



行政法人 國家災害防救科技中心  
National Science and Technology Center  
for Disaster Reduction

# Applications of Disaster Warning Alerts with Social Channels

National Science and Technology Center for Disaster Reduction (NCDR)

TZU-YIN CHANG

2019/6/26

# Outline



- **Data Standard -Common Alerting Protocol (CAP)**
- **Open Data Applications**
- **Conclusions**

# **DATA STANDARD / DATA SHARING - COMMON ALERTING PROTOCOL (CAP)**

# Background

## ■ Usually, Alert Messages are published by **different government agencies**

- Strong wind 、 earthquake 、 fire 、 explosion : **MOI**
- Flood 、 drought 、 mine disaster : **MOEA**
- Cold damage 、 earth and stone flow 、 forest fire : **COA**
- Air crash 、 shipwreck 、 traffic accident : **MOTC**
- Toxic : **EPA**
- Epidemic : **MOHW**
- Radiation disaster : **AEC**

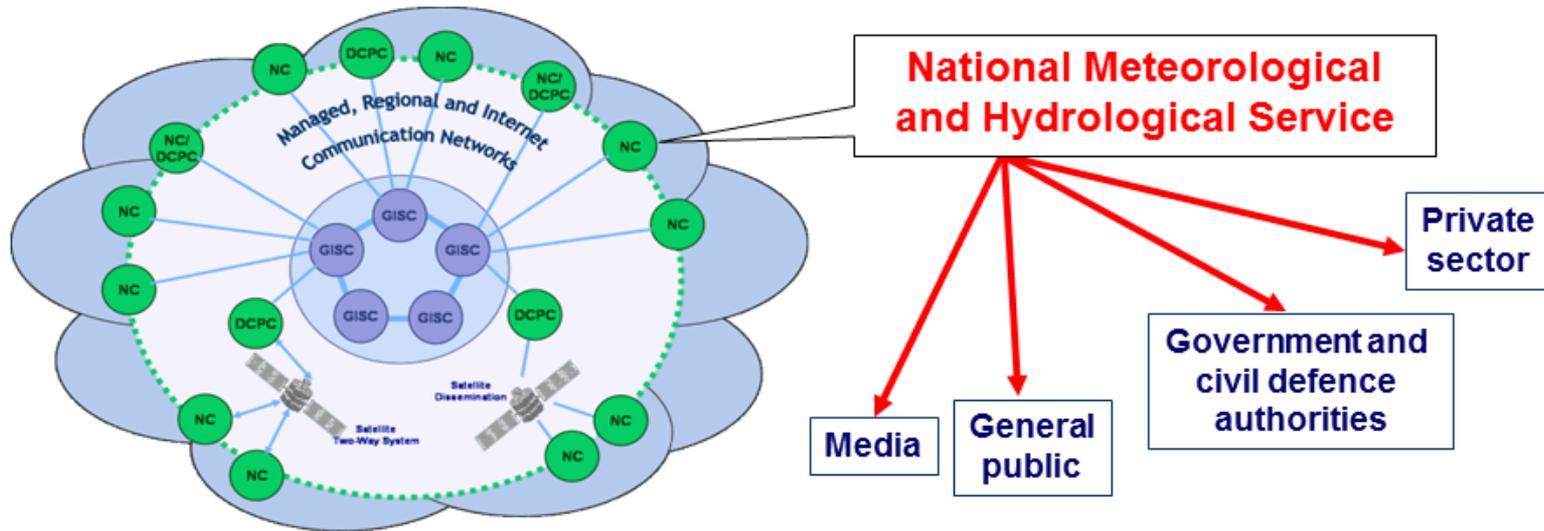
## ■ Face some challenge:

- It is **difficult to integrate and use alert messages** if non uniform alert format used by different government agencies





## WMO Information System



### WMO Information System (WIS)

GISC: Global Information System Center

DCPC: Data Collection or Processing Center

NC: National Center

# National Weather Service





National Oceanic and Atmospheric Administration's

## National Weather Service

weather.gov



Site Map
News
Organization

Search

**Local forecast by "City, St"**

[Home](#) > Alerts

### Experimental XML Feeds and Web Displays of Watches, Warnings, and Advisories

NOAA's National Weather Service offers several XML services  
[Forecasts](#)||[Watch/warnings](#)||[Current Observations](#)||[Tropical Cyclone Advisories](#)||[Storm Prediction Center Forecast Products](#)||[Change Notices](#)

This page provides access to NWS watches, warnings, advisories, and other similar products several different formats. Select a state or product name to view a list of active alerts in your web browser. These files are updated about every two minutes. Tropical Prediction Center/Storm Prediction center feeds are updated on an as needed basis. RSS and CAP/XML lists based on state and NWS forecast zones are provided to aid the automated dissemination of this information. More information on [RSS](#) and [CAP/XML](#) formats/feeds. This is an **experimental** product of the National Weather Service. [Comments and feedback](#) are welcome. A [Product Description Document](#) is also available.

A|C|D|F|G|H|I|K|L|M|N|O|P|R|S|T|U|V|W|--U.S.--

	HTML/WEB	RSS	CAP	RSS
	By State			By County/Zone
Alabama		<a href="#">XML</a>	<a href="#">CAP</a>	<a href="#">XML</a>
Alaska		<a href="#">XML</a>	<a href="#">CAP</a>	<a href="#">XML</a>
America Samoa		<a href="#">XML</a>	<a href="#">CAP</a>	<a href="#">XML</a>
Arizona		<a href="#">XML</a>	<a href="#">CAP</a>	<a href="#">XML</a>
Arkansas		<a href="#">XML</a>	<a href="#">CAP</a>	<a href="#">XML</a>
California		<a href="#">XML</a>	<a href="#">CAP</a>	<a href="#">XML</a>

**Warnings**

Current  
By State/County...

