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Citizen's resilience and Public Warning Systems

6th to 10th December 2021

8th December 2021
ETHICS, RESILIENCE, AWARENESS

Dr. Amelie Grangeat

Dr. Alessandro Lazari

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Trends on disasters and context

- **Climate Change** : possible outcomes of an increase in global temperatures include increased risk of drought and increased intensity of precipitations and storms, including tropical cyclones with higher wind speeds [2017 Wuebbles]
- **Cyber incidents** : Cyber incidents ranks as the top peril for companies globally in the Allianz Risk Barometer 2020 [2020 Allianz]
- **United Nation Sustainable Development Goals 11.5**
“By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations” [2015 UN]

Need of a holistic crisis management approach, with appropriate tools & technologies

[2017 Wuebbles] Wuebbles, D.J., D.W. Fahey, K.A. Hibbard, B. DeAngelo, S. Doherty, K. Hayhoe, R. Horton, J.P. Kossin, P.C. Taylor, A.M. Waple, and C.P. Weaver, 2017: Executive summary. In: *Climate Science Special Report: Fourth National Climate Assessment, Volume I* [Wuebbles, D.J., D.W. Fahey, K.A. Hibbard, D.J. Dokken, B.C. Stewart, and T.K. Maycock (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 12-34, doi: [10.7930/J0DJ5CTG](https://doi.org/10.7930/J0DJ5CTG). [Executive Summary - Climate Science Special Report \(globalchange.gov\)](https://www.globalchange.gov)

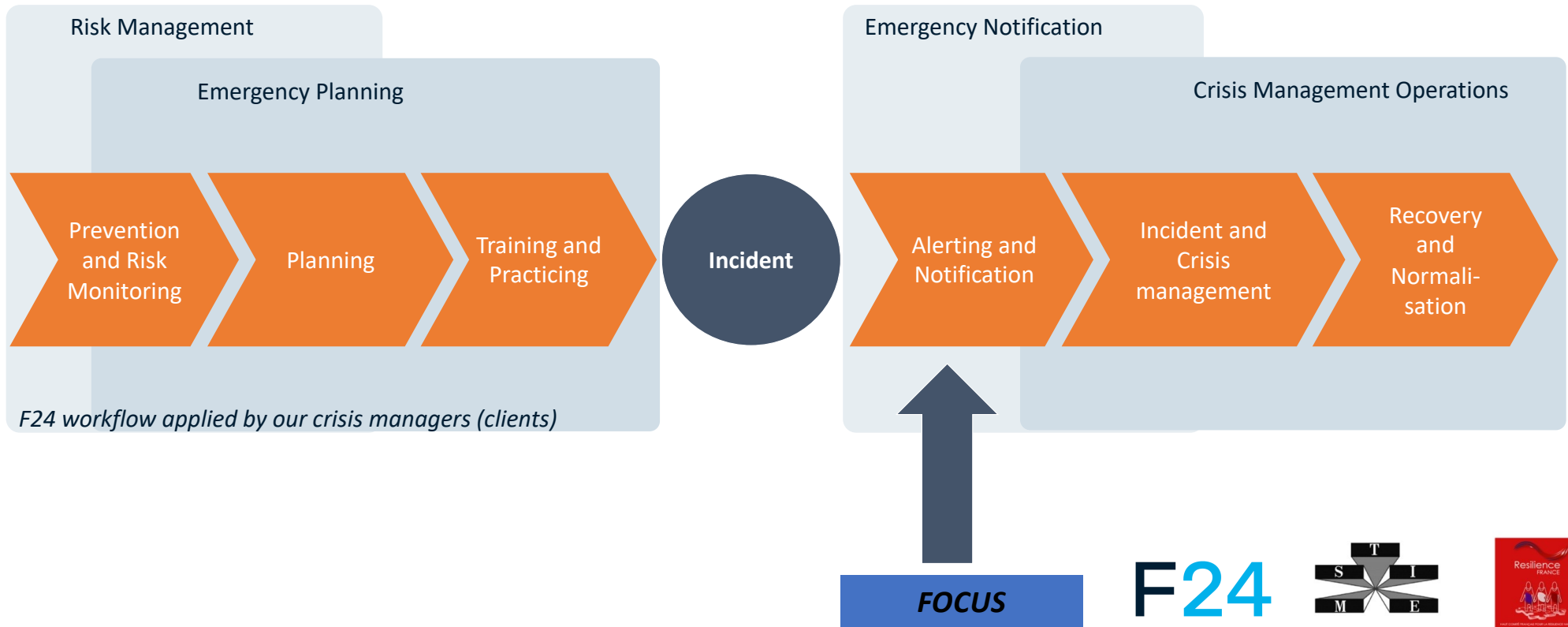
[2020 Allianz] Allianz Risk Barometer, based on the insight of more than 2,700 risk management experts from 102 countries, 2020 <https://www.agcs.allianz.com/content/dam/onemarketing/agcs/agcs/reports/Allianz-Risk-Barometer-2020-Appendix.pdf>

