

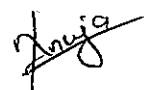
UNIVERSAL SINGLE NUMBER BASED INTEGRATED EMERGENCY COMMUNICATION & RESPONSE SYSTEM

Before one gets into the nitty-gritty of one number, two numbers or multiple numbers, it must also be clearly understood that addressing Emergency alone without appreciating the types of Emergencies will provide wrong results. Why, Emergency does not create Disasters, but Disasters create Emergencies, whether Natural or Man made. Emergency is territory neutral; disaster related Emergency is specific and generally territory specific, most importantly could cause complete breakdown of any sort of communication. Emergency will rely on existing infrastructure; disaster may need provision of infrastructure first to establish basic connectivity/logistics and subsequent addressing of the consequences; called Emergency. The most vital infrastructure required in both cases being Telecomm. Therefore, for Disaster situations there would be a need to address that aspect as well, first and foremost. For such scenarios Satellite based mobile communications is the answer, which can be addressed either here or as a subject matter separately.

Be that as may, Emergency situations arising out of Disasters, localised in nature, or ubiquitous in nature will follow the same path.

Communication plays a vital role during Emergency and Disaster situations. Emergency Routing is society's need more than requirement - timely intervention, rescue and recovery can save lives as well as infrastructure and may even lessen the extent of damage and as such is required to be the top priority under any and all circumstances. Prioritized communication services in the event of emergency, must be the top priority for any type of disaster management framework. From the past experiences it can be easily observed that the networks get congested during emergency/disaster like earthquakes, floods etc. For example, when there was a serial Bomb Blast in Mumbai in 1992/93, the fixed line networks crashed, resulting in communication issues and more panic and chaos was created amongst the public.

During any disaster, communication system may crash either because of overload or because of actual physical destruction of supporting infrastructure;



and the systems remains down / inactive, till the problems are resolved. Though, we cannot avoid actual physical destructions caused due to natural calamities, but we can certainly work upon framework that is robust enough to rule out artificial failure due to overload and has inbuilt contingencies to recognize emergencies. Idea is to ensure right framework, structure and process to ensure that artificial crashing of system doesn't takes place and that communication systems aid in timely and synchronized recovery and response efforts.

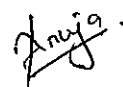
Therefore is a need to have universal single emergency number so that people need not remember different numbers for different types of emergencies.

Existence of different numbers for various emergency response systems creates confusion. Moreover, it is also difficult to remember so many numbers during an emergency. Another drawback in the present system is that sometimes in an emergency situation, multiple agencies are required to be contacted. It requires a citizen to dial contact numbers of various agencies and explain the same situation to each of them resulting in delay in getting help, whereas the situation warrants instant response. Hence there is a requirement of single number based integrated emergency communication & response system in India.

We are of the view that Single Number System used in most countries, should be implemented in India. Wherein, the caller dials the emergency number, the call is recognized by the telephone company central office switch and routed to the nearest Public Safety Answering Point (PSAP). At the PSAP, the dispatcher verifies the caller's location, determines the nature of the emergency and decides which emergency response teams should be notified.

Also, another important point to be noted is that without a location any emergency number is useless.

Although a single countrywide emergency number is desirable, but, to say, that this will aid and abet the Emergency response is clearly not a solution in itself. In the new mobile telephone/s and switches 112 is already incorporated as an



emergency number and presents an easy solution to introduce global acceptable recognizable number.

But there are more serious and imperative measure/s, which need to be adopted by regulatory action to ensure globally accepted standards. Some of prerequisites are as follows:

i. Call set-up time

Call set-up time is defined as the period starting when the address information required for setting up the call is received by the network and finishing when the called party busy tone or ringing tone or answer signal is received by the calling user. An operator be mandated to ensure that call-set up time is within and comparable to international parameters. In developed world this ranges from 0.69 seconds in fixed / 0.72 seconds mobile to 3.13 seconds. India should aim for 3.00 seconds.

ii. Response time to emergency calls

'Response time' is defined as the duration from the moment when the address information required for setting up the call is received by the network to the moment when the Public Safety Answering Point (PSAP) human operator answers the call. In the developed countries the response time is less than 20 seconds is considered satisfactory but in some countries like UK it is less than 5 seconds.

iii. Unsuccessful call attempts

'Unsuccessful call' is defined as a call attempt, properly dialled following dial tone, where neither called party busy tone, nor ringing tone, nor answer signal, is recognized at the access of the calling user within 30 seconds for fixed origination calls or 40 seconds for mobile origination calls from the instant when that last digit of the destination subscriber number is received by the network.

