

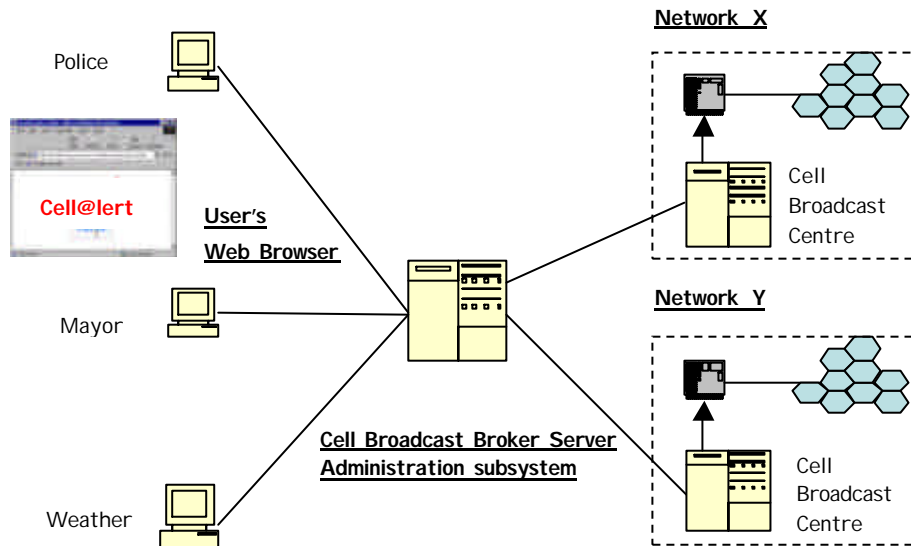
## Cell Broadcast Broker System (CBBS)

# Overview

### Overview of system V3.2 10 Feb 2003

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#### Cell Broadcast Broker System



*Fig1 The location of the Cell Broadcast Broker Server in the Network.*

## 1 An overview of Cell Broadcasting.

Cell broadcast messages can be employed in several ways when a number of cell phone users in a certain geographical area need the same urgent information. Such information may include text messages relating to emergency situations, and, for 3G cells and phones, pictures of wanted or missing persons or maps of areas to avoid and best escape routes.

Cell broadcasting is an already existing function of cellular networks and is defined by the official standardisation bodies, such as GSM MoU, (GSM 03.49) UMTS, 3GPP/3GPP2 and IS95CDMA. Many networks have cell broadcast channels defined for their networks which are unused at present for lack of a suitable application.

This is that application.

There are several technical as well as political problems to solve to make this happen.

## **2 Political problems to solve**

The very power of the Cell Broadcast Broker Service (CBBS), that of reaching millions of members of the public within minutes, means great responsibility for the operators of the CBBS system.

The people will want to have faith in the whole truth of the messages, they may be changing their whole life on the basis of what they see, perhaps getting the children out of school or changing their working plans for the day. Businesses would be affected by loss of trade if the area were suggested as one to be avoided, so the validity of the messages is most important to the citizens.

Superior governmental authorities will need to be sure that the proper steps have been taken to ensure that the CBBS users (that is message senders) who have access to the public with information, are indeed those who are bona fide authoritative sources of such information, and that their mandate is Pro Bono Publico, (in the public good).

Furthermore, the network operators, (who's co-operation is vital to the success of the programme), will want assurances also. They will not want to be liable for any information which turns out to be false. They will want to protect the reputation of their network and the interest of their customers by ensuring that messages are indeed timely, pertinent and not seen as a nuisance by the people.

*Network operators have a lot of face to loose if trivial use of the system blunts the impact of the service. After all, the people can always churn to another network if they become dissatisfied. The same cannot be said of a police force! When dealing with the networks we must be respectful of this reality.*

It is not possible for computers to make decisions like that, only people can be that smart. The CBBS strategy is one of decisions being made by

human 'Gatekeepers', while their policies are faithfully administered by the operation of the Cell Broadcast Broker.

### 3 Technical Problems

There will probably be many operators covering the same area, at least two and up to eight in some cases (taking 3G licences into account). There is no co-ordination of cell planning between competing operators, so the Cell layouts and Cell\_IDs of different networks will be very different.