**Observations**

Radar  
Satellite  
Snow Cover  
Surface Weather...

**Forecasts**

Local  
Graphical  
Aviation  
Marine  
Hurricanes  
Severe Weather  
Fire Weather  
Climate...

**Forecast Models**

Numerical Models  
Statistical Models...

**Weather Safety**

Weather Radio  
Hazard Assmt...  
StormReady /  
TsunamiReady  
Education/Outreach

# MeteoAlarm



**meteoalarm**  
alerting europe for extreme weather

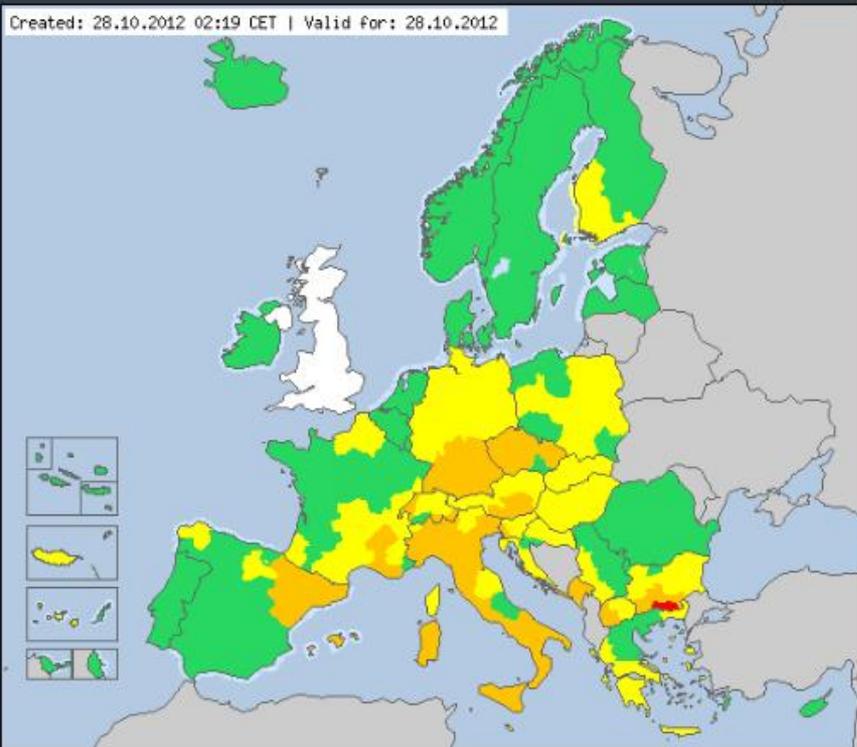
**EUMETNET**  
The Network of European Meteorological Services

[Start](#) | [News](#) | [About Meteoalarm](#) | [Help](#) | [Terms and Conditions](#) | [Links](#) | [Display Options](#)

english

» Europe:

Created: 28.10.2012 02:19 CET | Valid for: 28.10.2012



## Weather warnings: Europe

**Awareness Reports** - You can find detailed information about the warnings in the awareness reports issued for each country. Select the relevant country.

AT						IT				
BE						LU				
BG						LV				
CH						ME				
CY						MK				
CZ						MT				
DE						NL				
DK						NO				
EE						PL				
ES						PT				
FI						RO				
FR						RS				
GR						SE				
HR						SI				
HU						SK				
IE						UK				
IS										

awareness types:

Display:

Caption:



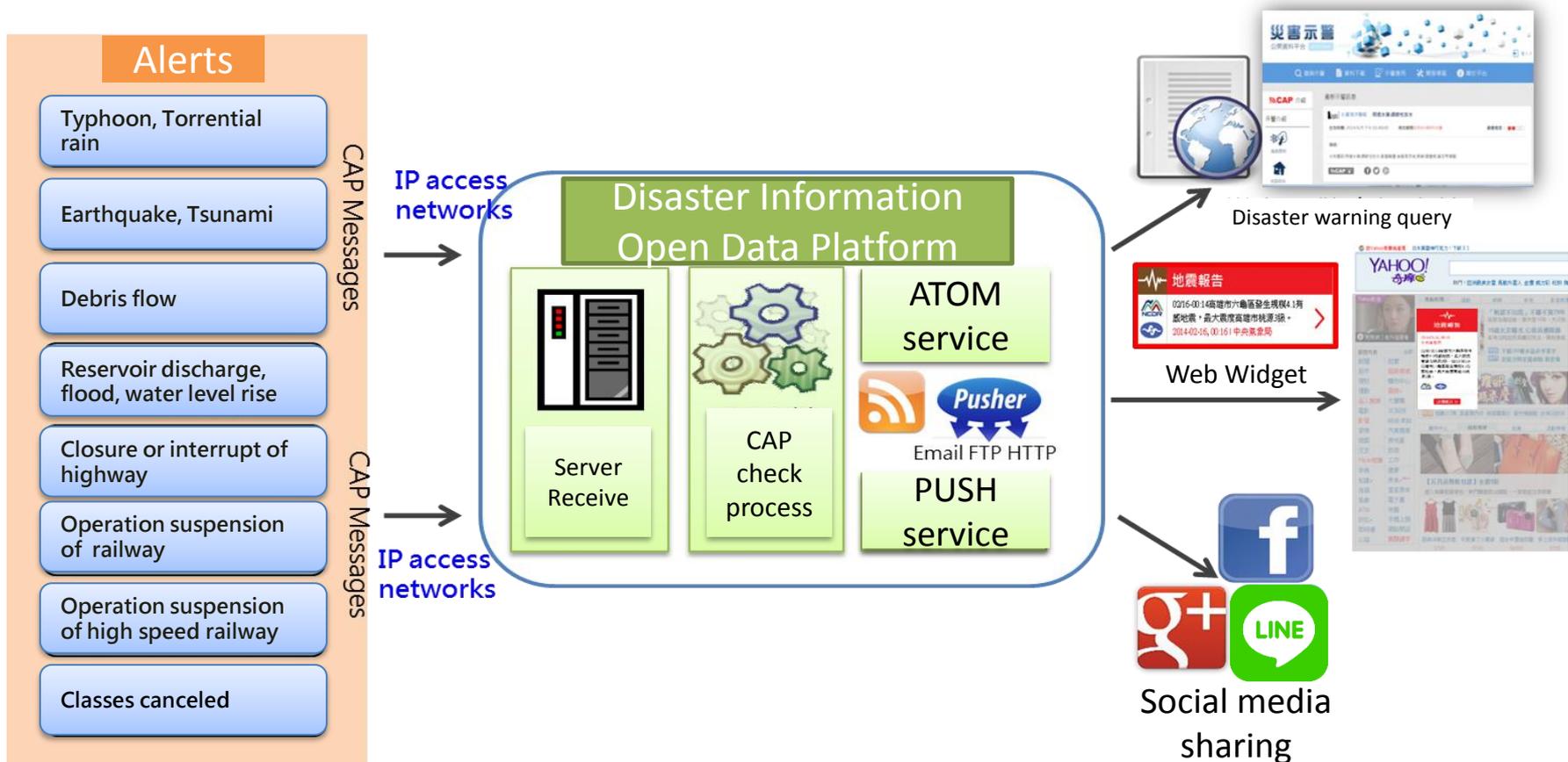
# Common Alert Protocol (CAP)

