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Emergency Call Requirements for IP Telephony Services In Japan
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Abstract

This memo introduces the status of study in Japan regarding the communication for emergency reports using public IP telephony services. First, it provides the information on the background and history, and then it summarizes the functional requirements from the relevant authorities.

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1. Introduction

Public IP telephony services in Japan became popular by the allocation of the exclusive IP phone number begun in September 2002. The IP telephone number is an eleven-digit telephone number includes "050" prefix followed by the carrier ID. Currently more than seven million users subscribe the IP telephony service, and further subscription is expected in the next few years.

1.1 IP telephony services in Japan

There are two types of public IP telephony services in Japan. One is the '050' service mentioned above, and another is the IP telephony service using standard telephone number of '0AB-J'. The ministerial ordinance requires service providers to achieve a certain level of required condition.

The requirements to the '0AB-J' IP telephony service are summarized below.

- o Provides voice quality equal to PSTN telephone
- o Enables the use of the emergency calls
- o Installed location of the IP telephone device is fixed and the devices are not portable

On the other hand, the IP telephony services with 050 prefix are not necessarily bound by these conditions.

There is a general opinion that it is preferable for the emergency calls to be enabled both on 050 IP telephony services or on 0AB-J IP telephony services as long as the users consider these services are alternatives to PSTN telephone.

1.2 Committee for the Advancement of Emergency Message Systems (CAEMS)

In November 2003, the Minister of Internal Affairs and Communications requested the Ministry of Internal Affairs and Communications (MIC) for the advice about the achievement of the emergency call with the IP telephony services prompt and emphatically.

Upon this request, MIC set up the IP Telephony Working Group under the Committee for the Advancement of Emergency Message Systems (CAEMS) from March 2004 to January 2005 to discuss the requirements to the emergency call securing in the IP network. The study group was composed of the emergency call acceptance organization (ECAO in this document), the people from academic background, the

telecommunications carrier, the IP telephony equipment manufacturer, and so forth.

As the result of study, a draft proposal that consists of the authority's service requirements and the functional requirements was compiled and the draft is currently under public review [MIC draft report]. The document in Japanese is available from MIC home page. At the end of March 2005, the final report that incorporates the public comments will be submitted to the minister of MIC.

The purpose of this report is for parties concerned of the telecommunications carrier, the emergency call acceptance organization, the IP telephone terminal maker, and so forth, to fix a detailed specification, to advance the introduction, and to use it widely.

This memo provides information on the requirements for the emergency call acceptance on the IP network, based on the above-mentioned draft proposal under the public review.

1.3 A assumed network model

The following preconditions were assumed for the CAEMS discussion.

IP Telephony Network:

There will be two types of network configuration

ECA0 is connected to IP network via PSTN using existing emergency line

ECA0 is connected directly to IP telephony network via a new IP line

Types of IP telephony services:

Fixed IP telephone

Portable IP telephone

IP telephone with mobile capability

2. Emergency numbers in Japan

There are three emergency telephone numbers in Japan. It is 110 (police), 118 (Japan Coast Guard), and 119 (fire station and ambulance).

When dialing one of these numbers, the emergency call is established toward the emergency reception desk of each organization that covers the area where the reporter is present. In PSTN, telephony carriers have a database with subscriber's name, address, and telephone number, and each emergency telephone number is converted to the telephone number of emergency reception desk of each ECAO.

Each ECAO places an emergency call reception desk based on the district of their definition.

Police (110): 52 head offices

1 in each 47 prefectures, except 2 in Tokyo and 5 in Hokkaido

Japan Coast Guard (118): 11 jurisdictions

Fire station and ambulance (119): Slightly less than 900 districts

Defined locally along with the district of about 3000 municipalities

3. IP Telephony Requirements for Emergency Messages

This section provides a list of highly important requirements in support of the emergency messages within the context of IP telephony in Japan.

