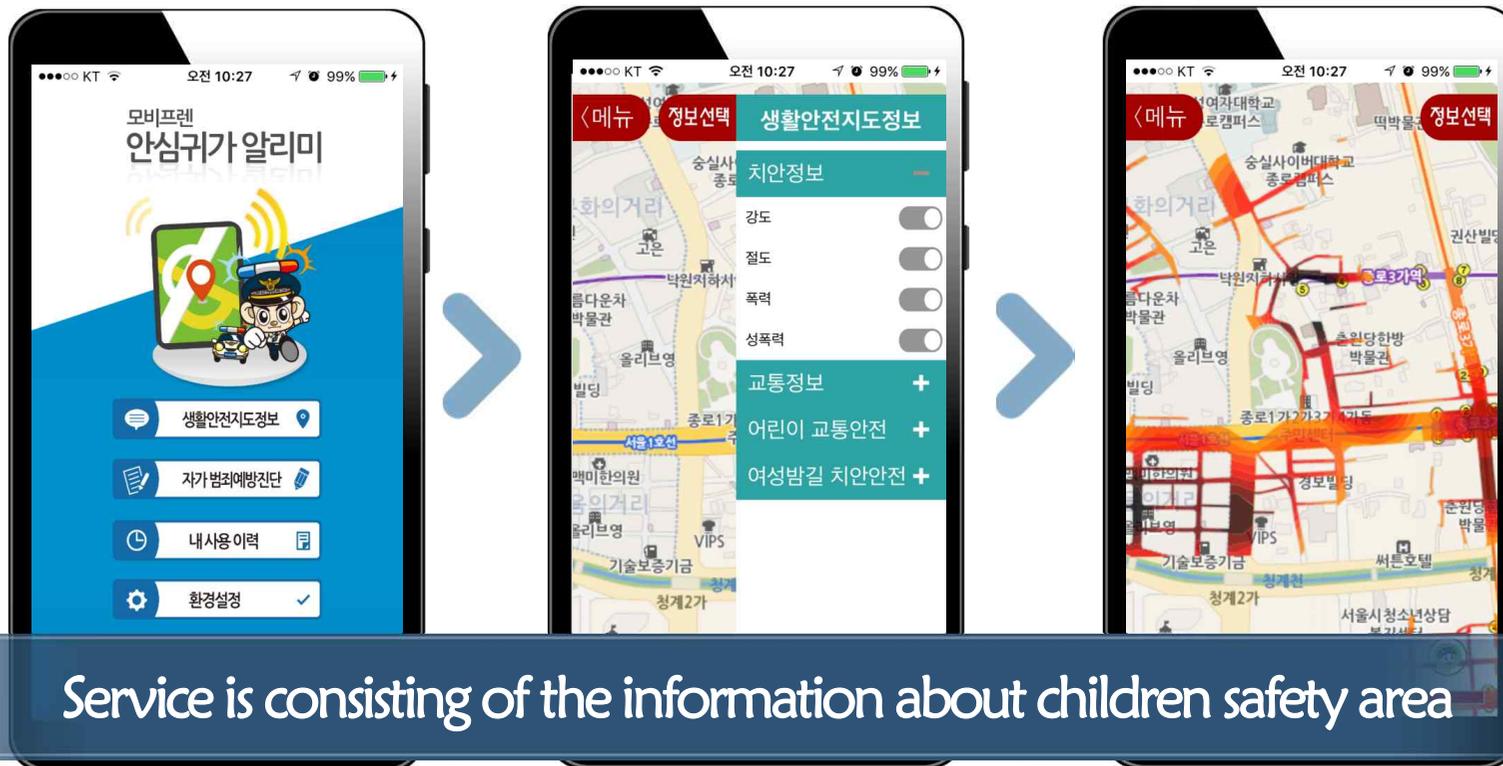
- 사회복지
- 문화관광
- 교육
- 보건의료
- 식품건강
- 재난안전
- 농축수산
- 부동산
- 교통물류
- 과학기술
- 환경기상
- 재정금융

소방서
비상급수시설
비상대피시설
산불취약지
산사태취약지역
소방서활동범위
소방서할유도
소방서수요도

it's using the Disaster theme map from "The Public Safety Map"

3. Open Public Data Service

Gyeongsangbuk-do 'Alimi'