- Common Alerting Protocol (CAP) :
  - **A Standard Format (XML)**: quickly collect and transmit.
  - Can **publish and receive the alert message** to locate area or whole nation.
  - Easily **automatic exchange the data** between **various systems** and be compatible with traditional systems as well.
  - Can **extend the sub-standard** to associate special device.
- CAP is accepted as standard by OASIS in 2004. The version of 1.2 was published in 2008.



# One Stop-Alert Platform(1/2)

- Standardizing formats and protocols of public alerts
- Sharing information via a open data platform
- Promoting the applications of public disaster alerts



# One Stop-Alert Platform(2/2)

- Integrating **34 different kinds** of CAP alerts created by **14 departments**
- Releasing a total of **13 kinds of real-time layers**



The screenshot shows the '災害示警' (Disaster Alert) public information platform. The main content area is titled '最新示警訊息' (Latest Alert Information) and features three alert cards. The first card is for '水庫溢洪警報 鯉魚潭水庫(自由溢流)', issued on 2014/6/3 at 08:00:00, with a validity of 24 hours and 39 minutes. The second card is for '降雨警報 大雨特報', issued on 2014/6/3 at 04:50:00, with a validity of 24 hours and 15 minutes. The third card is for '道路封閉警報 台8線87K+400-0K+000道路封閉', issued on 2014/5/26 at 06:00:00, with a validity of 3 days, 8 hours, and 39 minutes. A left sidebar contains navigation icons for various alert types like '颱風警報', '地震特報', '土石流警報', etc.



The screenshot shows the '即時資料' (Real-time Information) section of the platform. It displays a table of alerts from the '水土保持局' (Soil Conservation Bureau). The table includes columns for the alert name, the issuing date, and a 'Meta data' button for each entry.

即時資料之即時時間為資料更新時間		
台東縣土石流警報(kmz)	2014/05/22 04:59	Meta data
花蓮縣土石流警報(kmz)	2014/05/21 11:30	Meta data
台南市土石流警報(kmz)	2014/05/21 11:34	Meta data
花蓮縣土石流警報(kmz)	2014/05/22 04:59	Meta data
花蓮縣土石流警報(含疏散避難路線圖及避難處所)(kmz)	2014/05/22 04:59	Meta data
南投縣土石流警報(kmz)	2014/05/22 04:59	Meta data
嘉義縣土石流警報(kmz)	2014/05/21 11:34	Meta data
苗栗縣土石流警報(含疏散避難路線圖及避難處所)(kmz)	2014/05/22 04:59	Meta data
屏東縣土石流警報(kmz)	2014/05/21 11:35	Meta data
基隆市土石流警報(kmz)	2014/05/21 11:35	Meta data
南投縣土石流警報(kmz)	2014/05/21 11:35	Meta data
高雄市土石流警報(kmz)	2014/05/22 04:59	Meta data
雲林縣土石流警報(kmz)	2014/05/22 04:59	Meta data

# US-Tsunami Warning



## Tsunami Warning for Content: thunderstormc

1 day, 21 hours ago

Locations: Coastal areas between and including the California-Mexico border to Gualala Point, California (80 miles NW of San Francisco) [Show more](#)

23 days ago – West Coast and Alaska Tsunami Warning Center

How likely: ■ ■ ■ ■ How soon: ■ ■ ■ ■ How severe: ■ ■ ■ ■

auxiliary info

A tsunami Warning is now in effect which includes the coastal areas of California from the California-Mexico border to Gualala Point, California (80 miles NW of San Francisco). - Event details: Preliminary magnitude 8.4 (M) earthquake / Lat: 33.800, Lon: -116.600 at 2012-09-17T23:53:57Z Tsunami warnings mean that a tsunami with significant widespread inundation is expected, or occurring. Warnings indicate that widespread dangerous coastal flooding accompanied by powerful currents is possible and may continue for several hours after the initial wave arrival.

