

# Interface Design between Mobile Communication Service Provider and National Alert Originator in Korea

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**Abstract**— Recently, public alert using CBS technology is becoming one of the most effective and popular tools for government. In this paper, we present a Republic of Korea (ROK) civilian technical specification for the second-generation interface between the government alert gateway and mobile service provider alert gateway. The requirements for the gateways and the interface protocol are described along with design philosophy and base specifications and ROK regulations.

**Keywords**— Emergency, Disaster, CAP, KPAS, Alert, Warning

## I. INTRODUCTION

The Republic of Korea has been providing public alert service using 2G (CDMA) Cell Broadcast Service (CBS), which now is called Korean Public Alert Service (KPAS), as early as in 2005. The CBS public alert is now one of the most effective and popular service in the world. In Japan, the service is called Earthquake and Tsunami Warning System (ETWS), while in the USA Wireless Emergency Alert (WEA). As the mobile communication technology evolves with 5G and IoT, new and enhanced features for the public alert are conceived, designed, and implemented in some country. For example, the USA has been developing so-called enhanced WEA (eWEA), which consists of increase in maximum number of characters, supporting additional language, more flexible geo-targeting, adding Web links, and even supporting multimedia contents. The essential features of the international CBS Public Waring System are collected in 3GPP technical specifications [1] [2].

Recently, the ROK government is developing new features for the KPAS, which supports increase in Korean character and English as a second language. In near future the government is planning for more features like geo-targeting more language support etc. The initial interface between the ROK government alerting originator and the commercial mobile service providers are primitive supporting only with minimum requirements. The current interface should be revised in order to support these new and enhanced alerting features. In this paper, we present main design philosophy and distinctive characteristics of the second-generation interface specification accommodating these requirements [3].

## II. SPECIFICATION DESIGN PRINCIPLES

### A. Reference Model

As a first step of the specification, we propose a reference model, which abstracts the overall system and defines some terminologies. Fig. 1 shows the reference model. The model is based on a to-be-developed national integrated alert system. It consists of two subsystems and an interface. A subsystem called government alert gateway (GAGW) is responsible to the communication to the delivery channel. Each delivery channel has a corresponding alert gateway that communicated to the GAGW. In our context, we are interested in the Mobile Service Provider Alert Gateway (MSPAG). The interface between the GAGW and MSPAG are called Interface-C-MSP. The interface protocol is a profile specification of Common Alerting Protocol-Korean Profile (CAP-KP).

### B. General Requirements

The general requirements are those that influence overall subsystems. Some requirements are generalized here, and further specified in the subsystem requirements. They are adopted from the ROK regulations and a civilian technical specification [4]. They include alert classification, geo-targeting unit, maximum text length, minimum delay, alert message interval, and additional language.

### C. Government Alert Gateway Requirements

The requirements for the GAGW includes only essential features such as security, encryption, authorization, response to the request by the other subsystem, management of service provider's profile, reliability, conformance of interface protocol. The specification contains only the information of the GAGW that will help to understand the behaviour the overall system.