- MUST1: Emergency call MUST be got to the correct Emergency Call Reception Office (ECRO), which covers where the reporter is present.
- MUST2: Emergency call MUST be redirected to an alternative facility that the organization designates as an alternative reception office, in case the original ECRO could not do its duty due to a disaster etc.
- MUST3: Information for identifying the operator who can provide the reporter's subscription information MUST be presented to ECRO.
- MUST4: Emergency call MUST NOT be terminated unless ECRO terminated it, even though the reporter hung up. (Keeping connection)
- MUST5: Reporter's terminal MUST be rung up from ECRO if ECRO intends to resume the conversation with the reporter during "keeping connection" would be activated. (Reversing call)
- MUST6: Reporter's caller-ID MUST be presented to ECRO unless the reporter dials the restriction code followed with "11x" (110, 118 or 119).
- MUST7: ECRO MUST be allowed to acquire the caller-ID even though the reporter dialed with the restriction code.
- MUST8: Geographical Location Information (GLI) that the reporter is present MUST be presented to ECRO.
- MUST9: GLI MUST consist of
 - * Fixed IP-phone: subscriber's name, address, address code and telephone number
 - * Portable/Mobile IP-phone: subscriber's name, place of dispatch information, telephone number, and mobile-use or not

MUST10: Emergency call MUST have priority over all other calls in any case.

MUST11: Operator MUST prevent a malicious call pretending the place of dispatch.

3.1 Getting Emergency Call to Correct Emergency Call Reception Office

As mentioned in [section 2](#), the emergency call that will be dialed 110, 118 and 119 must be got to the correct emergency call reception office (ECRO), which takes charge of place where the call would be sent, by location-based call routing. This requirement must be met IP telephony emergency call service, in case of not only fixed-use IP telephones, but also portable IP telephones for fixed-use and mobile IP telephones.

In this case, call control nodes should identify emergency calls in order to establish a call even under network congestion. Some networks use alternative telephone number other than emergency number of 110/118/119 for routing purpose, and therefore the emergency calls should be identified by an identifier other than dialed number.

3.2 Keeping Connection

This requirement is for allowing the ECRO to secure the time or the chance of the conversation with the reporter if necessary.

IP telecommunication providers are required to provide the "keeping connection" functionality that keeps the call unless the ECRO would terminate the call, even though the reporter would hang up. And the providers are also required to provide the "reversing call" functionality that rings the reporter's terminal up by operating the instruction board in the ECRO, if the ECRO intends to resume the conversation with the reporter while the emergency call is kept by the "keeping connection" functionality.

For instance, it should be achieved by implementing either of the following functionalities:

The connection between the reporter and the ECRO, which received the emergency call from the reporter, is established regardless of the reporter's intention even if the reporter lifts the receiver trying to call somewhere after the reporter hung up the emergency call.

The reporter's present call is terminated or suspended and then another new call between the reporter and the ECRO is established

even if the ECRO calls the reporter up while the reporter is talking over a new call after the reporter hung up the emergency call.

3.3 Presenting and Acquiring Calling Line Identification, and Presenting IP Telecommunication Provider Identification

These functionalities, Calling Line Identification Presentation and Acquisition, and IP Telecommunication Provider Identification Presentation, are used for calling the reporter back from the ECRO that received the emergency call, if the ECRO intends to resume the conversation with the reporter after the call ends.

In general, IP telecommunication providers in Japan provide Calling Line Identification Presentation and Restriction (CLIP and CLIR) service; the selection of whether the identification is presented is either by the subscription contract or by specifying the service number (which is 184 or 186) before the telephone number you would dial. The latter has precedence over the former. That is, if you specify the service number for CLIR before the telephone number you dial, the reporter's telephone number won't be displayed on the called site even though the reporter subscribes as CLIP. On the other hand, if you specify CLIP, the reporter's telephone number will be displayed even though the reporter subscribes as CLIR.

For the emergency call, the reporter's telephone number must be presented to the ECRO regardless of the subscription of the reporter, unless the reporter specifies CLIR explicitly.

Furthermore, even if the reporter specifies CLIR, the ECRO must be able to acquire the reporter's telephone number over the call or the "keeping connection" condition. Because, for example, in case the reporter faces a crisis that is a matter of life and death, even if the reporter doesn't want to present his/her telephone number to the ECRO, the ECRO has to know the reporter's telephone number in order to settle the circumstance. This operation conforms to "The Guidelines on the Protection of Personal Information in the Telecommunications Business" (MIC Announcement No. 695 of 2004).

Also it is necessary for the ECRO to identify per call the IP telecommunication provider to which the reporter subscribes. This functionality allows the ECRO that receives the emergency call to inquire subscriber information for the IP telecommunication provider even if the ECRO couldn't acquire reporter's information on the telephone number or the geographical location etc.

3.4 Presenting and Acquiring Geographical Location Information

Geographical location information of the reporter must be presented to the ECRO that receives the call when the ECRO receives the call and the ECRO demands information from the IP telecommunication provider.

To consider applying the existing geographical location information system, there are two configurations; one is that two connections are used for voice and the geographical location system individually, and the other provides one connection for them.

