(advanced)SMS vs. Cell Broadcast in Wireless Emergency Alerts

one2many - the leading cell broadcast company

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Wireless Emergency Alerts service requirements / design criteria:

- **Reach** total population
- **Location** specific information **during** a crisis in specific **areas**
- Fast delivery (**Timing**)  
- Should always work even at crowed places (**Congestion**)  
- The public’s **Privacy** should not be compromised  
- Only the government should be able to issue alerts (**Security**)  
- Attract public’s attention and **Call for action**  
- Adhere to international **Standards** (EU-Alert / CMAS)
Wireless Alerts are a continuous guidance to safety in a specific area during a certain period of time.

People move around especially during a crisis.... advice should be up to date and related to their current location.

A WEA is a continuous guidance to safety in an area during the whole duration of an emergency situation (So not an one-off message).
Reach - all networks & all phones

• Networks
  – Cell Broadcast and SMS included in early GSM specifications
  – Continued support in UMTS and LTE

• Handsets supporting Cell Broadcast
  – Drivers
    • CMAS in the United States
    • EU-Alert in Holland
  – All mayor OS support CMAS/EU-Alert:
    • Android
    • iOS
    • Windows 8
  – Localization
    • Top 20 phones in The Netherlands support PWS from the shop.
    • The phones’ PWS functions are available and can be turned on by request to the manufactures
• **Time is of the essence!**
  – Earthquake
  – Tsunami
  – Bomb threats
  – Flash-fires/floods etc.

• The target audience can range from hundreds to millions
• High volume/impact scenario’s like tsunamis require low latency dissemination
**Congestion**

- **Mobile networks are built and dimensioned for spread use**
  - Congestion occurs at crowded places and peak usage
  - Eg. New Year’s Eve, sports stadium, festivals

- ‘The weakest link….’
  - Regional (air) signaling capacity

- **Delivery efficiency**
  - One to many -> broadcast (CB)
  - One to one  -> one by one (SMS, IP)

- **During a crisis/event networks get congested**
  - people trying to call for help
  - people outside of the area try to reach loved ones in an affected area.
  - People in a stadium cannot be reached at all.
The general public does not want ‘the government’ tracking them
  – Snowden / NSA phone META-data debate

In some countries prohibited by law to use location information

Delivering content based on subscribers location

\[ \text{vs} \]

Delivering content to a certain area

Location server (LBS) based solutions are keeping track of subscribers’ location
  – based on network signaling information
  – Eg. LBS SMS, IP address

Location based broadcasts do not require subscribers information
  – Eg. Cell Broadcast
Censorship

• SMS can be forwarded
  – Guidance to safety may be forwarded to people outside of the target area
  – Guidance maybe outdated when forwarded
  – Ie. Uncontrolled crowd management

• An often proposed solution to prevent SMS forwarding is censoring of user content
  – So if specific words are used in a SMS these are blocked
  – Eg. 112, evacuate, bomb etc

• The general public does not want ‘the government’ censoring them
  – Often against public opinion
  – Often against the law
Secure

• The public needs to be sure that Wireless Emergency Alerts originate from the government

• Cell Broadcast is the only wireless messaging service which is as secure as the network itself.
  – The mobile networks / crisis management organizations are the only ones which can broadcast Emergency Alerts.

• Eg. **SMS** can easily be **spoofed**
  – so anyone can pretend to be the government, giving false guidance, potentially harming people.
    • How to: [http://en.wikipedia.org/wiki/SMS_spoofing](http://en.wikipedia.org/wiki/SMS_spoofing),
    • Tooling: [http://fogmo.com/](http://fogmo.com/)
  – Spoofed once -> credibility of the service lost -> effectiveness gone
India, Pakistan shut down networks after panic

By Juha Saarinen on Aug 21, 2012 5:30 AM
Filed under Security

Updated: Electronic whisper campaign of terror.

Indian authorities have ordered internet service providers to block websites and restrict bulk SMS sending for two weeks after a campaign of threatening messages created mass panic in the country.

The restrictions, which applied for 15 days from Saturday 18 August, restricted users to sending a maximum of five SMS messages a day and blocked all bulk MMS messages.

All MMSes with attachments larger than 25KB were also blocked.

About 160 websites were blocked under the Government’s orders, according to the IDG News Service.

Tags
india, pakistan, sms, online, facebook, twitter

Related Articles
Internet Service Providers Association of India president Rajesh Chharia said ISPs had been instructed by the Government to remove access to the websites...
Call for action

• How to get noticed among the flood of messages…?
• Wireless Emergency Alerts need
  – a specific Ringtone and vibration
  – (overriding silent settings)
• Cell Broadcast provides an unique:
  – Ringtone
  – Popup with ‘Emergency Alert’ caption

WhatsApp Inc. @WhatsApp

new daily record: 20B messages sent (inbound) and 44B messages received (outbound) by our users = 64B messages handled in just 24 hours.