Service is consisting of the information about children safety area

3. Open Public Data Service

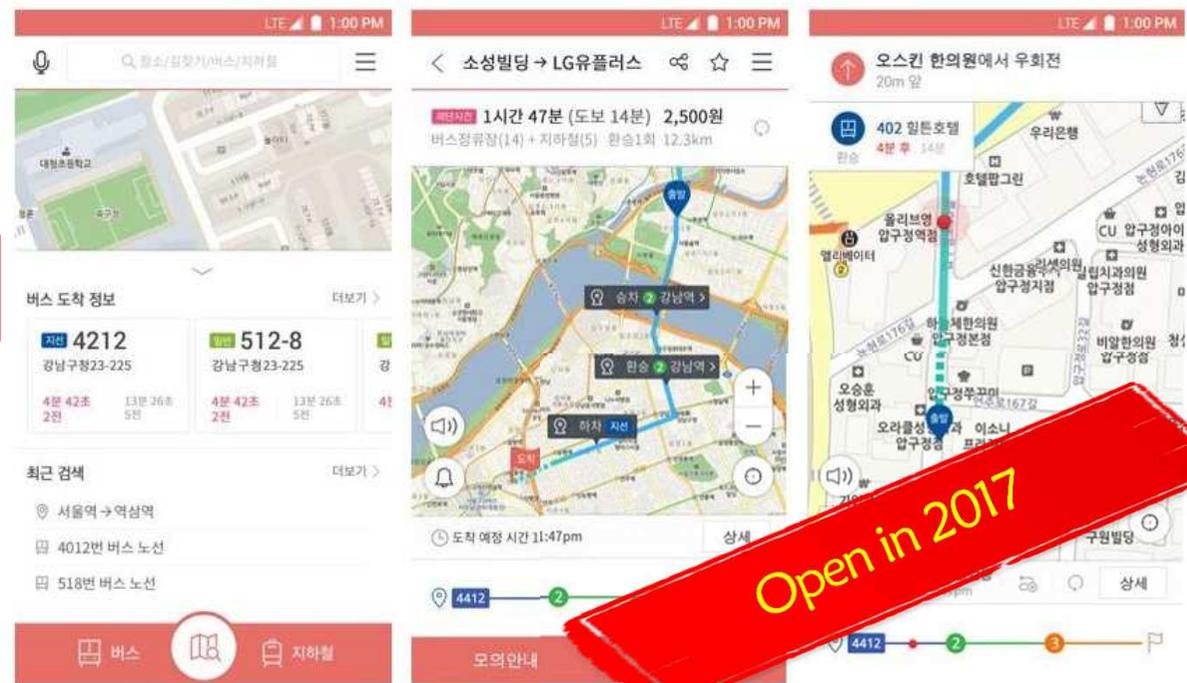
First Provider of “The Public Safety Map” based services