[2015 UN] United Nations, Goal 11: Make cities inclusive, safe, resilient and sustainable 2015, <https://www.un.org/sustainabledevelopment/cities/>

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Holistic approach before, during and after a crisis event



European Electronic Communications Code (EECC) and Public Warning Systems

Directive (EU) 2018/1972, Article 110

Public warning system

1. *By 21 June 2022, Member States shall ensure that, when public warning systems regarding imminent or developing major emergencies and disasters are in place, public warnings are transmitted by providers of mobile number-based interpersonal communications services to the end-users concerned.*
2. *Notwithstanding paragraph 1, Member States may determine that public warnings be transmitted through publicly available electronic communications services other than those referred to in paragraph 1, and other than broadcasting services, or through a mobile application relying on an internet access service, provided that the effectiveness of the public warning system is equivalent in terms of coverage and capacity to reach end-users, including those only temporarily present in the area concerned, taking utmost account of BEREC guidelines. Public warnings shall be easy for end-users to receive.*

By 21 June 2020, and after consulting the authorities in charge of PSAPs, BEREC shall publish guidelines on how to assess whether the effectiveness of public warning systems under this paragraph is equivalent to the effectiveness of those under paragraph 1.

Getting ready for 2022 with a Public Warning System

By June 2022, the European Electronic Communications Code (EECC) Article 110 requires all EU countries to operate a public warning system that can send geo-targeted emergency alerts to all mobile phone users located in the affected area during a natural or man-made disaster.



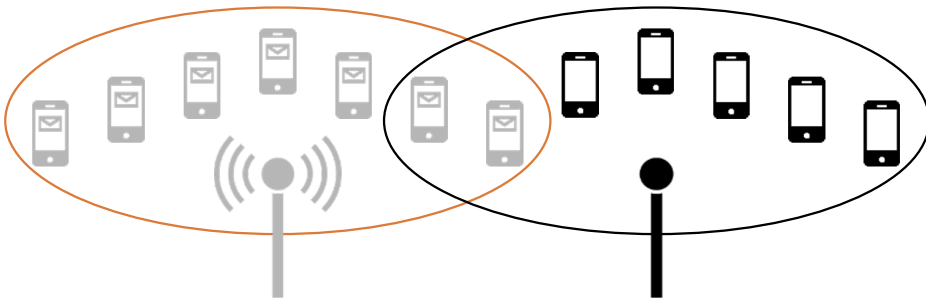
Crisis manager must be able to **warn every handset located in an area, without prior subscription** to a system



This implies to deploy a **location-based SMS** or/and a **Cell Broadcast** technology