HTTP (Hyper Text Transfer Protocol) is used for transferring Geographical location information that is formatted by XML (eXtensible Markup Language).

The content of the location information must be accurate so that the fire department, the police department etc. may deal with the problem promptly.

The following shows the contents of the location information.

element	tag	remarks
-----	-----	-----
Caller ID	repo_tele	reporter's telephone number
Area of address	add_area	area of reporter's address
Zip code	add_post	postal code number
Address code	add_code	JIS(Japanese Industrial Standard) address code
Address name	add_name	literal information corresponding to address code (name of prefecture, city or county, etc.)
Address number	add_num	house number, street number etc.
Others	add_others	house name, building number, room number, or building name and floor
Area of reporter's name	name_area	area of reporter's name
Name in kana	name_kana	pronunciation of reporter's name
Name in kanji	name_kanji	reporter's name in kanji letters
-----	-----	-----

Figure 1: The location information for the fixed IP telephone

element	tag	remarks
-----	-----	-----
Caller ID	repo_tele	reporter's telephone number
Area of location	loc_area	area of reporter's geographical location information
Zip code	loc_post	postal code number
Address code	loc_code	JIS(Japanese Industrial Standard) address code
Address name	loc_name	literal information corresponding to address code (name of prefecture, city or county, etc.)
Address number	loc_num	house number, street number etc.
Others	loc_others	house name, building number, room number, or building name and floor
Area of reporter's name	name_area	area of reporter's name
Name in kana	name_kana	pronunciation of reporter's name
Name in kanji	name_kanji	reporter's name in kanji letters
-----	-----	-----

Figure 2: The location information for the portable IP telephone

element	tag	remarks
-----	-----	-----
Caller ID	repo_tele	reporter's telephone number
Terminal type	term_type	whether reporter's terminal is fixed-use or mobile-use
Location type	loc_type	indicating either place of dispatch information or present place information (see *1)
Area of location	loc_area	area of reporter's geographical location information
Zip code	loc_post	postal code number
Address code	loc_code	JIS(Japanese Industrial Standard) address code
Address name	loc_name	literal information corresponding to address code (name of prefecture, city or county, and so on)
Address number	loc_num	house number, street number etc.
Others	loc_others	house name, building number, room number, or building name and floor
Area of measured position	CircularArea	circular area including measured position
Latitude	X	latitude of center of CircularArea
Longitude	Y	longitude of center of CircularArea
Radius	Radius	radius of CircularArea
Altitude	Alt	altitude of reporter's location (optional)
Precision of Alt	alt_acc	precision of Alt (optional)
Area of reporter's name	name_area	area of reporter's name
Name in kana	name_kana	pronunciation of reporter's name
Name in kanji	name_kanji	reporter's name in kanji letters
-----	-----	-----

Figure 3: The location information for the mobile IP telephone

(*1): "Place of dispatch information" means information on the place where the reporter makes the emergency call. "Present place information" means information on the place where the reporter is when the location information is sent.

4. Security Considerations

TBD

5. IANA Considerations

This document does not contain IANA considerations.

Appendix A. Japanese Address Code for Location Information

The address code [[LASDEC](#)] is used as one element of the location information that is transferred as a geographical location information to an emergency call reception office in [Section 3.4](#).

It is 11-digit code, which consists of 2-digit prefecture code, 3-digit municipality code, 3-digit section code and 3-digit subsection code. Currently, approximately 500000 codes are registered.

digit	name of code	value	remarks
1&2	prefecture code	01- 47	prefecture
3-5	municipality code	100-199	ward (in an ordinance-designated city) and special-ward
		201-299	city other than above
		301-799	town and village (in a district)
6-8	section code	001-999	section of a municipality
		10A-99Y(*)	and by-name of an area
9-11	subsection code	001-099	"Chome" that devides a section
		101-849	by-name of an area
		851-899	it is used when areas that are shown in the same place name have different postal codes
		901-999	for address name of Kyoto City

(*):The capital letters of the Roman alphabet are also used on 8th digit. In order to prevent misreading them as numerals, 'O', 'I', 'S' and 'Z' must not be used there.

Table 1: Structure of Address Code

Appendix A.1 Prefecture code

This is the top level of the address code and consists of 2-digit between 01 and 47 in the decimal system. Japan consists of 47 prefectures as you can refer from the following URL.

http://upload.wikimedia.org/wikipedia/ja/f/fd/Japan_prefectures.png

numbers: equal to prefecture code

red lines: the boundaries of each prefecture

blue lines: coastlines, or the boundaries of an area of a river or a lake

This code is defined by [JIS X 0401]. And also [ISO 3166-2] defines the similar code.