### Estimated arrival times and wave heights

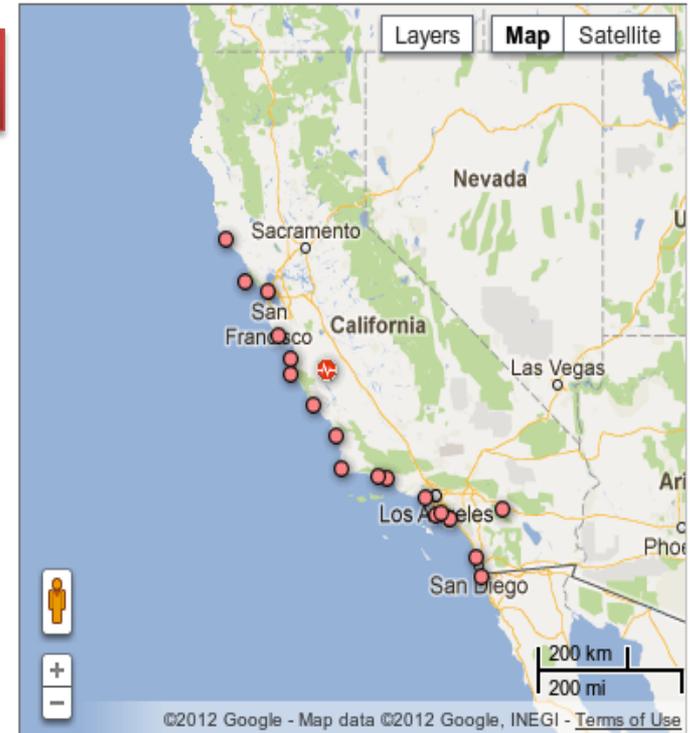
[Show all 17 locations](#)

Santa Monica, California	September 17, 2012 5:02 PM GMT-07 (23 days ago)	0.3m / 0.9ft
La Jolla, California	September 17, 2012 5:09 PM GMT-07 (23 days ago)	1.2m / 4.0ft
San Francisco, California	September 17, 2012 7:06 PM GMT-07 (23 days ago)	1.5m / 5.0ft

### Recommended actions

## Recommended Action

Recommended Actions: People in coastal areas should follow instructions from their local emergency officials. Evacuations are only ordered by emergency response agencies. If in a tsunami warning coastal area, move inland to higher ground. If in a tsunami advisory coastal area,



● Affected locations

[Open map in new window](#)

News

Affected location

# Taiwan-Thunderstorm



豪雨特報：北臺灣、中臺灣、東臺灣、南臺灣

2/發

Content: thunderstorm



Affected location

受影響的地區

在新視窗中開啟地圖

地點：苗栗縣通霄鎮; 苗栗縣苑裡鎮; 苗栗縣苗... 更多

第7號颱風影響，今(13)日臺灣東北部、中部以北地區、南部山區及東部山區有局部大豪雨或超大豪雨，南部、東部地區及東南部山區有局部豪雨或大豪雨，東南部地區及澎湖、馬祖、金門有局部大雨或豪雨發生的機率，請注意坍方、落石、土石流及山洪爆發，低窪地區請慎防淹水。超大豪雨區域：宜蘭縣、基隆市、臺北市、新北市、桃園縣、新竹縣、新竹市、苗栗縣、臺中市、彰化縣、南投縣、雲林縣、嘉義縣、嘉義市、臺南市、高雄市、屏東縣、花蓮縣。大豪雨區域：臺東縣

可能性：  
預計發生時間：  
嚴重程度：

auxiliary info

見

建議作為

Recommended Action

事前準備:

由於豐沛的雨量可能會帶來淹水現象、土石流等災害，可參考水利署淹水警戒訊息、水保局土石流警戒訊息的連結與措施。平時應疏通排水溝渠等設施；臨災前，若居住於或身處地勢低窪或易發生淹水、土石崩塌、土石流等地區，應隨時注意新聞、中央氣象局發布的動態，及早撤離或遷往高處。

期間應變:

應防範瞬間大雨、雷擊及強陣風。低窪地區易造成淹水，若發現開始淹水，盡速通報救災相關單位前往救援。長時間連續性降雨，土壤中含水量遽增，易導致坍方、落石及土石流，同時留意溪水濁度、水位變化情形及是否有山鳴聲，皆可做為判斷土石流發生的前兆。亦須注意山上集水區下雨情況，若大雨匯集，易引發山洪，致下游溪水暴漲。雨勢大時，能見度降低，不但視線不良且天雨路滑，若須出門，請注意行車安全，不可貿然駛入被水淹沒的路面。有關未來天氣發展，可隨時透由166、167氣象語音電話、智慧型手機APP或氣象局全球資訊網等管道，獲得發布之最新特報、即時天氣訊息及相關雨量資訊。

災後處理:

因連日豪雨，土壤含水量高，土石較為鬆動，應避免至山區活動，以防坍方落石所造成之災害。若有災害損失，事後應通知里鄰長、警察局派出所或鄉鎮公所，以為災害檢討之統計，並作防災之改進參考。豪雨過後，易有傳染病流行，民眾應立刻整理環境、清除污物、噴灑消毒藥品，發現有傳染病立即逕往衛生機關隔離醫治，以防蔓延。

# Taiwan-Debris Flow



## 土石流紅色警戒：苗栗縣泰安

接下來的 18 分鐘內有效  
地點：苗栗縣泰安鄉梅園村

苗栗縣泰安

Content: debris flow

發佈時間：1 小時 42 分鐘前 - 農委會水土保持局

可能性：■■■■ 預計發生時間：■■■■ 嚴重程度：■■■■

auxiliary info

依據中央氣象局風雨資料研判：計1條土石流潛勢溪流達紅色警戒(相  
流防災資訊網(<http://246.swcb.gov.tw/>)查詢)