Mobile Network technologies at the service of Public Warning Systems

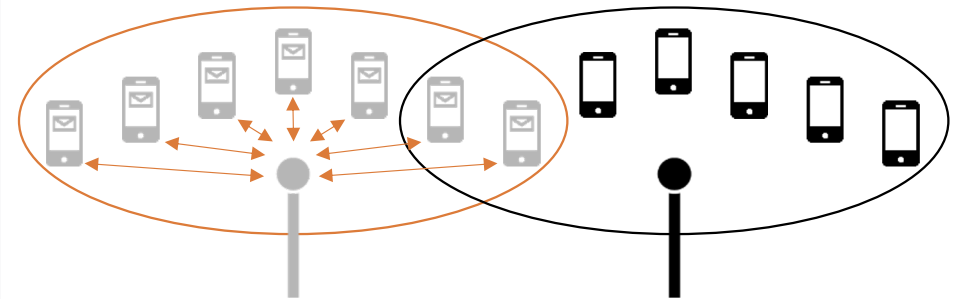
Cell Broadcast Service



Cell Broadcast is a mobile radio service for sending messages to all receivers within a radio cell.

- immediate alerting of a larger number of receivers (1 to n)
- unidirectional communication, therefore no information about number of receivers and read status
- some older devices not compatible
- functionality not available / activated at all network operators
- suitable for 'Presidential Alerts'
- needs to be deployed separately for 2G / 3G / 4G / 5G

Location-based SMS

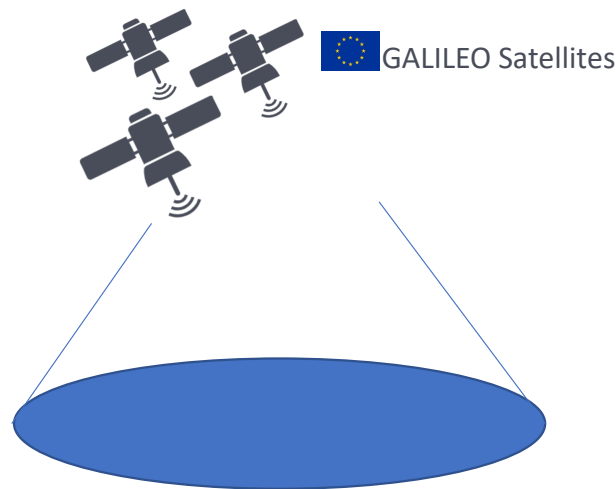


The data is sent individually to all recipients within a radio cell.

- 1-to-1 transmission, possibly resulting in longer delays in the case of a high utilization of the mobile network
- based on existing infrastructure, compatibility on all end devices
- bidirectional communication provides information on number of receivers and read status
- Suitable for "silent notification" (e.g., in the event of hostage situations)

Satellite technologies at the service of Public Warning Systems

- All Smartphones compatibles with Galileo (EU 2020 directive forcing Galileo compliance)
- European Satellites Galileo signals includes few bites for broadcasting alerts
- Prototypes ongoing for defining in advance key messages of alerts (no free text)
- Target : 2023 operational infrastructures