'Unsuccessful call attempts' and 'call set-up times', aims at evaluating the performance of telecoms operators and networks, as well as of questions



on response times to emergency calls and handling of calls in foreign languages, which aim at evaluating the performance of PSAPs.

iv. Calls in DUAL languages

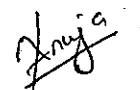
It should be universally recognised that PSAP calls should be in English and one more local language. If this is not available in all cases with all PSAPs and its availability depends on the linguistic resources of the PSAPs; facility for call transfer to another PSAP may also be made available.

The United Kingdom indicated that its PSAPs can have recourse to interpretation services covering 170 languages while France to 40 languages;

v. Hoax/false calls

There must be stringent measures put in place that Hoax/False calls are deterred. It is also worth noting that the majority of hoax/false calls come from SIM-less handsets this appears to have caused some countries to ban this feature. The proportion of various types of calls: silent, by mistake, mischievous. The measures to reduce the number of hoax/false calls could be divided into two main groups.

- First, technical and organisational measures have been taken in a few countries to prevent hoax/false calls from reaching the PSAP in the first place. These include prioritisation of calls and filters in (Spain); concerning the SIM less 112 calls, there is a possibility in Finland to direct those calls first to an announcement and only after that to the emergency centre if the caller continues the call after hearing the announcement. Furthermore, Finland has planned to open a separate number for enquiry calls that cannot be considered emergency calls.
- Second, there are both technical and legal measures to deal with individual cases of abuse. In the case of repeated hoax/false calls from one number, to put the caller (temporary) on a 'blacklist'. In some countries, SIM-cards from which emergency numbers are repeatedly abused may be temporary blocked. Penal action can also be taken.



vi. CALLER LOCATION

Overview of the requirements of accuracy and reliability of fixed caller location and mobile caller location, *separately, in relation to fixed and mobile calls, using partially different sets of criteria for these two types of calls.*

The two common questions for both types of calls were, firstly, the method used to provide caller location i.e. either 'push' or 'pull'. The application of 'push' method implies caller location data being provided and put at the disposal of the 112 call handler as soon as the call is answered, which would normally happen without delay. If the method applied is 'Pull', i.e. caller location is provided upon specific request, the time needed to provide it, indicating whether this information is based on actual measurements or are estimates. (1) average time for providing caller location and (2) the percentage of calls for which caller location is provided within one minute.

The timely provision of caller location data must be highlighted to ensure that undertakings by concerned operators make caller location information available free of charge to the authority handling emergency calls as soon as the call reaches that authority. In order to better the capability of prompt provision of caller location information while using 'pull' method, implemented solution should be specified as an 'Automatic Pull' or 'Non-automatic Pull'. The Regulatory Authority tasked to define accuracy and reliability criteria of the caller location information. Defining the period starting when the public safety answering point human operator requests the caller location information and finishing when the calling location information is received for pull systems.

vii. Requirements on caller location

Regulations should lay down criteria for the accuracy and reliability of the caller location information. For mobile caller location reliability requirements, the lack of such is doubled with a different interpretation of the reliability criteria as in the case of fixed telephony.



viii. Fixed caller location

For fixed caller location installation address, billing address or client's address was indicated as the accuracy requirement. In most countries the fixed line location is on 'Automatic Pull' taking just 5 seconds.

An option could be to set-up a central database which is continuously updated by operators. Source, however, if a central database is used by the emergency services to retrieve caller location, it is highly relevant that operators provide updates to this database concerning their subscribers, in particular to include new subscribers and to update the address data of existing subscribers who have changed address.

ix. Mobile caller location

Method and time needed to provide caller location upon request though mobile network Cell ID and/or Sector ID as the available mobile caller location information.

