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SERIES E: OVERALL NETWORK OPERATION, TELEPHONE SERVICE, SERVICE OPERATION AND HUMAN FACTORS

International operation – General provisions concerning Administrations

Requirements for a disaster relief mobile message service

Recommendation ITU-T E.108

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Recommendation ITU-T E.108

Requirements for a disaster relief mobile message service

Summary

Recommendation ITU-T E.108 specifies requirements for a disaster relief mobile message service. In the aftermath of a disaster, communication facilities are often overloaded due to many users attempting to contact friends or relatives to determine the safety of people who may have been affected by disasters. As a result, communication attempts often fail. The intent of a disaster messaging service is to allow an alternate method to communicate safety status information. Two approaches are presented. The first is a text-based messaging system, and the second is a voice-based messaging system.

History

Edition	Recommendation	Approval	Study Group	Unique ID*
1.0	ITU-T E.108	2016-01-29	2	11.1002/1000/12449

* To access the Recommendation, type the URL http://handle.itu.int/ in the address field of your web browser, followed by the Recommendation's unique ID. For example, http://handle.itu.int/11.1002/1000/11830-en.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications, information and communication technologies (ICTs). The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Compliance with this Recommendation is voluntary. However, the Recommendation may contain certain mandatory provisions (to ensure, e.g., interoperability or applicability) and compliance with the Recommendation is achieved when all of these mandatory provisions are met. The words "shall" or some other obligatory language such as "must" and the negative equivalents are used to express requirements. The use of such words does not suggest that compliance with the Recommendation is required of any party.

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As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementers are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database at http://www.itu.int/ITU-T/ipr/.

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Requirements for a disaster relief mobile message service

1 Scope

This Recommendation specifies requirements for a disaster relief mobile message service.

After a disaster occurs, many people want to contact their immediate family, relatives or friends to report their condition. In many cases, communication is via telephone over the mobile or fixed telephone network. However, due to a large population of users attempting to make similar calls, they often fail to get through due to heavy network congestion.

In contrast, the characteristics of Internet protocol (IP) packet networks are such that, although localized congestion may occur, the user does not experience blocking to the extent that communication is fully cut off, but still has the ability to transfer information, although with possibly reduced throughput.

As an alternative to using a mobile or fixed telephone network after disasters occur, an IP-based disaster relief message service provided through the mobile network enables people to inform their friends and family members of their safety or of damage conditions.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; all users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

[ITU-T E.164] Recommendation ITU-T E.164 (2010), *The international public telecommunication numbering plan.*

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following term defined elsewhere:

3.1.1 disaster [b-UNISDR, 2009]: A serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources.

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.2.1 disaster relief: Information or action to be effective for reduction and suppression of a serious disruption of the functioning of society. The disruption may be caused by accidents, natural phenomena or human activity, and results in a significant widespread threat to human life, health, property or the environment.

3.2.2 disaster relief system: A system that provides disaster relief (response) services to related parties, which include affected victims, rescue workers and systems.

3.2.3 disaster message board service: A type of disaster relief service that enables people to input text messages into a network-based message board facility for delivery to or retrieval by other people.

3.2.4 disaster voice message delivery service: A type of disaster relief service that enables people to put packetized voice messages on to network facilities for delivery to or retrieval by other people.

4 Abbreviation and acronyms

This Recommendation uses the following abbreviations and acronyms:

DB Database

IP Internet Protocol

PC Personal Computer

5 Conventions

None.

6 Background and concept

6.1 Background

After a disaster, victims generally want to inform their friends and family members of their safety or of the damage situation. At the same time, the friends and family members not directly affected may also try to directly confirm the safety of the possible victims. Normally, the first attempt by both parties is to try to contact each other using either a mobile or fixed voice telephone network.

However, call attempts may fail due to heavy congestion caused by the sudden increase of traffic and the possible drop of network capacity if the network itself is damaged by the disaster.

In comparison with a real-time voice call service, a packet service can be employed to transfer messages related to safety confirmation or the damage situation in off-peak hours (or even in busy hours), if the service is designed as a store and forward service. Also, as a packet-based system, a disaster message board service (see clause 3.2.3) generally requires less network capacity than a voice telephony based service.

The current generation of mobile phones provides a packetized data service. As many victims often flee a disaster situation taking with them a device such as a mobile phone, smartphone or tablet, a message system operating in conjunction with the mobile network is appropriate.