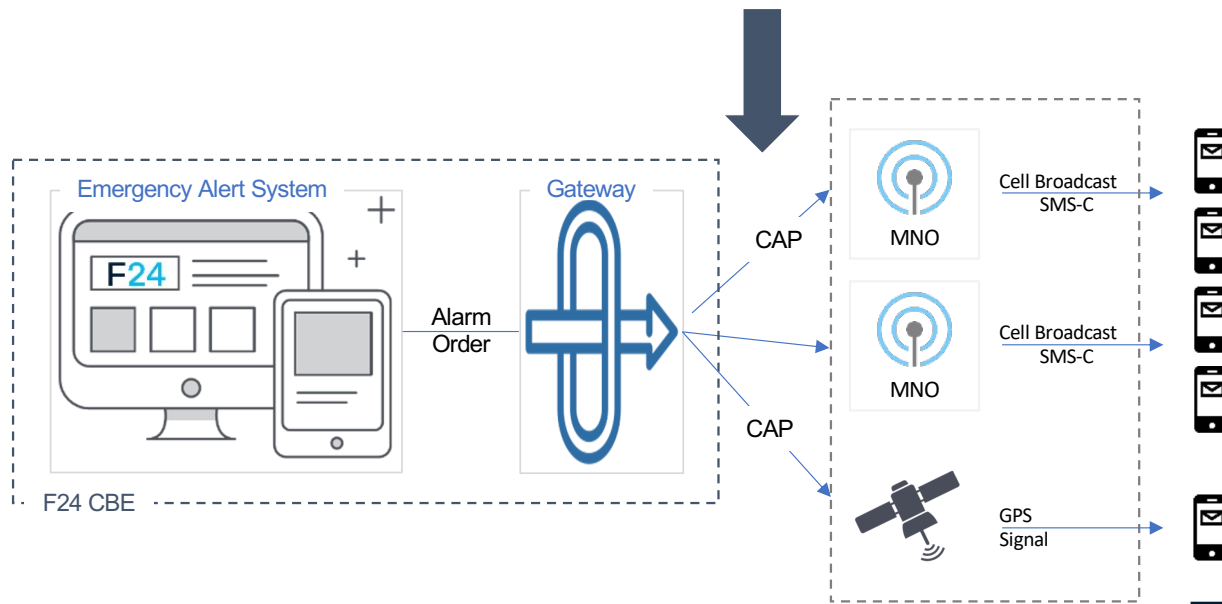


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Common Point between MNOs & Satellite alerting technologies ?

CAP : Common Alerting Protocol, international open standard for structuring an alert and encourage interoperability/multi-channel diffusion of the alert

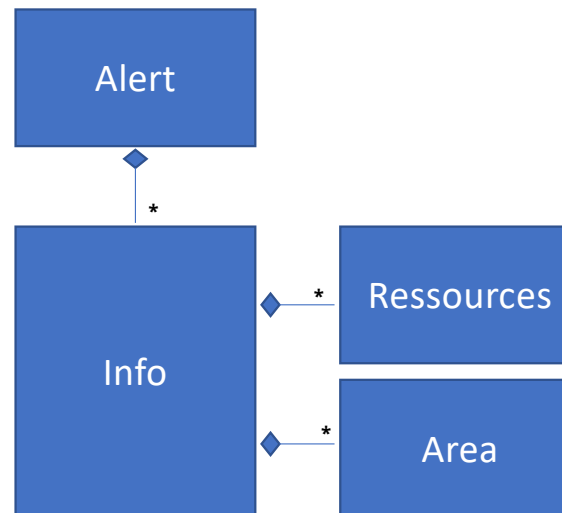


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CAP presentation & usage

- “general format for exchanging all-hazard emergency alerts and public warnings over all kinds of networks” [2021 OASIS]
- Created in 2001, used in the USA, Japan, all over Europe for recent Public Warning Systems, Mexico,... but not for every alerting channels yet !
- Every country has its own CAP version [2021 Grangeat] Research projet for CAPs comparaison
- Structure of a CAP :