3:24 AM - 2 Apr 2014

581 RETWEETS 288 FAVORITES
Emergency Alert
This is an NL-Alert on iPhone 5/iOS7 using cell broadcast technology of www.one2many.eu
Standardization

- **People travel... also international..**
  - Public Warning needs to be standardized across the globe

- **3GPP Standardized Wireless Emergency Alerts services using Cell Broadcast**
  - 3GPP has standardized public warning service (PWS) in requirements specification TS 22.268.
  - PWS is a generic warning service with some local variants:
    - **ETWS (Japan)** – Cell Broadcast
    - **CMAS (United States)** – Cell Broadcast
      - ATIS / TIA; J-STD-100/101/102
    - **EU-Alert (Europe, Netherlands)** – Cell Broadcast
      - ETSI; TS 102 900
    - **KPAS (Korea)** – Cell Broadcast
  
- **Local formal specifications Cell Broadcast is used for PWS**
  - Chile and Taiwan
  - China (ongoing)
  - Canada (ongoing)
  - Israel

- **Other countries where Cell Broadcast is used for PWS, without formal specifications**
  - Lithuania
<table>
<thead>
<tr>
<th>Short Message Service (SMS)</th>
<th>Characteristic</th>
<th>Cell Broadcast (CELL BROADCAST)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Messages sent point-to-point</td>
<td>Transmission type</td>
<td>Messages sent point-to-area</td>
</tr>
<tr>
<td>Required. Requires specific phone numbers to be known</td>
<td>Mobile Number dependency</td>
<td>Independent. Does not require phone numbers to be known</td>
</tr>
<tr>
<td>No. Only pre-registered numbers will be notified; message will be received regardless of actual location</td>
<td>Location based targeting</td>
<td>Yes. All phones within a targeted geographical area (cells) will be notified.</td>
</tr>
<tr>
<td>Static messages will be sent to pre-registered numbers.</td>
<td>Message type</td>
<td>Location specific. Tailored messages can be sent to different areas.</td>
</tr>
<tr>
<td>Direct. Users can receive messages and respond directly to the sender via SMS.</td>
<td>Bi-directionality</td>
<td>Indirect. The message should contain a URL or number to reply.</td>
</tr>
<tr>
<td>Subject to network congestion. Delivery is queued. Congestion can occur</td>
<td>Congestion and delay</td>
<td>CELL BROADCAST is always available.</td>
</tr>
<tr>
<td>140-160 characters. Longer ‘concatenated’ messages are supported.</td>
<td>Message length</td>
<td>93 characters. Longer ‘multiple page’ messages are supported.</td>
</tr>
<tr>
<td>Poor authenticity. The source of the message cannot be verified.</td>
<td>Security</td>
<td>Good security. Only the mobile operator can broadcast messages.</td>
</tr>
<tr>
<td>No.</td>
<td>Service barring</td>
<td>Yes. Users can turn off CELL BROADCAST reception or a specific channel.</td>
</tr>
<tr>
<td>By default. When phone is turned on messages can be received.</td>
<td>Reception</td>
<td>Requires action. CELL BROADCAST needs to be turned on in order to receive messages.</td>
</tr>
<tr>
<td>Yes. Senders can request delivery confirmation.</td>
<td>Delivery confirmation</td>
<td>No. Confirmation of delivery to the handset is not available, however actual broadcast in the network is.</td>
</tr>
<tr>
<td>No repetition rate.</td>
<td>Repetition rate</td>
<td>Yes. Can be repeated between 2 seconds and 32 minutes.</td>
</tr>
<tr>
<td>No. Identical to all receivers.</td>
<td>Language selection</td>
<td>Yes. Messages can be broadcasted in subscriber’s preferred language</td>
</tr>
<tr>
<td>Yes.</td>
<td>Message storage</td>
<td>Handset dependant.</td>
</tr>
</tbody>
</table>
Wireless Emergency Alerts - SMS

Why not SMS?
- Reach
  - Every phone supports SMS fully

- Timing
  - Sending a message to millions takes valuable time
  - Wireless network have limited (signalling) capacity

- Congestion
  - Wireless network are dimensioned for spread use
  - Eg New years eve, events, sports stadium

- Location
  - Guidance to safety depends on the location where people are
  - A LBS is required to query subscribers’ locations

- Privacy
  - A LBS is tracking and tracing of subscribers
  - Governments’ tracking people is a NO-GO discussion

- Security
  - SMS can be spoofed easily
  - Criminals can pretend to be the government

- Call for action
  - SMS or WA end-up on the pile of messages

- Costs
  - SMS / LBS based infrastructure costs are 5 times higher
  - Not standardized for PWS use
Wireless Emergency Alerts - Cell Broadcast

- Why is Cell Broadcast used?
  - Reach
    - Cell Broadcast PWS is supported by all OS, however needs to enabled
  - Timing
    - Sending a message to millions takes seconds
  - Congestion
    - Cell Broadcast always works
  - Location
    - Cell Broadcast disseminates on individual cell sectors
    - So inherently location based
  - Privacy
    - The network is unaware of subscribers receiving alerts
    - Cell Broadcast is like radio truly broadcast
  - Security
    - Only the serving mobile network is able to send Cell Broadcast
    - Cell Broadcast is as secure as the network
  - Call for action
    - All OS have a WEA client with a dedicated ringtone and vibration
  - Costs
    - Cell Broadcast infrastructure is below 1 Million USD investment
  - Fully standardized
    - All standardized Wireless Emergency Alerts standards are Cell Broadcast based
    - CMAS, EU-Alert, KPAS
Why have these governments chosen for Cell Broadcast based Wireless Emergency Alerts?

- **Wireless Emergency Alerts**
  - FEMA
  - CMAS

- **EU-Alert**
  - Earthquake & Tsunami Warning System

- **Personal Message Rocket Alert**
  - nll-alert

- **Taiwan CMAS**
  - ‘LAT-Alert’ Earthquake & Tsunami Warning

- **Korea - KPAS**
  - docomo

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Next Steps
Thanks for your attention!