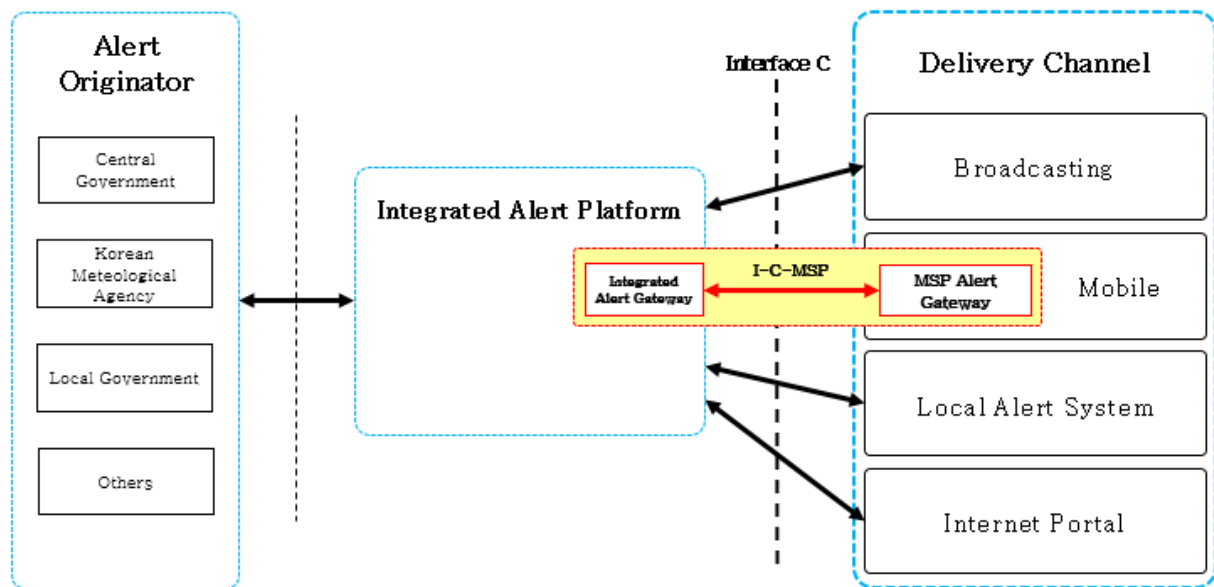


Figure 1. Figure 1 A Reference Model

#### D. Mobile Service Provider Alert Gateway

The specification includes detailed description of the MSPAG requirements. MSPAG requirements contains corresponding ones from the previous GAGW, for example security, reliability, authorization, etc. In addition, they include conformance checking of CAP-KP-MSP XML schema. The management of all the message it communicates with the GAGW has to be logged and open to the requests of the government alerting originators. The response to the CAP message sent from the GAGW should conform to the CAP-KP.

#### E. Interface Protocol

The interface protocol is based upon the Common Alerting Protocol-Korean Profile (CAP-KP) [5]. The profile was one of the outcomes of previous government-sponsored research project, whose goal is to conceptualize national integrated alert platform. The profile captures the requirements derived from the unique Korean administrative environment. The main design philosophy of the CAP profiling is that that while we stick to the CAP-KP accommodating various disaster types, we develop an additional profile specification, which is based on the CAP-KP, for each delivery channel. That is because the characteristics of the delivery channels continues to change as the new technologies and their applications. The profile specification for each channel holds the ever-changing features of each delivery channel. To the contrary, the characteristics of disaster, that has to be delivered to the public, is rather limited and time-invariant. Based on this design philosophy we have been developing CAP profile specifications for each delivery channel. For the mobile service provider, we developed a profile specification, which is called CAP-KP-BB. We are currently developing for delivery channels for broadcasting (BC), local alerting system

(LAS), and internet portals (Internet). The following are distinctive characteristics of CAP-KP-MSP. The current version does not support <msgType> of “Update” and “Cancel”, The <scope> has to be “Public”. To indicate that a CAP document support KPAS alert, the document has to include <code> of “Interface-C-MSP 1.0”. The <language> has to set to “ko-KR”. The <geocode> is mandatory. The <parameter> has to support various features of delivery channels: the classification of alert, maximum text length, English test, and sequential number.

Table 1 Example of Parameter

|                                                           |
|-----------------------------------------------------------|
| <parameter>                                               |
| <valueName>CBSSeqID</valueName>                           |
| <value>0123456789</value>                                 |
| </parameter>                                              |
| <parameter>                                               |
| <valueName>CBSPriority</valueName>                        |
| <value>1</value>                                          |
| </parameter>                                              |
| <parameter>                                               |
| <valueName>CBSText180Byte.ko-KR</valueName>               |
| <value>Korean text max 180Bytes...</value>                |
| </parameter>                                              |
| <parameter>                                               |
| <valueName>CBSText315Byte.ko-KR</valueName>               |
| <value>Korean text max 315Bytes...</value>                |
| </parameter>                                              |
| <parameter>                                               |
| <valueName>CBSText180Byte.en-US</valueName>               |
| <value>English alert message maximum 180 bytes...</value> |
| </parameter>                                              |

### III. CONCLUSIONS

In this paper we presented a ROK civilian technical specification for the interface between the government alert gateway and mobile service provider alert gateway. The specification starts with a reference model which consists of two subsystems and an interface: gateways located in each part and an interface between the two. The requirements for the gateway are summarized along with design philosophy and base specifications and ROK regulations. The interface protocol is designed based on the CAP, which provides flexible functionality.

We expect that new technical specification for each delivery channel will be developed soon, as a steppingstone for the national integrated alert system.

### ACKNOWLEDGMENT

This research was supported by Disaster-Safety Platform Technology Development Program of the National Research Foundation of Korea (NRF) funded by the Ministry of Science and ICT (NRF-2018M3D7A1084906).

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