This type of caller location currently appears to be the 'technically feasible' minimum caller location information which all mobile operators within India should be able to provide. Consequently, the revised regulatory framework should provide for technical feasibility as a condition for the provision of caller location. In order to be understandable and usable by the emergency services, it must be possible to link the Cell ID/Sector ID to a particular geographical area on a map, and appropriate technical arrangements should exist in the operators networks for this purpose.

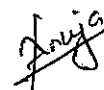
The accuracy of mobile caller location in the case of Cell ID/Sector ID highly depends on the mobile cell or sector coverage that varies considerably between urban and rural areas but with the availability of 'enhanced' mobile location technologies that allow for better results than Cell ID/Sector ID, operators should be asked to incorporate this in their networks. Most the developed countries have opted for additional facilities to increase accuracy of mobile caller location, based on measurements and calculations ('timing advance information'). Currently in Germany Cell ID requirements are in force, but available technical solutions are also



being implemented. The Czech Republic uses specific area and Best Server Base Transceiver Station ID. In Norway, 'polygonal positioning' is used in 3G location. In some countries the location is given by postal codes enabling the Emergency Responders to reach the area with the help of Sat Nav based on postal codes. In this context, it is important to note that the competent regulatory authorities should lay down criteria for the accuracy and reliability of the caller location information provided.

x. Possibility to additionally obtain the registered address of the mobile subscription

The possibility of obtaining the registered address of the mobile subscriber appears as a useful additional facility, especially in the light of the fact that more and more customers eliminate their fixed lines and use mobile telephones also at home, thus increasing the chance that the mobile customer's registered home address is also the place from which the 112 call is being made. With KYC mandatory in the country it should be possible for PSAPs to obtain the address of the subscription from the operators.



Issues for Consultation

1. **What are the types of emergency services that should be made available through single emergency number?**

There can be two types of emergency situations (i) Unpredictable emergencies like earthquake; and (ii) Predictable emergencies like flood.

- a. **Unpredictable Emergency** – After knowing about the emergency, all the calls can be restricted for 2 minutes by building automated capacity in the system or service provider can cancel the calls after 2 minutes. This will allow high priority calls to be made without network congestion. Moreover, the system must be robust enough to identify the emergency. Though, we cannot avoid actual physical destructions caused due to natural calamities, but we can certainly work upon framework that is robust enough to rule out artificial failure due to overload and has inbuilt contingencies to recognize emergencies.
- b. **Predictable Emergency** – If emergency is predicted before, then latest status update shall be available on toll free call-in numbers as described in step 1. And for this enough capacity must be built in the system to control the heavy traffic flow. Moreover, access to network may be restricted, if emergency is of the highest level.

2. **What universal number (e.g. 100,108 etc) should be assigned for the integrated emergency communication and response system in India?**

We are of the view that there should be a concept of primary emergency response number and a secondary emergency response number. Primary number should be 108, Emergency service number managed by EMRI (Emergency Management and Research Institute). On the other hand, '100' should be used as a secondary number, which is reserved for calling Police. It is important to note that even if a single number is notified for emergency services, the changeover to the new regime will take some time and till then, people will continue to call present emergency numbers for emergency calling. Because of our numbering scheme, we may have to stick to a number **beginning "1"**



3. Should there be primary / secondary access numbers defined for the integrated emergency communication and response system in India? If yes, what should these numbers be?

In addition to a primary emergency response number, a secondary emergency response number also exists in some of the countries. Calls from this number are again routed to primary response numbers in these countries. Though presence of secondary emergency number can create confusion but in countries where there are multiple numbers; because the emergency number was different earlier and was subsequently changed, people still remember them and use them in case of emergencies. Moreover, even if a single number is notified for emergency services, the changeover to the new regime will take some time and till then, people will continue to call present emergency numbers like 101/102 etc.

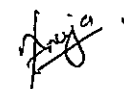
Hence it is reasonable to continue with present emergency numbers also as secondary emergency numbers and re-route the calls made to these numbers to primary emergency number. Whatever be the number of numbers, they must translate and terminate at one place.