Considering these situations above, two types of disaster relief (see clause 3.2.1) mobile services are possible; one is an IP message-based service and the other is an IP voice-based service.

In the case of an IP-message based service, with a mobile phone victims can easily inform their friends and family members of their safety or of the damage situation. After the victim provides safety information (or information related to the damage situation) to a packet-based disaster relief system (see clause 3.2.2), their friends and family members can independently retrieve this information from the system.

Some people may prefer a live voice-based communication system. In some situations, voice-based calls may be the only option for some (such as the aged or infirm). In this case, the system can allow storage of a digitized voice message, which can then be accessed by their friends and family members through the IP network.

NOTE – The word "victim" in this document is the person who might be affected by disaster.

6.2 Concept of an IP message-based service

For an IP message-based service, victims can input into their mobile phone the disaster relief message, which may include information such as confirmation of their safety and the damage situation. The mobile phone terminal transfers the message to a server called a disaster message board via the mobile network.

Their friends and family members can then access the server and retrieve this information by accessing the web through a mobile phone or Internet terminal.

In addition, the user (victim) can arrange to have the message automatically delivered to specific mobile phone numbers to notify his safety-confirmation and damage situation.

The concept of a disaster message board service is shown in Figure 1.

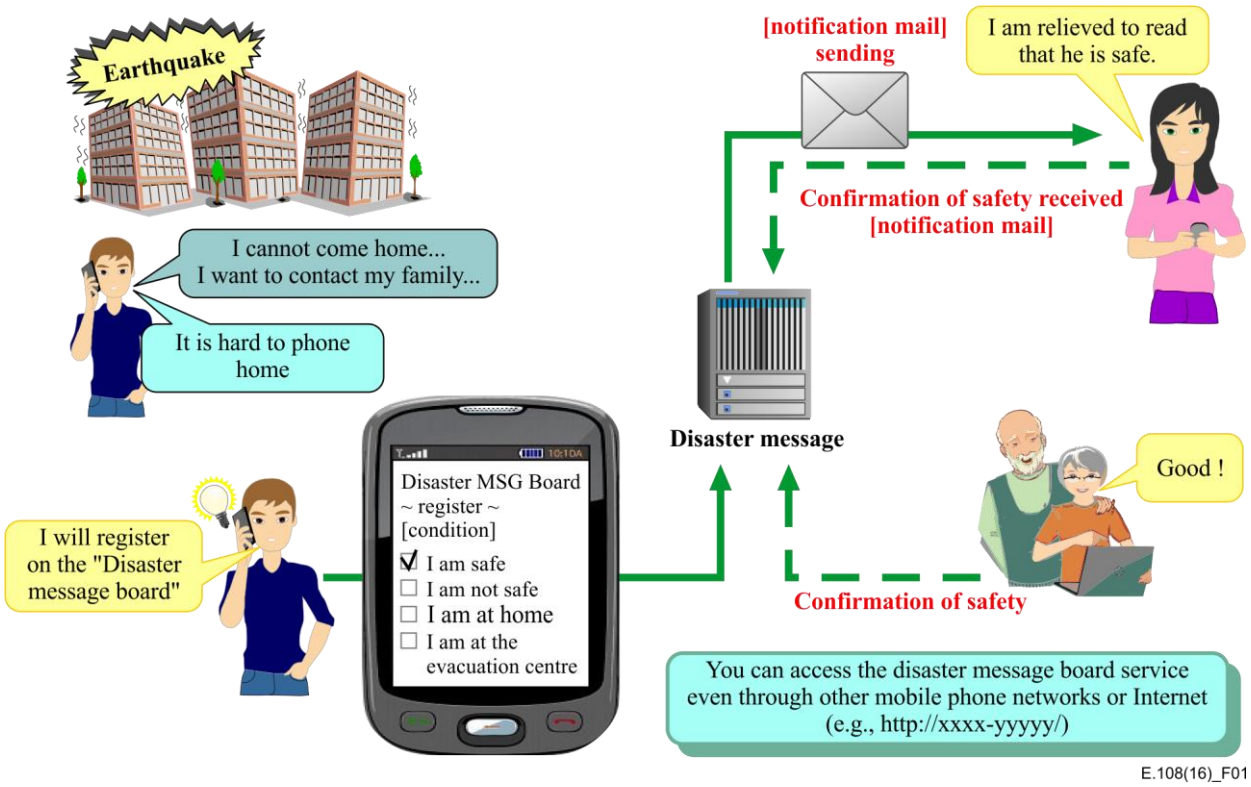


Figure 1 – Disaster message board service

In some countries, disaster message board services may be independently provided by each service operator. In this case, to minimize the inconvenience to users, the system is required to provide a cross-search function to allow searching, even by foreign users, of all databases (DBs) for safety information provided by the users. By inputting the phone number of friends and family members, the message-receiving users can identify the situations of friends and family members after cross-searching as shown in Figure 2.