## 建議作為

## Recommended Action

請配合鄉(鎮、市、區)公所及當地警消單位指示，儘早撤離或前往避難處所避難，並與當地避難處所保持聯繫，有

來源：水土保持局

當行政院農業委員會發布土石流警戒時，建議民眾遵從下列建議事項：

黃色警戒：請隨時觀察環境變化，留意最新訊息，做好疏散避難準備並保持聯絡管道暢通。

紅色警戒：請配合鄉(鎮、市、區)公所及當地警消單位指示，儘早撤離或前往避難處所避難。

查詢土石流相關資訊可上土石流防災資訊網獲得最新資訊

### 事前準備：

應熟悉了解居住區域環境的避難路線、緊急避難處所的位置。

準備避難時所需之緊急避難包、隨身衣物與重要證件。

隨時注意收聽氣象報告與廣播電視等訊息。

清理排水溝，暢通水路。

### 期間應變：

攜帶緊急避難包、隨身衣物與重要證件。

疏散至村內緊急避難處所，若有災害擴大之虞，則疏散至外地收容所。

通知親友你已疏散至那個避難處所。



受影響的地區

Affected location

這個地區的其他警報

颱風警報：北臺灣、東臺灣、中臺灣、南臺灣、外島  
中央氣象局 - 更新時間：2 小時 12 分鐘前

豪雨特報：北臺灣、中臺灣、東臺灣、南臺灣  
中央氣象局 - 更新時間：19 小時前

豪雨特報：北臺灣、中臺灣、東臺灣、南臺灣  
中央氣象局 - 更新時間：2 小時 12 分鐘前

# Taiwan-Flooding Warning



## 淹水警戒：臺中市和平區

接下來的 53 分鐘內有效  
地點：臺中市和平區

Content: flooding warning

發佈時間：7 分鐘前 - 水利署

可能性：■■■■ 預計發生時間：■■■■ 嚴重程度：■■■■

auxiliary info

水利署訊 臺中市和平區淹水二級警戒(上谷關站3小時雨量134mm)，如持續降雨，部分地區行車及道路可能3小時內開始積淹水(如：和平區-博愛里、天輪里、自由里、台8線、台7甲線)，建請即時注意淹水通報及應變。

### 建議作為

## Recommended Action

準備沙包擋水牆防淹水 來源：水利署

#### 事前準備：

- 主動清除住家周邊水溝。
- 準備物資（如乾糧、礦泉水）及防災器材（沙包、防水閘門、手電筒、收音機）等。
- 將貴重財物及汽機車移放安全地方。
- 事先瞭解如要疏散避難之收容所地點。
- 隨時注意村(里)廣播或與村(里)保持聯繫。
- 隨時透過電視、廣播或網路等媒體關心天氣動態。
- 事先下載行動水情APP或由水利署防災資訊服務網登錄手機門號或住家電話號碼(僅提供一級淹水警戒)，俾利災中取得住家所在鄉鎮市區發布之淹水警戒資訊。

#### 期間應變：

- 儘量避免外出，以免發生危險。若外出行駛道路須注意積水高度以免熄火或導致汽機車泡水故障並小心駕駛該路段。
- 隨時透過電視、廣播或網路等媒體關心天氣動態，或上防災資訊服務網查詢即時警戒情況。
- 因應水庫濁度過高等狀況而導致停水，事先儲水備用。
- 提早使用擋水閘門，若時間充裕，可於閘門縫隙填塞報紙或DM，再由外部封貼易撕膠帶，防水效果更佳。



■ 受影響的地區

Affected location

#### 這個地區的其他警報

- 颱風警報：北臺灣、東臺灣、中臺灣、南臺灣、外島  
中央氣象局 - 更新時間：2 小時 16 分鐘前
- 豪雨特報：北臺灣、中臺灣、東臺灣、南臺灣  
中央氣象局 - 更新時間：20 小時前
- 豪雨特報：北臺灣、中臺灣、東臺灣、南臺灣  
中央氣象局 - 更新時間：2 小時 16 分鐘前
- 土石流紅色警戒  
農委會水土保持局 - 更新時間：1 小時 46 分鐘前

# Open Data-Applications

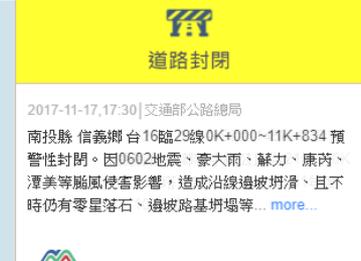
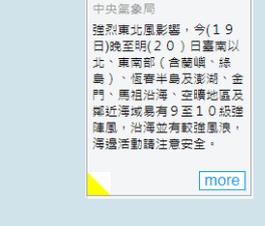
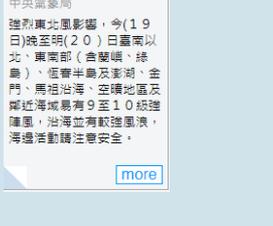
- over **780** users

