

Cell Broadcast System

FAQ for CB in Public Warning



Background

Public warning systems are intended to alert the general public to a wide array of public threats from flu pandemics, toxic spills, terrorist threats and natural disasters from tsunamis to earthquakes and wildfires. Over the past years, governments worldwide came to the conclusion that current channels like sirens, radio and TV do not suffice anymore. As people carry around a mobile phone with them wherever they go using the mobile network as an alert channel is an obvious choice.

Key to their successful implementation, is that the chosen technology and systems used are robust and will work efficiently during disasters and large scale events.

The implementation of effective public warning systems is high on the agenda for governments worldwide. In the US, the WARN Act signed in 2006 set in motion the requirement for a cell phone and pager alert public warning system based on a user's location. It was deemed important that recipients need not have to sign up for the alerts but could opt-out if wished. The approach from carriers was decided to be voluntary and the working group was quick to note that SMS and email could not be used as options for the messaging technology.

The days of sirens and alarms being enough to warn the public of impending danger are long gone. Today's dangers require a tailored approach to each individual event and detailed instructions must be given to the public, informing them with localized information to alert and guiding them to safety.

The example of a fire at a chemicals plant illustrates this well. While persons within the immediate range of the fire should be evacuated, those downwind of the toxic smoke could be at danger if they venture outdoors. Two distinct messages, therefore, need to be broadcast – different messages sent to distinct locations.

Today, only cell broadcast has the geographical flexibility to do this. As messages are broadcast to all users within range of individual cells/base stations, the right messages get to the people who need them.

Importantly, cell broadcast meets the requirements being laid down by governments for their public warning systems (as can be seen from the example of the WARN Act). Users do not need to sign up to the system as the messages are sent to all phones in a specified area rather than to individual handsets. This means that visitors to the area as well as locals will receive the relevant warnings – and similarly local residents that are out of town will not be unnecessarily alarmed. Users can also easily opt-out simply by turning off the cell broadcast channel on their handsets.

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Cell broadcast also offers a truly robust approach to public warning. Cell Broadcast has its own dedicated channel, which ensures that cell broadcast messages always get through - even at peak periods (like New Years Eve) or at exceptionally busy locations.

(Note: to the speaker: Emergency SMSs are delivered one at a time (slow, as opposed to mass broadcasting by CB – compare TV and radio) and share signalling channel capacity of an operator’s network and therefore have to compete with regular SMS and voice. In addition, the network easily congests as many subscribers will start messaging or calling especially in the affected area)–

For operators, one of the biggest concerns with deployment of a public warning system is how to recoup the investment. Cell broadcast offers excellent means of doing this. The features of cell broadcast enable operators to exploit for example (location based) mobile advertising services, location based information services and Dynamic Discount Service network optimization for revenue generation and improving customer loyalty. For operators needing to rollout a public warning system cell broadcast is the best solution available on the market which will not only providing robust Warning Services, but also allowing them to get a return on their investment and help improve their bottom line.

FAQ

Q1: What is Cell Broadcast?

A1: A GSM network consists of thousands of cells (antennas); and facilitates the wireless connection of a (mobile) handset to the network. Cell Broadcast enables to send out a short message to all handsets in a particular cell, group of cells, or the entire network. Every handset that has CB channels enabled and is within the coverage area of cells that are broadcasting a CB message will receive this message. CB can be compared to radio; everybody tuned in receives the message.

Q2: Why deploy a warning service using the mobile network?

A2: A mobile phone is a very personal device, which is carried with us everywhere we go. It is therefore the ultimate device to reach people.

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Q3: Why is CB the best technology for public warning?

A3: There are several arguments: Cell Broadcast is broadcast, reaching millions in a matter of seconds. Cell Broadcast is location specific; only people in the disaster area, to whom it concerns, are contacted; enabling real-time crowd control, guiding them to safety. Furthermore, Cell Broadcast always works, even when the network is congested.

Q4: What is the difference between SMS and CB?

A4: The differences are, amongst others:

1) CB is point-to-multi-point / broadcast; meaning messages are broadcasted to all handsets which are 'listening' to a certain CB channel. Millions of handsets are reached in a matter of seconds.

SMS is point-to-point; meaning messages are individually sent to a known number, one after another.

2) CB is location specific; messages are broadcasted in a particular area. SMS is recipient / handset specific regardless of its location.