JIS X 0401	ISO 3166-2	Name of prefecture
01	JP-01	Hokkaido
02	JP-02	Aomori
03	JP-03	Iwate
04	JP-04	Miyagi
05	JP-05	Akita
06	JP-06	Yamagata
07	JP-07	Fukushima
08	JP-08	Ibaraki
09	JP-09	Tochigi
10	JP-10	Gumma
11	JP-11	Saitama
12	JP-12	Chiba
13	JP-13	Tokyo
14	JP-14	Kanagawa

15	JP-15	Niigata	
16	JP-16	Toyama	
17	JP-17	Ishikawa	
18	JP-18	Fukui	
19	JP-19	Yamanashi	
20	JP-20	Nagano	
21	JP-21	Gifu	
22	JP-22	Shizuoka	
23	JP-23	Aichi	
24	JP-24	Mie	
25	JP-25	Shiga	
26	JP-26	Kyoto	
27	JP-27	Osaka	
28	JP-28	Hyogo	
29	JP-29	Nara	
30	JP-30	Wakayama	
31	JP-31	Tottori	
32	JP-32	Shimane	
33	JP-33	Okayama	
34	JP-34	Hiroshima	
35	JP-35	Yamaguchi	
36	JP-36	Tokushima	
37	JP-37	Kagawa	
38	JP-38	Ehime	

39	JP-39	Kochi	
40	JP-40	Fukuoka	
41	JP-41	Saga	
42	JP-42	Nagasaki	
43	JP-43	Kumamoto	
44	JP-44	Oita	
45	JP-45	Miyazaki	
46	JP-46	Kagoshima	
47	JP-47	Okinawa	
+-----+	+-----+	+-----+	+-----+

Table 2: Prefecture code

Appendix A.2 Municipality code

This follows the Prefecture code and consists of 3-digit in the decimal system. This code shows a special-ward, a ward in an government-designated major city, a city, or a town or a village in a district. The following URL shows the division. There are 23 special-wards (in Tokyo), 726 cities, 1559 towns and 400 villages as of 14 Mar. 2005.

http://upload.wikimedia.org/wikipedia/ja/7/7b/Japan_map.png

black lines: the boundaries of each municipality

red lines: the boundaries of each prefecture

blue lines: coastlines, or the boundaries of an area of a river or a lake

This code is defined by [JIS X 0402].

Appendix A.2.1 Prefecture

000 is used for a prefecture. For example, Hokkaido is 01000.

[Appendix A.2.2](#) Government-designated major cities and wards

A government-designated major city is a city of 500000 or more, granted special rights by government ordinance.

The code for a government-designated major city is used the number starting from 100 every 30 in order that the ordinance-designated city is enforced in a prefecture, e.g. 100, 130, 160. And each ward in the cities is sequentially numbered from 101, 131, 161.

For example, in case of Yokohama City and Kawasaki City that are government-designated major cities in Kanagawa prefecture (which prefecture code is 14);

Yokohama City: 14100

Tsurumi Ward: 14101

Kanagawa Ward: 14102

...

Kawasaki City: 14130

Kawasaki Ward: 14131

Saiwai Ward: 14132

...

[Appendix A.2.3](#) Special-wards in Tokyo

100 is assigned for "Special-ward" as well as the government-designated major city. And each ward in Tokyo (which prefecture code is 13) is sequentially numbered from 101.

For example;

Special-ward: 13100

Chiyoda ward: 13101

Chuo ward: 13102

...

[Appendix A.2.4](#) **Cities**

Each city excepting Government-designated major cities is sequentially numbered from 201. Usually the number is assigned in order of the municipal organization enforcement.

For example, in case of Tokyo prefecture;

Hachioji City: 13201

Tachikawa City: 13202

Musashino City: 13203

...

[Appendix A.2.5](#) **Towns and Villages**

The number from 301 is assigned for each town and village. The town and village is made a group in each district, and the number of every 20 is given sequentially as 301, 321, 341.

For example, in case of Higashi-Tsugaru District and Nishi-Tsugaru District of Aomori prefecture (which code is 02);

Higashi-Tsugaru District

Hiranai Town: 02301

Kanita Town: 02302

Imabetsu Town: 02303

...

Nishi-Tsugaru District

Ajigasawa Town: 02321

Fukaura Town: 02323

Iwasaki Village: 02325

...