個人行動助理  
**Google Now**

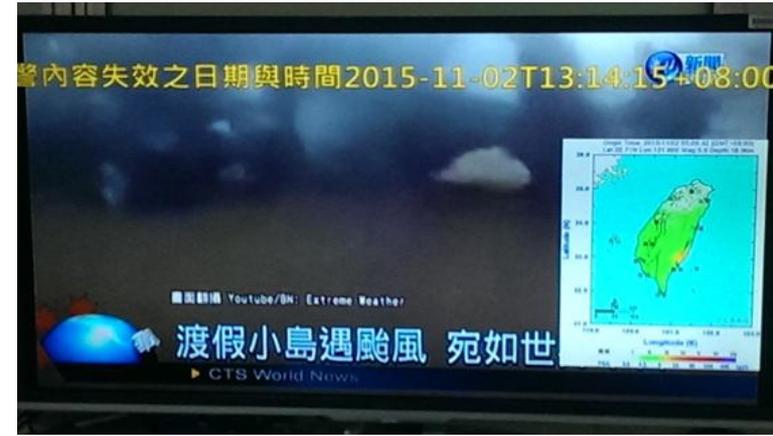
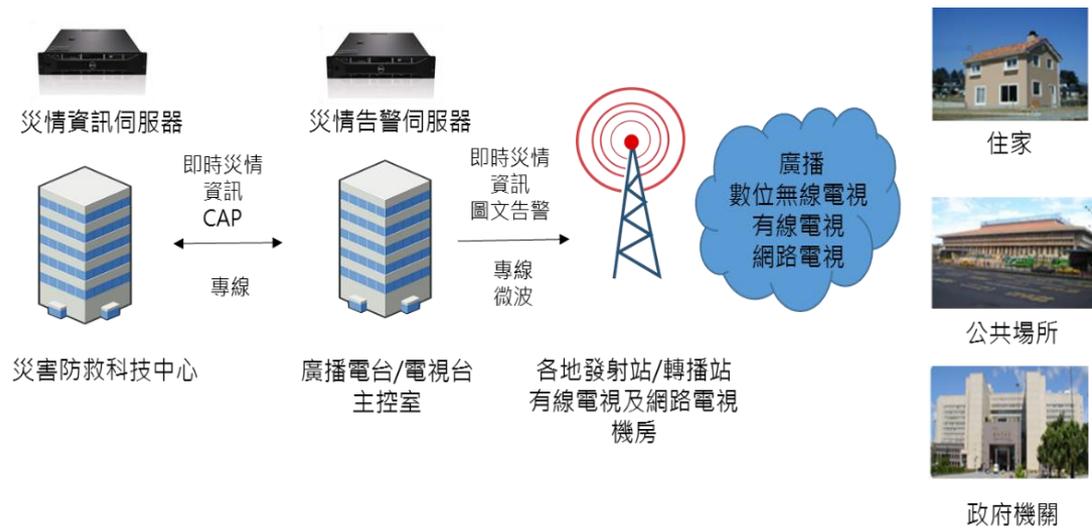
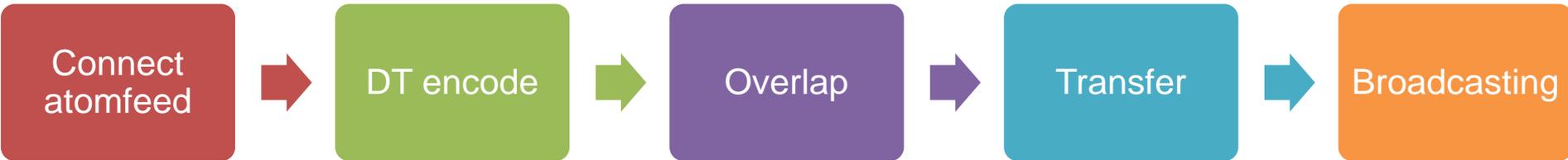
村里生活圈  
**Village APP**



## Web Widget 4 types of content x 5 layouts

Severity-Extreme (Province)			
Severity-Severe (Province)			
Severity-Extreme (County)			
Severity-Severe (County)			

# Application-Digital Television



# Application-Social Media Channel



- 2018/03/09 NCDR LINE@ Official Account launched
- NCDR LINE@ official account is for delivering early warning to public

防災資訊 零距離



LINE在台灣每月活躍用戶高達1900萬，平均一天 20次開啟率，為持續深入民眾生活，LINE台灣總經理陳立人今日於年會中宣布，與國家災害防救科技中心合作的官方帳號，即日起上線，提供全台灣用戶防災資訊的訂閱；另外預告2個重大計

<https://tw.appledaily.com/new/realtime/20180309/1311478/>

# NCDR LINE@ Official Account



- NCDR LINE@ Official Account
  - Include 14 units, **25 disaster warning information**, provide **customized subscription services** such as heavy rainfall, earthquake, low temperature, strong wind, air quality, etc.
  - The public can **check the real-time information warnings** in Taiwan, and can also subscribe to the police to take the initiative to receive real-time information on **meteorology, hydrology, transportation, and livelihood information**

1. Adding NCDR@    2. Adding NCDR@

QR code



Official Account  
( ID: @NCDR )



# NCDR LINE@ Official Account



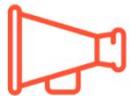
- NCDR LINE@ Official Account Provide
  - **Instant Alerts:** Query the current instant alerts and their posted area
  - **Subscribe to Alerts:** Select alerts that users want to receive by districts
  - **Related Links:** Provide the relevant URLs





# Subscribe to Alerts

- Diverse locations and alerts are optional for user to be selected.



即時示警



訂閱示警



相關連結

查看功能選單



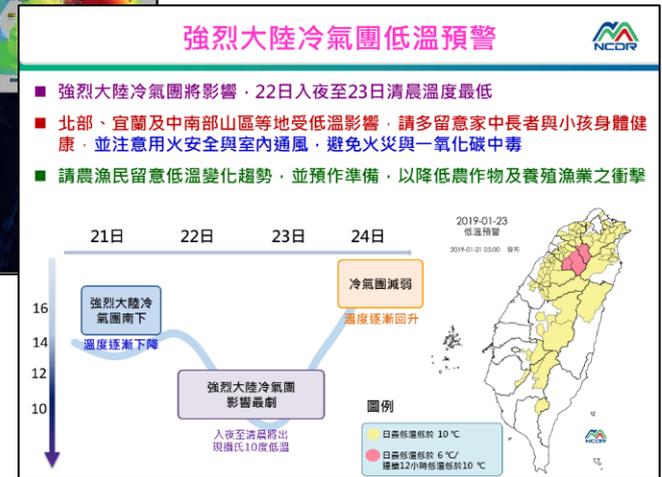
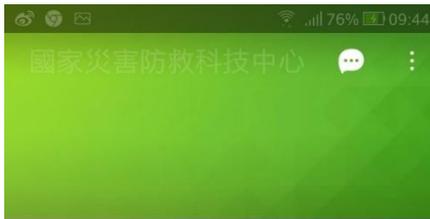
# Subscribe to Alerts

- According to the warning area and warning details issued by the central and local governments, we can push the information to public proactively.
- By using LINE Login API, we can provide **the customized service** for the user according to his or her unique subscription list.



