# Data Interoperability between Emergency Agencies: the CAP protocol and state-of-play of related research projects

*Dr. Ing. Uberto Delprato*
*IES Solutions – Intelligence for Environment and Security*

**FEU meeting**
**Amsterdam, 03 November 2012**

# Agenda

- Data Interoperability: why
- The REACT FP6 project and the CAP protocol
- The CNVVF system COOP2REACT
- Other EC projects involving CAP
- What's next?

# Data interoperability: why

Speed, coordination and transfer of information across Emergency Services are key in providing effective reaction and response to incidents and disasters

Control rooms managing emergency services with different specialisation (e.g. fire and rescue or ambulances) and/or covering different geographical areas need to

1. have available a common dataset
2. rapidly interoperate on it and
3. share a collaborative view on the same geography.

# Interoperability layers

Political Objectives

Harmonised Strategy/Doctrines

Aligned Operations

Aligned Procedures

**Knowledge/Awareness**

Information Interoperability

Data Object/Model Interoperability

Protocol Interoperability

Physical Interoperability

Organisational Interoperability

Technical Interoperability

**Charter**

**Information**

**Voice**

# The REACT project

- Funded by the EC under FP6
- 2.5 years, 10 partners
- Trials in Italy, Germany, UK
- Scope: improving emergency management through data sharing by defining open data Protocols and a distributed architecture scalable from local level up to European level

# Interoperability layers







Political Objectives

Harmonised Strategy/Doctrines

Aligned Operations

Aligned Procedures

**Knowledge/Awareness**

Information Interoperability

Data Object/Model Interoperability

Protocol Interoperability

Physical Interoperability

Organisational Interoperability

Technical Interoperability

**REACT**

# How a message is structured

- The structure of the message is made according to the **Common Alerting Protocol (CAP)** data format
- The description of the alert is a combination of the fields available in the CAP structure and the entries of the **TSO (Tactical Situation Object).** They can be expanded without any problems to the structure of the message
- Why is worth adopting the CAP standard: a visual guide for Emergency Services (prepared together with Dr Eliot Christian of the US Geological Survey: http://www.jixel.eu/adotta_standard_cap.php?lang=EN

# REACT: challenges left open

Aiming at an actual adoption of the REACT concept in real operations, the main organisational challenges for Emergency Services are:

- To get authorisation by all decision makers of the organisations willing to share data; such authorisation should take the form of an agreement defining operational procedures, IT security and compliancy levels with in-force regulations and laws
- The integration of interoperability functionalities with existing legacy systems operating in command and control rooms
- La definition of agreed operational procedures for sharing data and information on events

# COOP2REACT: Open standards

Non-proprietary standards allow all emergency Services to adopt them without costs for licensing or special tools:

- CAP (Common alerting Protocol) used for structuring information in an XML file
- Italian CAP Profile for the further definition of additional information fields
- ATOM FEED as distribution mechanism of CAP messages in a many-to-many distributed architecture
- http://www.vigilfuoco.it/aspx/Page.aspx?IdPage=4554

# COOP2REACT: Special Applications

The Non-proprietary standards proved flexible enough to allow the set up of special configuration for :

- Reconstruction after L'Aquila earthquake (2009): http://www.vigilfuoco.it/aspx/MessaInSicurezza_eng.aspx
- Fighting Forest Fires (2010-2011): https://capviewercal.jixel.eu/
- Managing the aftermath of the earthquake in Emilia Romagna (2012): https://sismaer12.jixel.eu

# COOP2REACT: what is available upon signing an agreement with CNVVF

- A web application (CAPGenerator) for creating CAP messages.
- An access to a Routing application (CAPRouter – installed on CNVVF servers) for creating and distributing ATOM FEEDs with CNVVF (and only with CNVVF)
- A web application (CAPReader) for retrieving and visualising CAP messages in text format (no integrated map available)
- https://capviewerevo.jixel.eu/index.php

# COOP2REACT: what organisations can do further

- Integrate CAP-generating functionalities into their existing Command and Control Centres (like CNVVF have done with their SO115 application
- Purchase (as full license or as a service) or develop personalised applications for:
  - Generating CAP messages (e.g. a personalised license of the CAPGenerator)
  - Distribuite ATOM FEEDs to any Emergency services (e.g. a personalised license of the CAPRouter)
  - Visualise CAP messages as both text and georeferenced points on maps (e.g. a personalised license of the CAPViewer)
- All these functionalities made easy and operable thanks to the adoption of standard open protocols

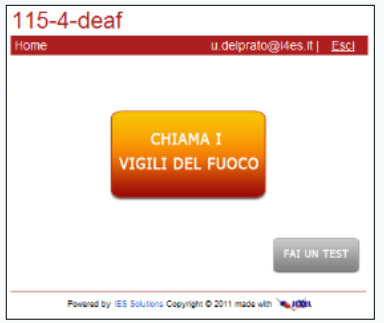
# COOP2REACT: possible new service/ functionalities

Being based on open standards, further specialised application can be designed, implemented and integrated. Generating, retrieving, displaying and analysing CAP messages can be adapted to several different scenarios:

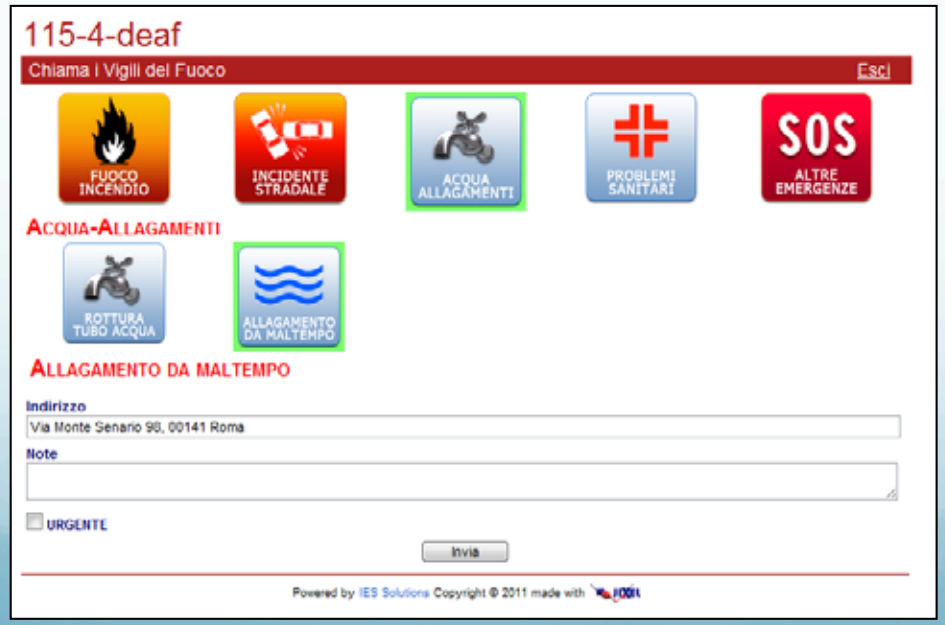
- Multilingual Interfaces
- Geographic or thematic Integrations
- Applications for mobile devices
- Icon interfaces (e.g. 115-4-DEAF)

# 115-4-DEAF: a new solution based on COOP2REACT

Thanks to the interoperability implemented with COOP2REACT, a new interface was developed to help deaf citizens needing help from firemen.




Even if it does not assure the performance of Real-Time-Text or Total-Conversation, it allows the rapid deployment of affordable Nation-wide deaf-dedicated rescue services



# Challenges in data sharing

| Concerns | Answers |
|---|---|
| ❑ Inertia: “we call by phone, it works, no need to make changes” | ➢ It is true that it works, but it shows its limits with micro and maxi emergencies (i.e. Sarno) |
| ❑ Unconfessable fears: “if my operators go wrong, better not to leave written evidence” | ➢ Understanding minor errors prevent the major ones |
| ❑ Conflict of jurisdiction: “the others could offload their responsibilities onto us” | ➢ Best way to trim the procedures in use |
| ❑ Possible overflow of alerts: long cue of unmanned alert | ➢ Alert accepted only when the operator send an acknowledge |
| ❑ Possible information leaks (blue light services) | ➢ With blue light services start unidirectional … however CAP foresees encryption et alia |
| ❑ Possible entry point for malware | ➢ Open to only professional entities - internet security strategies |

# Other EC-funded projects involving CAP: REACH112

- Funded by the EC under CIP-ICT-PSP
- 3 years, 22 partners (www.reach112.org)
- Pilots in Spain, France, UK, the Netherlands, Sweden
- Scope: extend the 112 services to deaf people by means of "Total conversation". 12-months real pilots
- CAP is used to allow for information exchange between organisations and between pilots

# Other EC-funded projects involving CAP: IDIRA

- Funded by the EC under FP7-SEC
- 4 years, 18 partners (www.idira.eu)
- Demonstrators in Germany, Italy, Greece
- Scope: to develop a new capability for more efficient multi-national and multi-organisational disaster response actions, by developing a technological framework covering recommendations for operational procedures and a set of fixed, deployable and mobile components including data and voice communication assets.
- CAP is used as standard for data exchange at any level

# Other EC-funded projects involving CAP: REFIRE

- Funded by the EC under the Prevention, Preparedness and Consequence Management of Terrorism and other Security related Risks Programme European Commission - DG-HOME
- 2 years, 6 partners (www.refire.org)
- Demonstrator in Italy
- Scope: adoption of effective location and communication services for indoor and deep-indoor emergencies and define a set of standards and protocols able to enable daily use of interoperable systems.
- CAP is used as standard for data exchange

# Other IT-funded projects involving CAP: SARFIRE

- Funded by ASI (Italia Space Agency)
- 2 years, 6 partners (www.sarfire.it)
- Demonstrator in Italy
- Scope: integration of ground data, Earth Observation imagery and models to provide fire risk maps
- CAP is used to share data, including synthetic maps and layers built by mathematical models

# Other IT-funded projects involving CAP: MOSBASE

- Funded by FILAS (Latium Region)
- 2 years, 2 partners (www.mos-base.com)
- Demonstrator in Italy
- Scope: integration of data from Infrared sensors, Earth Observation imagery and models to provide maps about burnt areas
- CAP is used to share data, including fire alerts and layers built by mathematical models. Users can also send CAP messages via an App for iPhone

# Other EC-funded projects involving CAP: CAP2COOP

- A proposal for a “Preparedness project” submitted to the EC – DG-ECHO
- 2 years, 5 partners (THW supporting)
- Demonstrator in Italy, Germany, Slovenia
- Scope: adoption of the CAP protocol at large scale, by defining a European profile and a cookbook for implementation on legacy systems
- CAP is … well the project name says all

# What's next?

European CAP profile

- Improve and resubmit CAP2COOP

NG112

- Next Generation 112 – An initiative by EENA

Joint cooperation in exercises

- Prove interoperability in real situations, assess benefits and unanswered challenges

Thank you for your kind attention

Dr. Ing. Uberto Delprato

u.delprato@i4es.it

+39-346-6367499

www.i4es.it

www.jixel.eu