In addition, due to constant improvements in Cell coverage and capacity, the size and layout of the cells covering a geographical area can be highly dynamic. The Cell\_IDs that were true for a town last month may not be true now due to cell splits or switch cut-overs.

Also, many networks have a hierarchical cell structure system, with overlapping patterns of cells of different sizes, Umbrella Cells, Macro Cells, Overlaid cells, Micro Cells and Pico cells, and up to 8 layers of sub band structure in different frequency bands, (850-1900 or 900-1800-2Ghz) each having very different Cell\_IDs and different base station spacing.

The situation will get much more complex by the end of 2003, with the introduction of 3G GPRS, EDGE, CDMA2000, and UMTS. 3G cell broadcast messages will be much more capable, so different Cell\_ID tables will be needed for a 'plain text' version of the broadcast than for a 'multi-media' version.

### 4 Solution

All of this is much more complexity than the user, (such as a police officer) can possibly have the time to deal with. He will need a simple map with a 'mouse click' interface to define the geographical area to be covered. The rest will need to be invisible to the user.

By having the user interact with the Cell Broadcast Broker over a web page, (via a Web Portal), loading of special client software is an unnecessary and expensive step. Almost any computer can use CBBS without any modification at all.

Cell broadcast messages are broadcast by the Cellular Network Operators on a per-cell basis over a cell broadcast channel. In order to make a cell broadcast message happen, a signal has to be sent to the cell broadcast centre. From here, to the Base Station Controllers (BSC), containing the message to be transmitted, and crucially, the 'Global' Cell\_IDs of the cells

in which the broadcast is to be made, along with some other data such as how often and when the message is to be broadcast.

Importantly, Cellular operators guard the information about their cells (the cell data) with great care, as the information can be useful to a competitor. They may find the prospect of having this information on multiple unsecured servers to be unacceptable.

The solution is to keep the cell data to a look up table in a 'Cell Broadcast Centre' at the Network operator's office, listing the Cell\_IDs of the cells, the Lat Long positions of their respective Radio Base Station sites and azimuth data for their sectors. This leads to per cell resolution, but for the first application this may be good enough considering the small size of modern cells, which are typically 1-3 Km across (about 2 miles). **The cell data never leaves the Network's office.**

## 5 The 'Cell Broadcast Broker Server' (CBBS)

The Cell Broadcast Broker System consists of two parts

- The Administration Subsystem. (via Web Portal),
- The Cell Broadcast centre.

The Administration Subsystem would be responsible for ensuring the authenticity of the message and the authority of the sender to create such a message. Human 'Gatekeepers' will set the 'User profile' in the 'Administration Subsystem' to control sender rights and privilege. The signal from the end user's workstation at the police station, to the CBBS at CEASA, would only indicate the geographical area to be covered, plus the message. CBBS then sends the broadcast request signal to the 'Cell Broadcast Centre' at the office of each network operator concerned.

At the network operator's office, there is a 'Cell Broadcast Centre (CBC)' server, which collates the cell Lat-Long data from the CBBS with the CellID data, for that network. The table is derived as a standard report in plain text form, as is regularly done as a 'report' from the Cell Planning tool or Network Management tool. The Radio Network Engineering department of each network already have this information on file in the office and keep it up to date with regular reports. All that is needed is a copy of this report.

None of the operators would have access to each others cell data, neither is it necessary to update hundreds of remote data bases with the cell data tables.

Transmission between CBBS and CBC could be achieved with standard 'commercial off the shelf' TCP/IP secure tunnelling protocols, featuring security and authentication.

## **6 The business model**

The CBBS service would be purchased on a subscription basis by the users, such as the Police Force or River Authority. This would finance the operation of the broker service. Or there could be surcharges on a per request basis.

The Cellular network operators could levy charges to CEASA on a 'Per-message-per-cell' basis, or on a basis as to what size of area has been covered. Charging on a basis of population density covered is also possible.

CEASA CBBS would be acting as the billing gateway broker as the CBBS knows the geographical coverage requested by the user and is also capable of calculating population density of so desired. CEASA would also manage customer account management, authentication, security and applying of any restriction on the customer, such as what jurisdiction may be addressed.

**End**