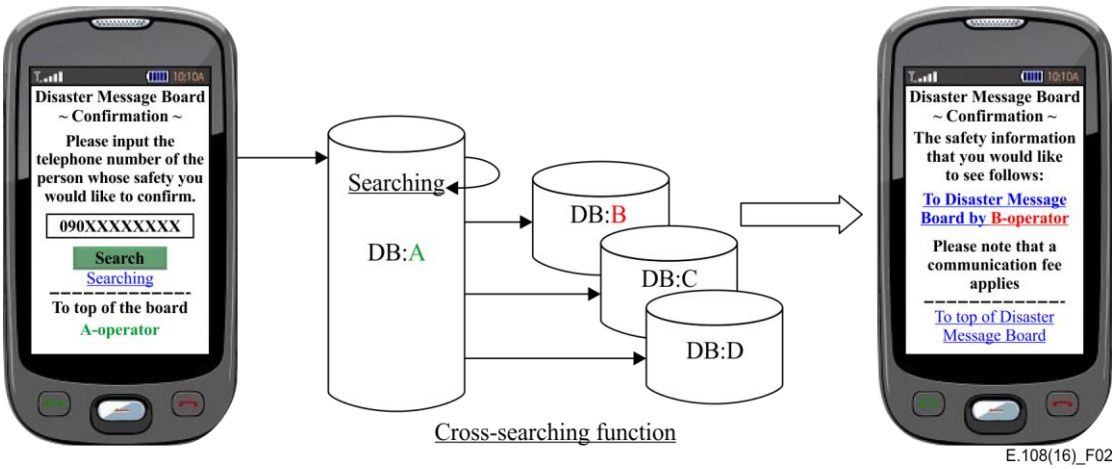


Figure 2 – Cross-searching function on databases of different message boards

The requirements for a disaster message board service are specified in clause 7.

6.3 Concept of IP voice-based service

For a voice-based service, first the victim inputs into their mobile phone the called (recipient) telephone number and a voice message confirming their safety or providing information on the damage situation. The called number is generally that of friends or family members. The voice message is then packetized in the phone and transferred to the server. The packetized message is sent from the server to the called number during non-busy hours.

As a result, friends and family members can be provided with safety confirmation and information about the damage situation. The concept of a disaster voice message delivery service (see clause 3.2.4) is shown in Figure 3.

