CAP and mobile multimedia alerts

Menno Bot
Solution Architect at one2many
menno.bot@one2many.eu
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About one2many

80 installations at 50 customers in 30 countries
50% market share

Local offices on each continent

Multiple nationwide public warning solutions & leading CAP consultancy provider

Leader in Standardization of public warning in ATIS, 3GPP, ETSI

Our Customers Support 300+ MILLION Mobile Subscribers

Industry’s LEADING TECHNOLOGY
World’s First Cell broadcast and 3G, 4G integration
Public Warning as a Service (PWaaS) & eMBMS
Contents

• 5G-XCAST research project
• Public warning in 5G-XCAST
• Usage of CAP for multimedia alerting
• Observations and next steps
Broadcast in 5G?

- Broadcast transmissions are key in many 5G use cases but
  - multimedia capable broadcast has not been considered in the first release of 5G (3GPP Rel’15)
  - Text based cell broadcast will be there in 5G to support public warning!
- 5G-Xcast is designing broadcast on top of 5G radio and 5G core
5G-Xcast Consortium

- 18 partners from 9 countries
  - 2 broadcasters & associations
  - 5 telecom operators & vendors
  - 8 SMEs
  - 3 universities

Balanced and strong consortium between the telecom and broadcast world
How does the research project work?

- Create use-cases and discover detailed requirements
- Analyse what is available today
- Propose new architecture, features, call flows
- Implement trials
- Spread the knowledge!
5G-Xcast Public Warning Use Case

User Devices

Message Contents
Broadcast in Area

Tablets

Handsets

Target Area

TV Sets

Message Contents

- Text [1 or More]
- Audio [1 or More]
- Video [1 or More]
- Other Data Types

Minimal Set Includes

- Audio Content for Visually Impaired
- Video With Sign Language

Alert Originator

ONE2MANY
Challenges of multimedia public warning over mobile today

• Todays cell broadcast can send public warning messages as text but multimedia is not well supported

• LTE broadcast (eMBMS) can deliver multimedia messages but:
  – Lack of mechanism to trigger broadcast reception in the mobile phone, this currently requires the user to start the broadcast reception
  – Challenges with configuration for the target area
Public Warning Trials in 5G-Xcast

Use case PW “Multimedia Public Warning Alert” :

• Delivery multimedia public warning messages to large audiences using LTE eMBMS
• Transmission of alerts for users with hearing and vision deficiencies
• Successful delivery of alert in various reception conditions to several UEs using broadcasting (indoor, outdoor, mobile)
Why are we using CAP in our trial?

- CAP can support multimedia content:
  - Embedded together with the alert information
  - External content using links

- And also:
  - The alert creation tool supports CAP
  - A CAP alert can be conveniently broadcasted by the one2many eMBMS (LTE broadcast)
Options for creating multimedia content

• Automatically generated content:
  – Convert contents of the alert into multimedia
  – Embed the logo of the alert issuing agency

• Allow the alert creator to define the multimedia content:
  – Select pictograph from a collection that includes the common alert types (storm, heavy rain) and recommended action (evacuation, stay at home)
  – Adding pre-defined handling instructions for a known type of alert
Adding the content into CAP

• The multimedia content must be base64 encoded (RFC 3548)
• For most programming languages libraries exist to do this for you
• Online conversion tools exists as well:
  – https://www.base64encode.org/
• Base64 encoding does increase the size of the content
CAP multimedia example snippet

```
<resource>
  <resourceDesc>audio alert in English</resourceDesc>
  <mimeType>audio/mpeg</mimeType>
  <size>120192</size>
  <uri>audio_alert_EN.mp3</uri>
  <derefUri>iVBORw0KGgoAAAANSUhEUgAAAyAAAAMgCAMAAADsrvZaAAAABGdBTUEAALGPC/xhBQAAAAFzUkdCAK7OHOkAAADAUEExURfz9/P
  ...
  ...
  ICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAgICAM</derefUri>
  <digest>700b1bfc8c93db2ea03cf2ba9949218b0e98339d</digest>
</resource>
```
How does it all work?

- **BM-SC**: CAP alert
- **MBMS GW**: notification
- **eNodeB**: CAP alert
- **PWP**: CAP alert
- **EPC**: CAP alert
- **Google FCM**: CAP alert

**TUAS test network**

**Used equipment:**
- **PWP**: one2many
- **BM-SC, MBMS GW**: one2many
- **EPC**: Cumucore
- **eNodeB**: Nokia
- **Phone**: Bittium
- **mbms middleware**: Expway
- **PW App**: one2many

- **ONE2MANY**
Screenshots of the App 1

Fire in Deventer paint factory

There is a fire in the Deventer paint factory. Please close all doors and windows. Smoke from the fire may contain toxic fumes.

Image of the affected area

There is a fire in the Deventer paint factory. Please close all doors and windows. Smoke from the fire may contain toxic fumes.
Screenshots of the App 2

One2many Alerting

Downloaded Alerts

- Fire in Deventer paint factory
  - Severity: extreme
  - Oct 12, 2018 4:30:39 PM

- Fire in Deventer paint factory
  - Severity: extreme
  - Oct 12, 2018 2:35:22 PM

- 2: Sample Alert Message with Embedded Large Audio File
  - Severity: extreme
  - Oct 5, 2018 2:49:39 PM

- Sample Alert Message with Embedded Content Files
  - Severity: extreme
  - Sep 28, 2018 11:51:09 AM

- 2: Sample Alert Message with Embedded Large Audio File
  - Severity: extreme
  - Sep 28, 2018 11:39:48 AM

One2many Alerting

Alert Contents

Sign language instructions

There is a fire in the Deventer paint factory. Please close all doors and windows. Smoke from the fire may contain toxic fumes
Observations 1

• The broadcast is very efficient; no network overload
• It takes just several seconds for the entire multimedia alert to download.
• The Google FCM notification is generally very fast but
  – there were a few occasions that it took minutes to arrive on the phone
• Currently the Google FCM notification only contains the URL, not the alert itself
Observations 2

- CAP can embed any type of content but a suitable player is needed on the phone to render
- Some content could also be generated on the App
5G-XCAST next steps for PW

• Perform tests based on documented requirements
• The radio group (WP3) is considering how to trigger the public warning alert
• Experiment with text cell broadcast to trigger the App
• Test with alert using external content (links) where the CAP alert is sent using FCM and the multimedia content using HTTP and/or broadcast
• Plan to test with dynamic spectrum
Public deliverables, scientific papers, presentations:
http://5g-xcast.eu/documents/

Website:
www.5g-xcast.eu

Twitter:
@5Gxcast

Videos:
https://www.youtube.com/channel/UCCl2iSgTDx42UiLoRcDyDBg
https://youtu.be/daFOf30NG2U

Thank You
Any Questions?