Pedestrian Navigation

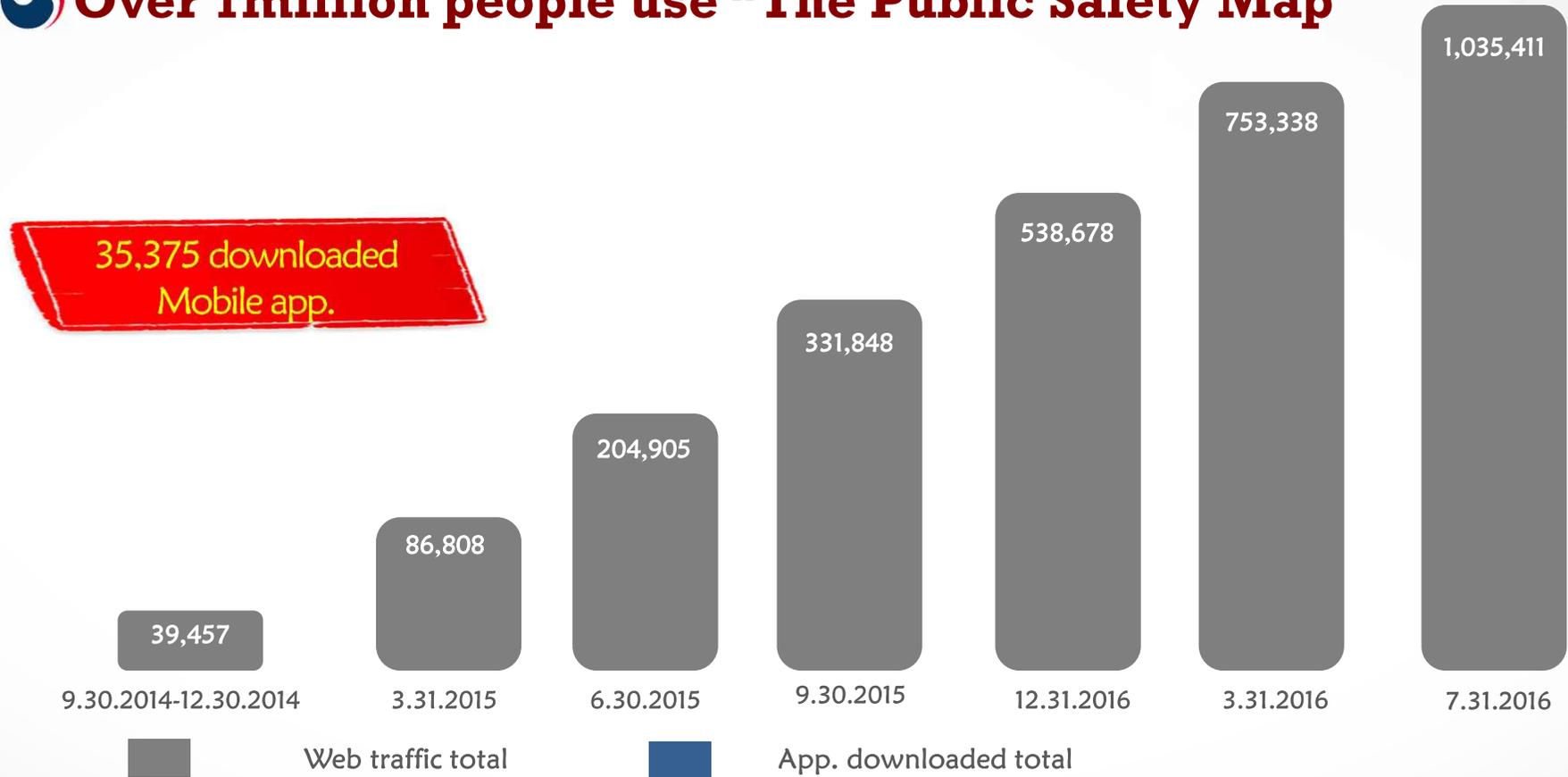
Traffic Accident Blackspot

Women safety information for night road

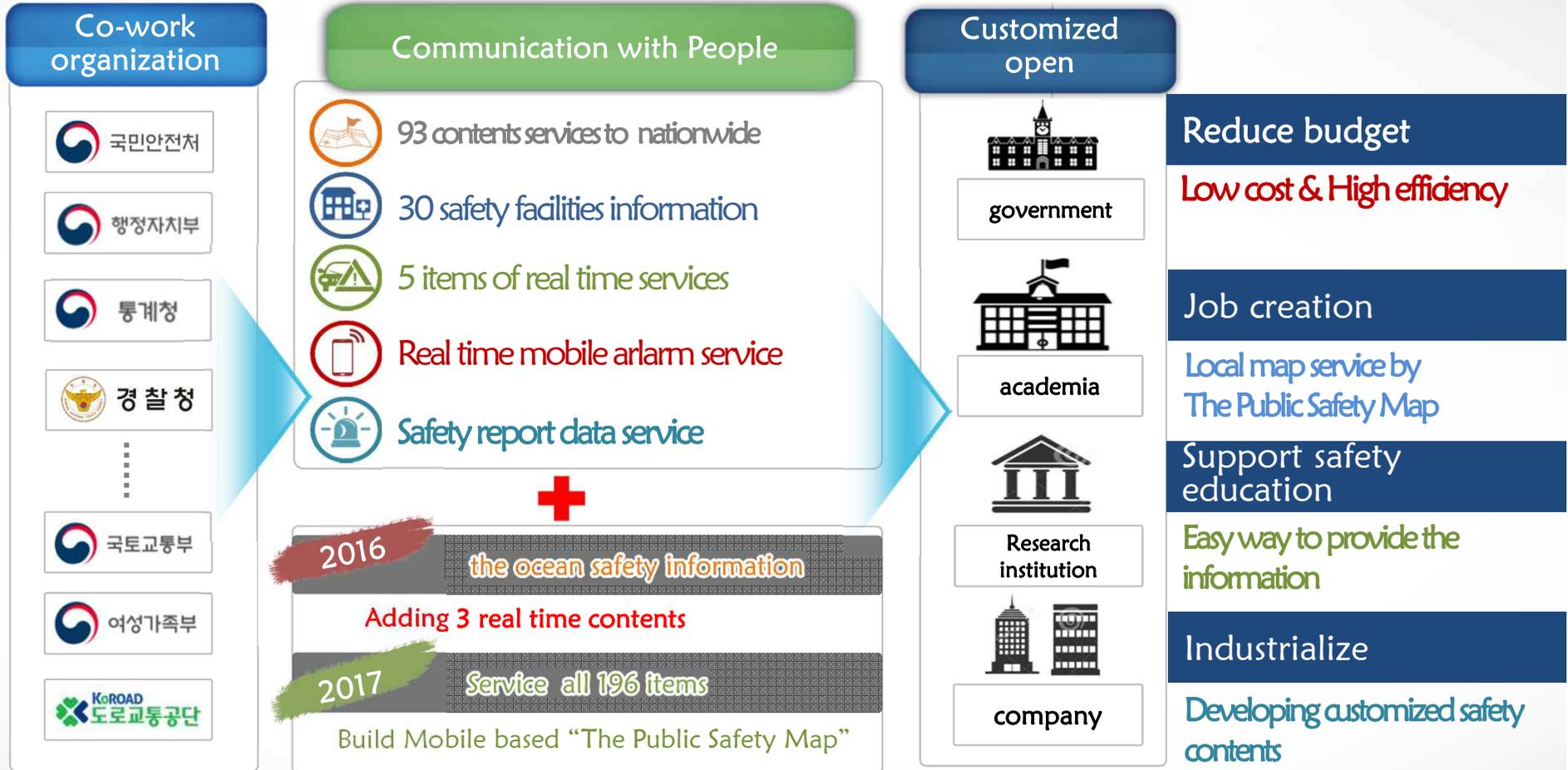


3. Open Public Data Service

 **Over 1million people use “The Public Safety Map”**



4. Plan & Expected Effects



Thank You



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