[2021 OASIS] <http://docs.oasis-open.org/emergency/cap/v1.2/CAP-v1.2-os.html>

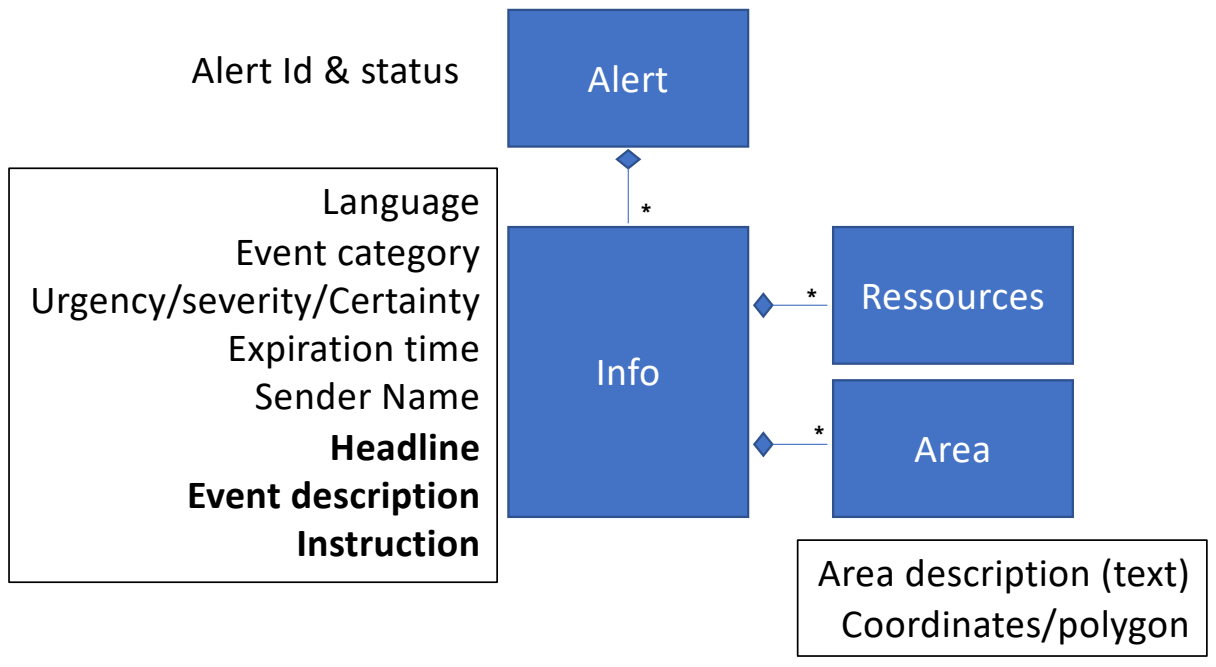
[2021 GRANGEAT] GRANGEAT, WP1.1 CAPs in Public Warning Systems, ANR French research project 2021 « CAP 4 multi-canal alert » <https://capalert.univ-avignon.fr/>

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CAP : structuration of a clear alert

XML fields



Message content best practice

- In practice, the content of the message:
- o WE KNOW : facts without interpretation
 - o WE DO : actions ongoing, authorities implicated
 - o WE CARE : advices/instructions to the population, showing authorities empathy
 - o WE'LL BE BACK : additional channels of information + next communication

+ message content different per media !

[2021 Belgium]
https://crisiscentrum.be/sites/default/files/documents/files/2021-03/brochure_bgd5_fiches_pratiques_fr_0.pdf