# Extra Services-Graphics

- Graphic information of situations and suggestions are presented for easy understanding and sharing



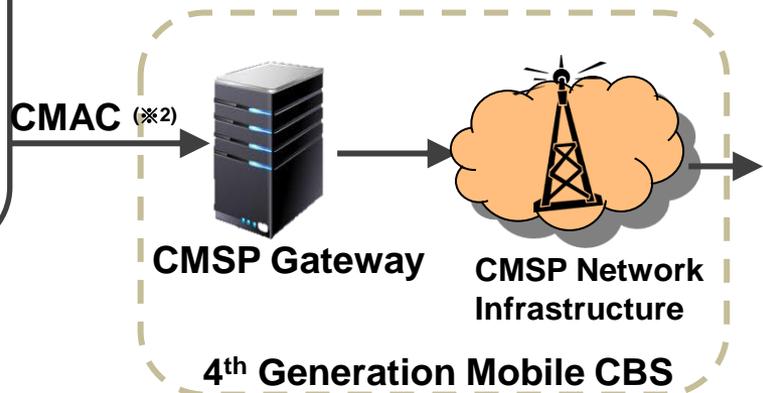
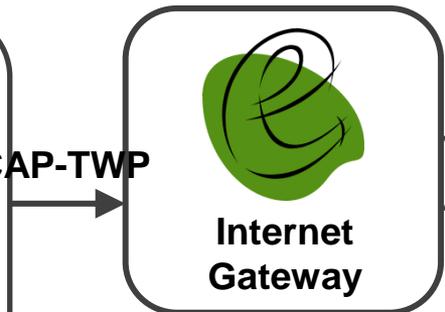
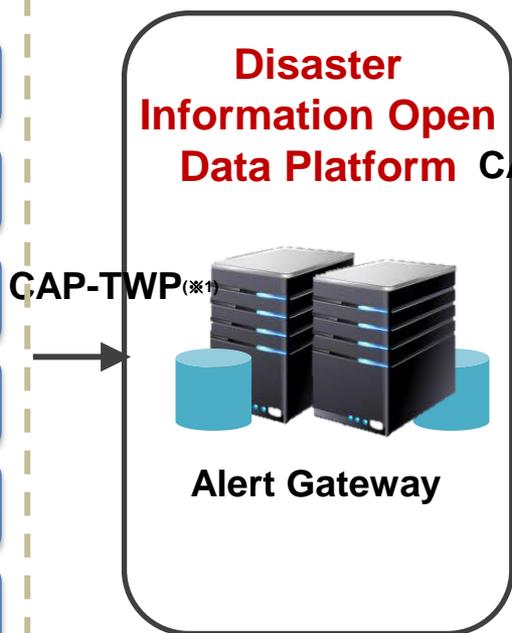
# CELL BROADCAST SERVICE

# PWS Construction Map



## Alerting Message Issued by government

- Typhoon, Extremely rain
- Earthquake, Tsunami
- Debris flow
- Reservoir discharge, Flood, High water level
- Closure or interrupt of highway
- High speed rail service interruptions
- Train service interruptions
- Call off work and school



# CBS Construction Map



CAP



CMAC



## Government

Central Weather Bureau  
Water Resources Agency  
Soil and Water Conservation Bureau  
National Police Agency  
National Fire Agency  
Atomic Energy Council  
Centers for Disease Control  
City Government

## CBE

Format Transfer  
Message examination  
Message logging and report

## 5 Telecom Operators

3G, 4G network



CAP : Common Alerting Protocol

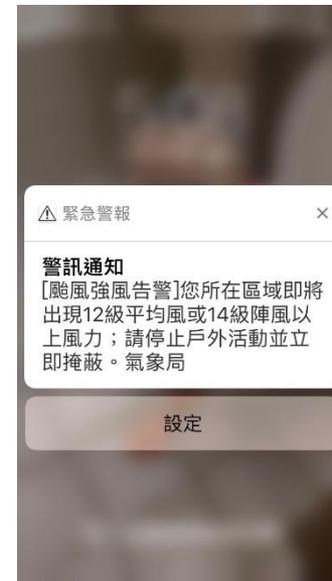
CMAC : Commercial Mobile Alert for C Interface

# CBS Message Types



Message Type	Presidential (National) Alert	Emergency Alert	Alert Message	Required Monthly Test
Channel	4370/4383	4371/4384	911/919	4380/4393
User Turn off	No	Yes	Yes	Yes
Special sound	Yes	Yes	No	Yes
Alert Level	Warning	Warning	Watch/Advisory	Normal