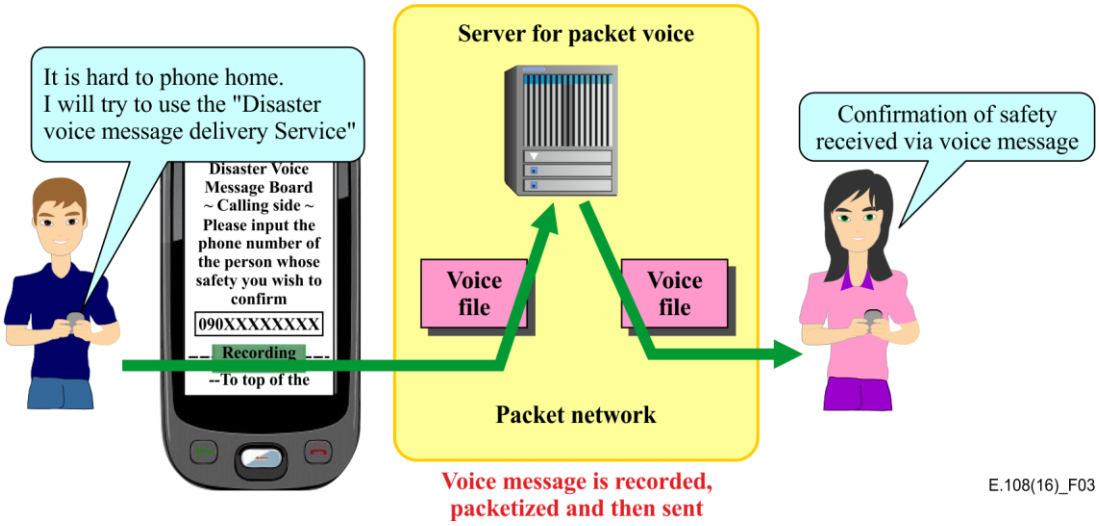
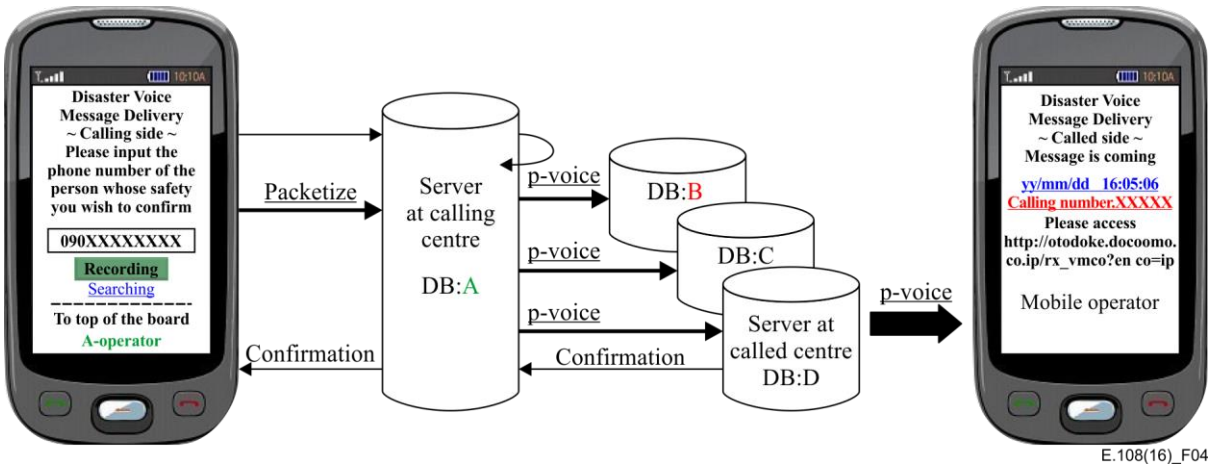


Figure 3 – Disaster voice message delivery service

In some countries, disaster voice message delivery services may be independently provided by each service operator. In order to prevent restricted access to a user if the receiving user subscribes to a different operator, the system is required to provide an interoperator usage function to allow access to a disaster voice message delivery service provided by other operators.

This function will provide a URL to allow all users, even foreign users, access to the disaster voice message delivery service. All users can then hear voice messages, as shown in Figure 4.



p-voice: packetized voice recording

Figure 4 – Interoperator use between different disaster voice message delivery services

The requirements for a disaster voice message delivery service are found in clause 8.

7 Requirements for disaster message board service

A disaster message board service is required to meet the functions described in clauses 7.1 to 7.7.

7.1 Message registration function

The service is required to allow a user to generate his or her message and register the message to the network system for retrieval by other users (message-receiving users). For the sake of ease of handling, the service is required to present a set of pre-defined messages to the user to allow the user to choose the appropriate messages rather than having to type the messages.

1) Items for registration:

   1.1) Fixed menu of relief messages (required)

   - □ I am safe
   - □ I am not safe
   - □ I am at home
   - □ I am at the evacuation centre
   - □ other

   1.2) Free text message (recommended)

   1.3) Voice message (optional)

   1.4) Video message (optional)

2) Terminals for registration

   The message is registered via a mobile phone terminal with a telephone number conforming to the format specified in [ITU-T E.164] (required).

3) Identification of the user

   Mobile phone users normally will carry their terminals. The message from the mobile terminal can be identified to be registered by the user. The message is used for safety confirmation or recognition of the damage situation of the user.

7.2 Uploading function

The registered message, which is selected from the menu or typed by a user, is sent and uploaded to a server for the "disaster message board". The service is required to accept and store user-generated messages, which can later be retrieved by other users (message-receiving users).

7.3 Searching and displaying function

The service is required to allow users other than the message-generating user to discover and read the message. This condition should be satisfied even if the message-generating user and other users subscribe to different network operators.