3) Regardless of network state (congested or not) CB is always available. CB is part of the signalling traffic between handset and network. E.g. in the case of network congestion it will be impossible to use regular voice and SMS services while CB will remain fully functioning.

4) SMS is facilitated centrally in a mobile network by the sender's own Short Message Service Centre (SMSC). CB messages are broadcasted by the base stations autonomously. The Cell Broadcast Centre (CBC) controls what the base stations will broadcast, where, when.

5) Every CB message has a serial number and can be repeated for new handsets entering the area, without appearing on handsets which already displayed the message.

Q5: What is the difference between an SMS service such as Burgernet in the Netherlands and public warning over CB?

A5: SMS services like Burgernet are not public warning services. Burgernet is used by the police to send SMS text messages to registered users to ask them to help the police locate suspected people (such as burglars) in the area of their home. SMS is the required technology here, because the suspected person shouldn't receive the message and secondly the number of persons that will receive a Burgernet message is small and therefore quite suitable for SMS.

SMS warning services do exist. These services require registration under privacy legislation. Visitors from another country will not have registered themselves, and in countries where public

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warning is a regional responsibility, citizens may have registered for the service in their own region, but not for services in the rest of the country.

Furthermore, SMS services are not location specific. Determining the location of a mobile phone can be done, but is time consuming and people may have moved a considerable distance between the moment their location has been determined and the warning message has been received, making the message possibly irrelevant.

Q6: Which countries deploy CB as public warning technology?

A6: NTT Docomo in Japan offers Alert Mail since November 2007. It is a CB service that provides warnings for earthquake and tsunamis. NTT Docomo supplies mobile handsets to their customers that have a specific configuration menu where the user can choose to receive earthquake warnings and/or tsunami warnings. Furthermore, the volume and duration of the dedicated alert tone can be set in this menu. The Earthquake and Tsunami Warning System (ETWS) is currently being standardized in 3GPP (a global telecommunications standardization institute). Once that has been concluded other tsunami and earthquake prone countries, mostly in Asia, may deploy the same service.

The US is developing a Commercial Mobile Alert Service (CMAS) in ATIS (GSM and UMTS standardization) and TIA (CDMA standardization). Operators may elect to participate in the service and when they do, they shall follow the specifications that are currently being developed by ATIS and TIA. Both ATIS and TIA are developing a CMAS via CB specification, since CB is considered the only viable technology for CMAS. Testing of CMAS shall start at the end of 2010 and be operational in 2012.

Q7: In what circumstances would an SMS warning service be better?

A7: SMS warning service have their own specific information purpose, and are part of a total public warning communication concept, including radio, TV, CB, sirens, newspaper, SMS etc. If the community that shall be alerted is fairly small, and these citizens are all asleep at night, radio and TV will not reach them, but landline phones and mobile phones may.

Q8: Is there a one-size-fits-all warning service?

A8: No, there isn't. A public warning service shall reach citizens whether they are at their home, at their workplace, moving on foot, or in a vehicle or at a public venue. At home, citizens could be watching TV or be asleep, or doing something else. It may be obvious that not all technologies will reach everyone at any time. Therefore, a public warning service shall deploy various

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technologies. A mobile phone is a very useful device to display warning messages because people tend to carry their phones with them at all times.

The EC funded project CHORIST (www.chorist.eu) demonstrates a public warning system based on multiple technologies.

Q9: Is CB being standardized for public warning?

A9: CB itself is already a fully standardized service; while CB is being adopted as a worldwide standard for public warning (such as ETWS in Japan, CMAS in the US and in The Netherlands). Examples to enhance the service are a specific alert tone dedicated for public warning purposes and overcome non-uniform public warning channel number (e.g. 112 vs. 911).

Besides work in 3GPP, the US is specifying CMAS over CB for deployment in the US. An example of the CMAS specification is the CMAS specific alert tone, which is the well known US siren signal.

Q10: Isn't CB old technology?

A10: The base GSM standards date from the mid eighties of the previous century and are continuously updated. They are mature, trusted and implemented worldwide. The need for mature, bug free systems is required for public warning systems. Interoperability testing between CBC and BSC, RNC and real life implementation is paramount. CBCs are being implemented for over a decade.

CB is specified in GSM and in UMTS and is being specified in LTE, the successor of UMTS, making it future proof.

Q11: How long does it take to broadcast a message?

A11: CB messages can be broadcasted every 2 seconds. For the CBC the maximum time required to instruct a base station to initiate a message is a matter of seconds. If a broadcast involves multiple base stations (for example a complete country), the base stations are instructed in parallel.