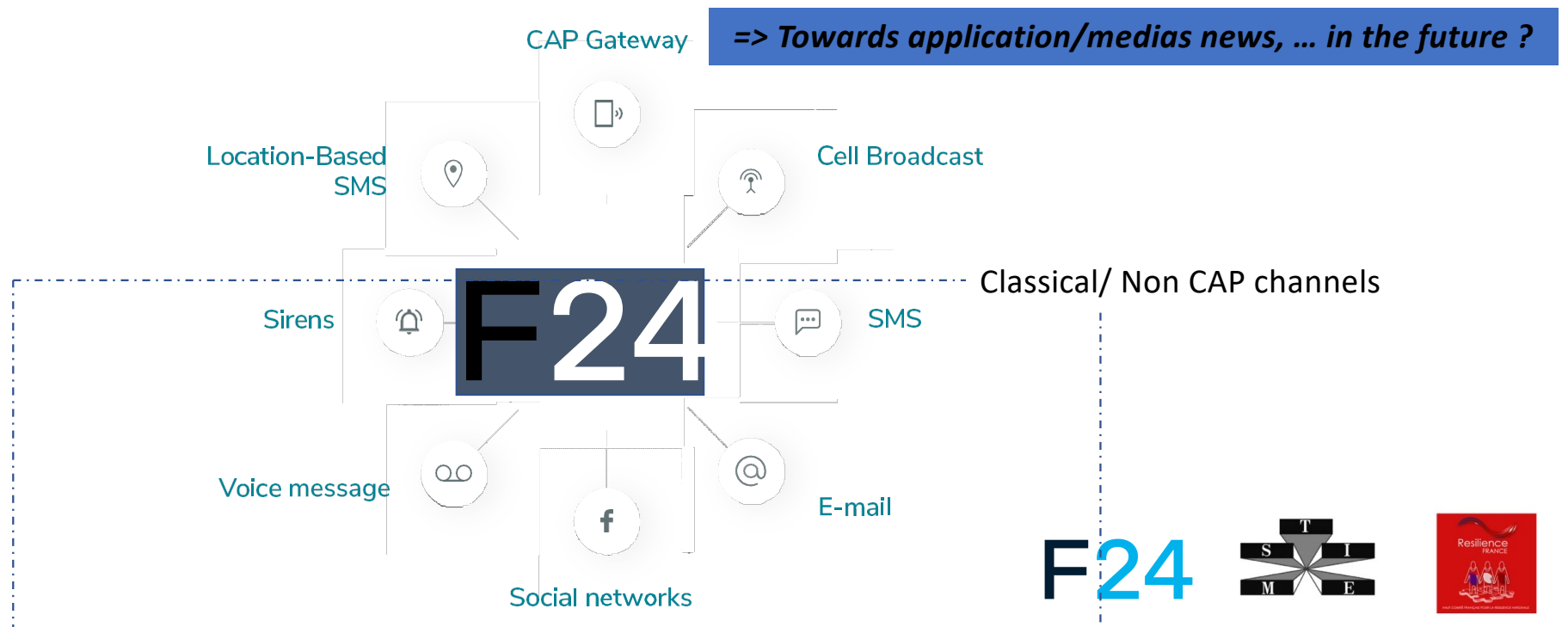
**CAP fields enable interoperability for a more efficient broadcast of the alert on multi-channel, but its structure does not match best practice of communication
=> A user interface must make the link between CAP fields, and a structuration of the message for a clear alert**

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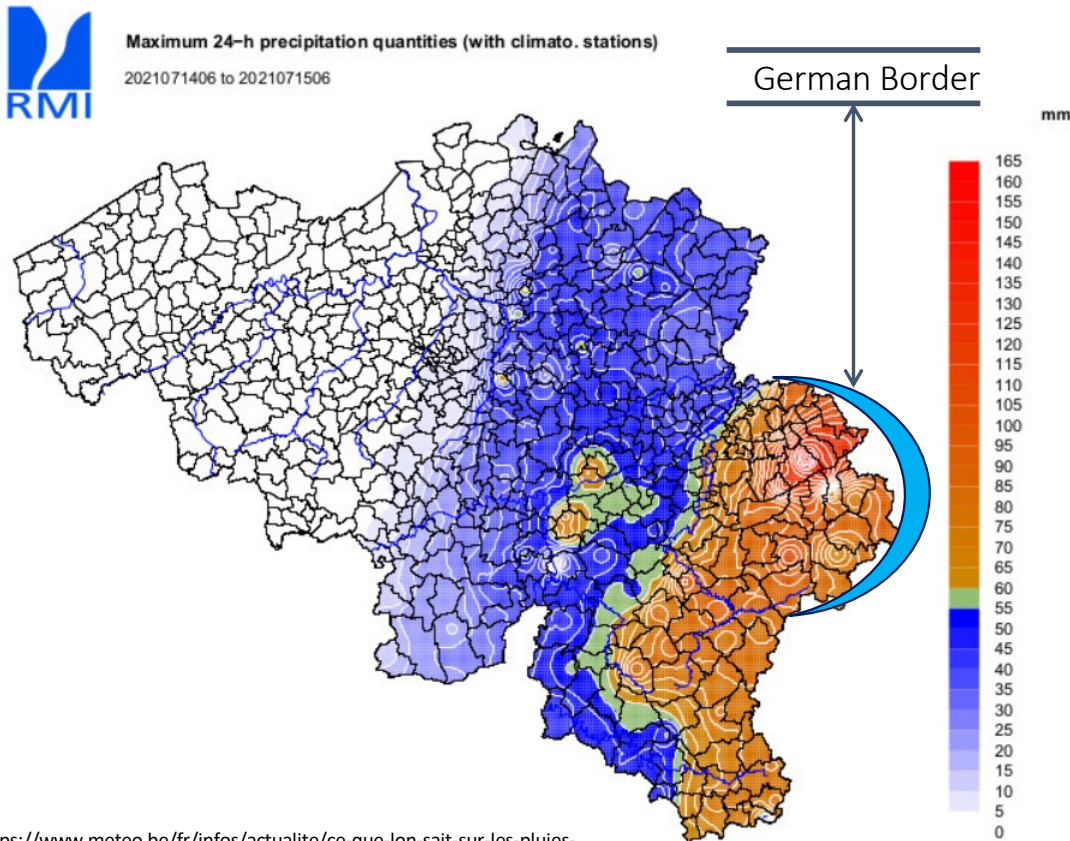