1) DB and type of searching (required)
   - To search a safety confirmation or damage situation within a DB of the operator which provides service to a user terminal for registration (see Figure 2).
   - To cross-search a safety confirmation or damage situation in DBs of other operators (see Figure 2)
   - To cross-search a safety confirmation or damage situation in DBs with the same [ITU-T E.164] country code.
2) Terminal for searching:
   - 2.1) Mobile phone terminal with web-access function (required)
   - 2.2) PC and tablet PC (required)
   - 2.3) Display (required)
     Searched message to be displayed at a terminal

7.4 Notification delivery function (recommended)

It is recommended that the message be automatically delivered to mobile phone numbers specified by the user in advance, to confirm his/her safety and provide information about the damage situation. For this, it is necessary to:

1) Pre-register the mobile phone numbers to be called by a potential message-generating user through the terminal for registration.
2) Send the message defined in clause 7.1 from a server for the disaster message board to the pre-registered phone numbers.

7.5 Deletion function

The service is required to allow the message-generating user to update or delete the message. This function allows the message-generating user to:

1) delete safety confirmation or damage situation information only through the terminal for registration (required);
2) update a safety confirmation or damage situation only through the terminal for registration (required).

7.6 Language requirements

1) Local languages (required)
2) English (recommended)
3) Other language (optional).

7.7 Supplementary function: Auto-registration of self-safety information

This function is optional, but it may be implemented in some countries as an important function of disaster-relief applications.

According to experience from past disaster relief applications, users (i.e., victims in an affected area) are quite eager to take action to learn about the situation of others (and their posted messages) while failing to inform others of their own condition, causing concern for others outside the affected area. To collect the conditions of the victims more efficiently in a confused situation, the automatic registration of a user's condition is desirable. An application server such as the disaster message board server can know that users are alive simply from their actions of trying to confirm their family or friends' safety.

It is recommended that the disaster message board system support automatic registration of users' conditions based on the users' interaction with the system and service. The actions that trigger automatic registration include retrieval of other user's messages. In this case, self-safety information is automatically sent to the server with the search query of the retrieval. This is based on the idea that receiving a search query from a user's device means that the owner of the device is alive.

This function can apply to other disaster relief systems such as IP voice-based services.

8 Requirements for a disaster voice message delivery service

A disaster voice message delivery service is required to meet the functions in clauses 8.1 to 8.6.

As a general requirement, the need for international interoperability and interworking of national systems should be addressed.

8.1 Registration function

Users who wish to deliver their voice message to other users are required to input the number of the user to be called into their terminal, followed by the message they wish to deliver.

1) Called number:

   According to the user's request, the system is required to deliver a voice message to a single terminal. In addition, it is recommended that the system handle multiple terminals. So, the systems are required:

   1.1) To register a single called number into a calling terminal (required)

   1.2) To register multiple called numbers into a calling terminal (recommended).

2) Recording message:

   The voice message is recorded and packetized at a calling terminal (required).

3) Terminal for registration:

   The message is registered at a mobile phone terminal with a telephone number (with the number format according to [ITU-T E.164]).

4) Identification of the user:

   The mobile phone user normally carries his/her terminal. The voice message from the terminal can be identified as one registered by the user. The message is used for safety confirmation or recognition of damage situation of the user.

8.2 Upload function (required)

The registered message is sent and uploaded to a calling server to which the user subscribes. The service is required to accept and store user-generated messages, which should be later delivered to other users.

8.3 Confirmation of registration at a calling server (required)

A confirmation message is sent to a calling terminal after a message is stored at the calling server.

8.4 Interoperator usage function (recommended)

The service is required to allow users other than the message-generating user to receive the message. This condition should be satisfied even if the message-generating user and other users subscribe to different network operators.

8.5 Notification of received voice at a called server (required)

The message is transferred from a calling server to a called server to which the message receiving user subscribes. After the message is accepted and stored at the called server, a notification message is sent to the called terminal.

8.6 Receiving and reproducing a voice message

The service allows receiving users to hear the notification message as voice at their terminals.

1) **Receiving (required)**

   A packetized voice message is received at a called terminal.

2) **Reproducing (required)**

   The received packetized voice message is reproduced at a called terminal.

3) Type of called terminal:

   Smartphones (interoperable with the calling terminal) (required).

Bibliography

[b-UNISDR, 2009] United Nations International Strategy for Disaster Reduction, UNISDR (2009), *2009 UNISDR Terminology on disaster risk reduction.* <http://www.unisdr.org/we/inform/publications/7817>

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