Warning
Watch
Advisory
Normal



# CBS Alert Types

## Natural



Torrential Rain



Earthquake



Tsunami



Typhoon Strong Wind



Debris Flow

## Infrastructure



Road Closure



Electric Outage



Water Outage



Reservoir Discharge



Nuclear Accident

## Civil



Explosion



Air Raid Alert



Missile Air Raid Alert



Infectious Disease



Evacuation

# 2016/05/12 CBS Earth Quake Waring Message

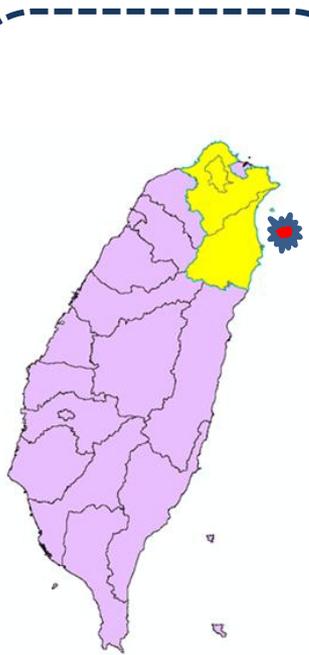


Waring Message

Alert Gateway

Broadcast channels

Application



CAP-TWP

Alert Gateway



CAP-TWP



Internet Gateway

CMSP Gateway  
Cell Phone  
Network



緊急警報

每月測試  
PD RMT

2016年6月22日

總統提示  
[地震速報]05/31 13:24左右  
北部地區發生中型地震，預  
估震度4級以上地區:臺北，  
宜蘭，桃園，氣象局。

2016年5月31日

總統提示  
[地震速報]05/12 11:17左右  
東北地區發生中型地震，預  
估震度4級以上地區:宜蘭，  
臺北，氣象局。

earthquake : 11:17:14.8  
message issue:11:17:32.34

11:17:32.50

11:17:32.70



- Heavy rainfall event was predicted by CWB at 14:00 06/22
- CWB sent **“Torrential rain alert this area til 15:15 06/22 ”** to public via CBS
- Social media: Flash Flooding at Xingshan Elementary and Junior High School

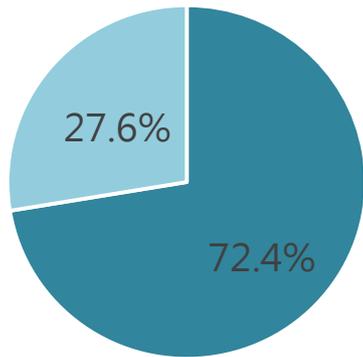


# CBS Message Issued

Issue Agency - Alert	2016	2017	2018
Directorate General of Highways - Highway Closure	14	5	-
Water Resources Agency –Reservoir Discharge	38	-	4
Centers for Disease Control – Communicable Disease	3	1	4
Centers for Disease Control – International Communicable	-	-	-
Soil and Water Conservation Bureau – Debris Flow	11,300	13,661	6236
Central Weather Bureau - Earthquake Warning	6	4	23
Central Weather Bureau - Earthquake Report	6	20	48
Central Weather Bureau – Torrential Rain	-	14	19
Central Weather Bureau - Tsunami	-	6	6
National Police Agency – Air Raid Alert	-	14	12
Directorate-General of Personnel Administration – Work and School Closure	-	-	-
Atomic Energy Council - Nuclear Accident	-	2	1
National Fire Agency - Emergency Support	-	1	-
Central Weather Bureau - Typhoon Strong Wind	-	3	1
National Communication Commission- Monthly Test	-	-	76
Ministry of National Defense- Missile Air Raid Alert	-	-	4
City Government - Evacuation	-	-	52
CPC Corporation – Explode	-	-	1
CPC Corporation - Industrial Fire	-	-	2
Taiwan Power Company - Electric Outage	-	-	3
Taiwan Water Corporation - Water Outage	-	-	1
<b>Total Message Count (2018.9.30)</b>	<b>11367</b>	<b>13731</b>	<b>6493</b>

# Results from Telephone Questionnaire

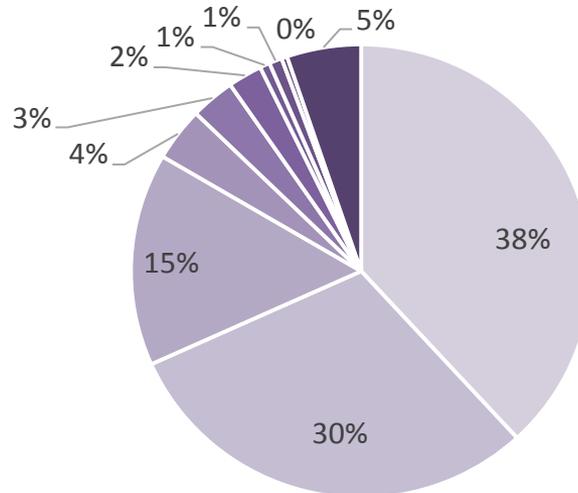
Have you ever received CBS messages?



■ YES ■ No

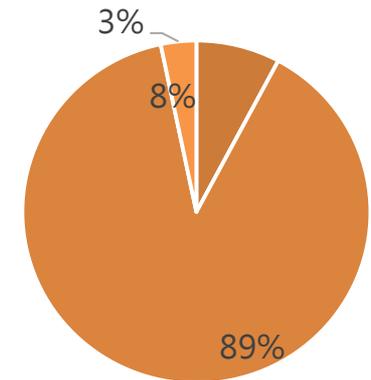
72.4% respondents received CBS messages

Which type of alerts have you received ?



- Earthquake
- Quake Early Warning
- Animal and plant epidemic
- Air Raid
- Typhoon Strong Wind
- Torrential Rain
- Road Closure
- Debris Flow

Are you satisfied with CB service?



■ Very Good ■ Good ■ Bad

89% respondents were satisfied with CBS

# Conclusions



- The different formats of alert messages are integrated using CAP standard as the united alert messages with the **joint format for being sent and received**.
- **The alert dissemination policy has been changed**. In past years, governments provided open data to enterprise for the value-added purpose. Now, governments focus on using multi-channels for delivering alerts to public.



行政法人 **國家災害防救科技中心**  
National Science and Technology Center  
for Disaster Reduction

**Thank you for your attention**