Note that 02322, 02324 are missing number due to municipal mergers.

Exceptionally, Shimajiri District of Okinawa Prefecture is assigned between 341 and 369, and Miyako District is assigned between 371 and 379, because Shimajiri District consisted of more than 20 towns and villages.

In the case of Hokkaido, each branch administrative office is made a group, and the number is given at intervals of 30 such as 301, 331, 361. And also in the case of solitary islands of Tokyo prefecture and Tsushima islands of Nagasaki prefecture, each branch administrative office is made a group, and the number following the mainland is given at intervals of 20.

[Appendix A.3](#) Section code and Subsection code

Section code and Subsection code are defined by two public corporations under the jurisdiction of the Ministry of Internal Affairs and Communications, which are LASDEC (Local Authorities Systems Development Center, <http://www.lasdec.nippon-net.ne.jp/>) and JGDC (Japan Geographic Data Center, <http://www.kokudo.or.jp/>). These are used for representing official address names and popular names. As popular names, there are the name of an architecture, the number of floor and so on.

code	Prefecture	Municipality	Section	Subsection
13104112000	Tokyo	Shinjuku	Island-Tower	
13104112101	Tokyo	Shinjuku	Island-Tower	1st floor
13104112102	Tokyo	Shinjuku	Island-Towe	2nd floor

Table 3: Example: address code of a building

13 is the code of Tokyo prefecture, 104 is Shinjuku Ward, 112 is Island-Tower building. And the number of floor is a kind of puplar names, so 101 and 102 are assigned.

And Island-Tower is in Nishi-Shinjuku, Shinjuku Ward, Tokyo

prefecture. The codes of that area are the following;

code	Prefecture	Municipality	Section	Subsection
13104070001	Tokyo	Shinjuku	Nishi-Shinjuku	1-Chome
13104070002	Tokyo	Shinjuku	Nishi-Shinjuku	2-Chome
13104070003	Tokyo	Shinjuku	Nishi-Shinjuku	3-Chome
13104070004	Tokyo	Shinjuku	Nishi-Shinjuku	4-Chome
13104070005	Tokyo	Shinjuku	Nishi-Shinjuku	5-Chome
13104070006	Tokyo	Shinjuku	Nishi-Shinjuku	6-Chome
13104070007	Tokyo	Shinjuku	Nishi-Shinjuku	7-Chome
13104070008	Tokyo	Shinjuku	Nishi-Shinjuku	8-Chome

Table 4: Example: address code of Chome

070 at 6-8 digit is assigned for Nishi-Shinjuku, and 001 thru 008 at 9-11 digit are each "Chome".

code	Prefecture	Municipality	Section	Sub section	Postal Code
13104099003	Tokyo	Shinjuku	Toyama	3-Chome	162-0052
13104099851	Tokyo	Shinjuku	Toyama	3-Chome	169-0052

Table 5: Example: address code of different postal code

3-Chome, Toyama, Shinjuku-Ward, Tokyo is assigned more than one postal code number. So, 13104099003 (13: Tokyo, 104: Shinjuku, 099:

Toyama, 003: 3-Chome) is assigned as the principal code, 13104099851 is as the supplementary code.

[Appendix A.4](#) Adding and Discontinuing Code

[Appendix A.4.1](#) Cases of adding and discontinuing code

- o readjustment of the division of land
- o enforcement of the ward system
- o enforcement of the city system
- o municipal merger
- o renumbering of lots, etc.

[Appendix A.4.2](#) Adding Code

A new address code is assigned to the new address, which is brought administratively. However no new code is assigned in the following cases;

- o changing only the name of city, ward, town or village
- o shifting village to town
- o in case of municipal merger, and one of their name is reused for the merged municipality

[Appendix A.4.3](#) Discontinuing Code

In case a address was abolished, the corresponding code to the address would remain but never be used.

[6.](#) Informative References

[ISO 3166-2]

International Organization for Standardization, "Codes for the representation of names of countries and their subdivisions -- Part 2: Country subdivision code", 1998.

[JIS X 0401]

Japan Industrial Standard, "To-Do-Fu-Ken (Prefecture) Identification Code", April 1973.

[JIS X 0402]

Japan Industrial Standard, "Identification code for cities, towns and villages", December 2003.

[LASDEC] Local Authorities Systems Development Center,
"Characteristics of Zenkoku Machi-Aza File".

[MIC draft report]

The Ministry of Internal Affairs and Communications,
"draft report concerning Measures for Preserving Important Communications Such as Emergency Messages on IP Networks",
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