4. For implementing single number based Integrated Emergency Communication and Response System in India, should the database with information of telephone users be maintained by the individual service providers or should there be a centralized database?

We are of the view that there should be a centralized database so that the information is easily accessible during the time of emergency.

5. In case of centralized database which agency (one of the designated telecom service provider, a Central Government department or a designated third party) should be responsible for maintaining the database?

We believe that either a Government agency or Emergency Management & Research Institute should continue to manage the data base.



6. What are the technical issues involved in transfer of location of a mobile user in real time?

7. What accuracy should be mandated for the location information to be provided by the mobile service provider?

(Combined response for 6 and 7)

We are of the view that without location information any emergency number is useless. Regulations should lay down criteria for the accuracy and reliability of the caller location information". For mobile caller location reliability requirements, the lack of such is doubled with a different interpretation of the reliability criteria as in the case of fixed telephony.

8. Should emergency number access be allowed from inactive SIMs or handsets without SIMs? Please justify your answer.

Yes emergency number access should be allowed from inactive SIMs or handsets without SIMs. SOS facility should continue to be in for inactive SIM.

9. Should emergency access be allowed through SMS or email or data based calls? If yes, what will be the challenges in its implementation?

We are of the view that emergency access should be allowed for SMSes and calls and should have sufficient contingency built into the system for the changes from one communication to the other.

10. Is it technically possible to get Location information in case of SMS or data based calls on real time basis? If yes, please elaborate the process and technical challenges if any.

Yes, but is time consuming, why? Because one would have to first pick the number from SMS and carry out data search to locate that number, best avoided.

11. How to build redundancy in operations of Centralized response centres or PSAPs as they may be vulnerable to attack – both Physical and Application software related (Virus, Malware, denial

of service, hacking) or to Network failures or Congestion i.e. Call Overload?

In any case, there have to be multiple locations. Some of which must be made secure and accessible to very few to avoid a crash like situation. Must learn from the experience of the best of best data centres from around the world.

12. Should all the calls made to universal emergency number be prioritized over normal calls? Please justify your answer.

Yes, all the calls made to universal emergency number should be prioritized over normal calls. Time matters, how an emergency can be routinely handled.

13. What legal/penal provisions should be made to deal with the problem of Hoax or fake calls to emergency numbers?

We are of the view that there should be a provision for sufficient penalty (something like a lakh or so) so that it acts as a deterrent.

There must be stringent measures put in place that Hoax/False calls are deterred. It is also worth noting that the majority of hoax/false calls come from SIM-less handsets this appears to have caused some countries to ban this feature. The proportion of various types of calls: silent, by mistake, mischievous. The measures to reduce the number of hoax/false calls could be divided into two main groups:

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from one number, to put the caller (temporary) on a 'blacklist'. In some countries, SIM-cards from which emergency numbers are repeatedly abused may be temporarily blocked. Penal action can also be taken

- 14. How should the funding requirement be met for costs involved in implementation of IECRS? Should the cost be entirely borne by Central/State Governments or are there other possible ways to meet the funding requirements?**

One of the ways could be from Universal Service Obligation Fund.

- 15. Should Key Performance Indicators (KPIs) related to response time be mandated for PSAPs? If yes, what should be the KPIs? Please justify your suggestions.**

Yes there should be KPI's.

- 16. Should use of language translation services be mandated for PSAPs?**

We believe that use of language translation services should be mandated because India has people of several religion/language. Moreover, during the time of emergency or even otherwise most the people prefer to use their own respective language.

- 17. In your opinion, what issues related to interconnectivity and IUC may come up in implementation of IECRS in India? What are the suggested approaches to deal with them?**

This has to be treated as a service to Humanity, saving vital infrastructure, hence must be free.

- 18. Should a separate emergency number for differently able persons be mandated in India? How the use of this number be administered?**

It would be "good to have" but not really necessary.

- 19. In your opinion, apart from the issues discussed in this consultation paper, are there any other technical, commercial or regulatory issues that may be involved in implementation of IECRS in India? Please elaborate.**

A clear differentiation between Emergencies and the subsequent /consequent requirements as elaborated above.