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Q12: What about network congestion?

A12: Networks have a limited bandwidth and when the network gets too busy, the traffic channels get congested. Users that try to set up a call will receive a busy signal and will try again. The next stage is when the capacity of the signalling channels also runs out. Then it is no longer possible to even get a dial tone. Such behaviour occurs each year at New Year's Eve at midnight. It also happens in cases of emergency. 9/11 and 7/7 are notable examples, and there are many more.

Even though SMS text messages do not contain much data, in emergency circumstances, SMS traffic gets delayed, and it may take many hours to deliver all SMS warning messages. Furthermore, the user may have moved a considerable distance in the meantime and the message may have lost its relevance to the location of the emergency.

CB uses its own dedicated (signalling) channel, which does not suffer from congestion. This makes CB very suitable as a public warning technology.

Q13: Is there a dependency on operators?

A13: Yes; every operator needs to have a Cell Broadcast Centre and CB functionality enabled in its network.

Q14: Does CB support foreign visitors?

A14: Yes; every handset including when roaming (example: foreign and national roaming MVNOs) which is connected to the network receives CB. When someone has the warning service enabled and this person visits another country, this person will also receive warning messages, provided that this network also offers the warning service.

Q15: Do you have to register for a public warning service using CB?

A15: No; however the handset should have the disaster CB channel enabled.

Q16: Is the warning message dependant on the location?

A16: Yes; one of the key elements is that CB is location specific, enabling real-time crowd control, guiding public to safety. For instance citizens in the affected area can be directed to evacuate the area and citizens in neighbouring areas can be told to go inside and close doors and windows.

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Q17: How do I distinguish a warning message from a normal message?

A17: A CB message can be an immediate display / flash, or a regular CB message. The actual user experience differs per handset. In the standardization committees like 3GPP a dedicated Public Warning alert tone is proposed for newer handsets.

Q18: Do public warning messages get priority over normal traffic?

A18: SMS priority service is a service where priority messages are sent ahead of the queue. It does not mean that in cases of congestion SMS text messages get priority over other services and thus do not suffer delays from congestion. In case of congestion, also SMS priority messages will be delayed. In the case of CB it is possible to cease broadcasting of non-priority messages when an emergency message shall be broadcast with priority.

Q19: Does CB deplete the battery of the mobile phone?

A19: Enabling the CB functionality in a handset will lead to increased battery consumption. In a thesis from the University of Norrköping, "*Support for Cell Broadcast as a Global Warning System*", the additional battery consumption is calculated to be very small, especially compared to today's features such as Bluetooth, Wi-Fi, UMTS, full colour displays, and built-in MP3 players, which consume far more battery power.

Q20: What is EU-Alert?

A20: EU-Alert is the generic name of the Public Warning Service in EU member states. For the name of the service in the member state itself, the letters EU will be replaced by the two-letter country code. In the Netherlands, for example, the service will be called NL-Alert.

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About one2many

As a spin-off from Acision (formerly LogicaCMG Telecom Products), one2many became in one go the world leader in Cell Broadcast with experience of over 80 installations, at 50 customers in more than 30 countries. one2many's proven and stable Cell Broadcast solutions are used over a decade by leading mobile operators all around the world for a variety of use cases:

- Public Warning systems
- Interactive revenue triggering services
- Powerful location based SMS-interaction services such as dating and second hand markets
- Area specific network traffic optimization of subscriber communication by discounted tariffs at low usage moments
- And many more

Established in 2007, one2many has its headquarters in The Netherlands, Europe. Employees of one2many are currently based in offices in the Netherlands, Dubai UAE and Serbia.

The company has close relations with all network infrastructure companies, major SIM vendors, leading handset manufacturers and industry standard organizations, and has a unique combination of both theoretical background and practical field trial experience in CB public warning. This has resulted in the most mature CBS product in the market with its initial release development starting in 1996, and has today the most extensive BSC and RNC driver library in the market.

Although the basis of one2many has been Cell Broadcast, the company is currently rapidly growing and expanding its portfolio not only in the Cell Broadcast area (interactive Cell Broadcast, Content Casting Centres, and SMS – Cell Broadcast interaction solutions) but also in the adjacent Mobile Advertising arena.

one2many is an active member of standardization committees like ETSI, ATIS, 3GPP, TIA, and the Cell Broadcast Forum and CHORIST (EU project, which ended in 2009).