The importance of multi-channel communication

- Different channels as a function of the crisis speed and duration
- Example of PWS communication for July's major flood
- Everything who should be connected must be connected => interoperability (CAP !!!)



Belgium PWS usage during major July's flood



<https://www.meteo.be/fr/infos/actualite/ce-que-lon-sait-sur-les-pluies-exceptionnelles-des-14-et-15-juillet-2021>

- Same meteorological depression blocked on Eastern **Belgium and Germany**. Extreme precipitation in 48 hours, above the century level
- 37 casualties in Belgium
- In Liege city :
 - Upstream, the dam of Ile Monsin is under construction and cannot regulate correctly the flow => risk of dam's break
 - Evacuation of Liege
- The floods impacted also Brabant Wallon, le Hainaut, Luxembourg Province and Namur
- Area without electricity, without drinkable waters
- On the 20th of July : day of national mourning

https://www.rtbf.be/auvio/detail_inondations-retour-sur-plusieurs-jours-d-apocalypse?id=2792606&jwsourc=cl

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Belgium PWS usage during major July's flood



Liege, Belgium's third-largest city. July 2021

Valentin Bianchi/Associated Press. NY Times
<https://www.nytimes.com/2021/07/16/world/europe/liege-belgium-flooding.html>

1,7 Millions Location-based SMS
in less than 24 h (15th July)

60 alerts campaigns
sent by 37 municipalities

40 information campaigns
sent by 25 municipalities

Mobilisation of the technical
F24 crisis team in support of IBZ

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Open discussion on COVID communication and PWS

- Location-based SMS/ CB / Satellite
=> very intrusive channel, to keep only for immediate threat of life
- For long time crisis like COVID :
 - less intrusive channels to prefer
 - Mails : F.I.
 - used in Belgium for each change of COVID rules
 - Pre-requisite : build voluntarily a DB of mail's citizens (GDPR)
 - radio/TV communications
 - Information website and hotlines
 - This crisis seems to be the “new normal” over time
 - Less reason to use a “Warning system”
 - More reason to use an “information” system

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Conclusion

- A Public Warning System is the lifeline of the citizens during crisis, helping them to build their resilience
- Multi-channel communication is a key for covering all the targeted citizens, with different advantages per media
- CAP is a protocol to encourage for a better future interoperability between alerting channels
- But CAP is only a tool, and authorities must edit each time its CAP particularities, and build a clear structure of the alert for a good understanding of the citizen

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**Thank you for your attention !
We stay at your disposal**

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Amélie Grangeat

Head of Product – Public Warning System

+33 771 921951

amelie.grangeat@f24.com



Alessandro Lazari

Senior Key Account Manager

+39 333 3323221

alessandro.lazari@f24.com

