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# CoAP Over SMS
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Abstract

This document explains how to use CoAP in cellular networks, by using SMS (Short Message Service) as the transport protocol.

Status of this Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

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This Internet-Draft will expire on April 23, 2012.

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# 1. Introduction

In cellular networks, it is possible that constrained end-points don't support an IP stack, i.e. TCP or UDP, but support the SMS protocol instead. Compared to the UDP protocol stack, SMS provides a much smaller message size: SMS can transfer up to 140 bytes in each message. So, some optimizations need to be done to reduce the CoAP message size to make it fit for SMS. Also, some adaptations in CoAP need to be specified, to cater for SMS specific parameters.

## 1.1. Motivation

In some environments, internet connectivity is not supported by the constrained end-points, but a cellular network connection is supported instead. In this situation, SMS will be supported, instead of UDP.

In OMA, there is a new approved work item named "the Lightweight M2M Protocol", which aims at identifying requirements and defining protocols for M2M applications in cellular networks.

In 3GPP, SMS is identified as the transport protocol for small data transmissions (See 3GPP-23.888).

Currently, there are already some SMS based deployments for binary M2M protocols, which are quite similar to CoAP.

## 1.2. Terminology

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC2119].

# 2. CoAP Over SMS

## 2.1. Addressing

In cellular networks, the CoAP endpoints have to work with a SIM (Subscriber Identity Module) card and have to be addressed by the MSISDN (Mobile Station ISDN (MSISDN) number).

To allow the CoAP client to detect that the SMS message contains a CoAP message, the TP-DATA-Coding-Scheme SHOULD be included.

## 2.2. Mapping to SMS Messages

When using SMS, the CoAP Client works as a Mobile Station to send the SMS message, and the CoAP Server works as another Mobile Station to receive the SMS message. All the SMS messages are stored and forwarded by the Service Center. The message exchange between the CoAP Client and the CoAP Server is depicted in the figure below:

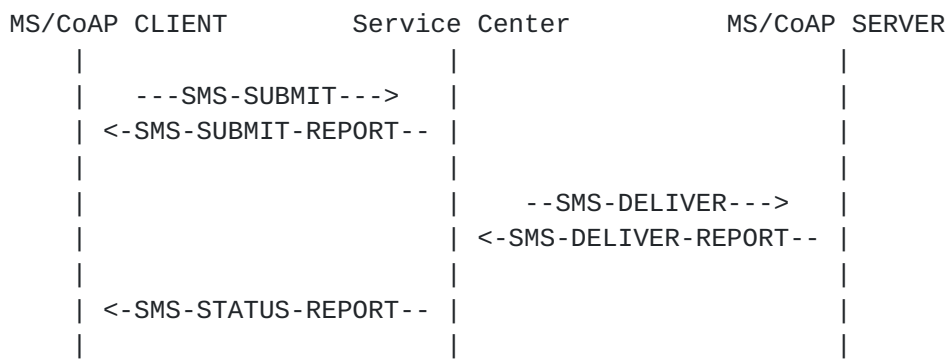


Figure 1: CoAP Messages over SMS

Note that the message exchange is just for one request message from CoAP Client and CoAP Server. It includes the following steps:

Step 1: The CoAP Client sends a CoAP request in a SMS-SUBMIT message to the Service Center. The CoAP Server address is specified as TP-Destination-Address (see see 3GPP-23.040).

Step 2: The Service Center returns a SMS-SUBMIT-REPORT message to the CoAP Client.

Step 3: The Service Center stores the received SMS message and forwards it to the CoAP Server, using an SMS-DELIVER message. The CoAP Client address is specified as a TP Originating Address (see 3GPP-23.040).

Step 4: The CoAP Server returns an SMS-DELIVER-REPORT message to the Service Center.

Step 5: The Service Center returns the SMS-STATUS-REPORT message to the CoAP Client to indicate the SMS delivery status, if required by the CoAP Client.

Note that the SMS-STATUS-REPORT message just indicates the transport layer SMS delivery status and has no relationship with the confirmable message or non-confirmable message. If the CoAP Client has sent a confirmable message, the CoAP Server MUST use a separate SMS message to transmit the ACK.

### 2.3. Parameters Mapping

In case of SMS transport, MSISDN MUST be used as the value of the Uri-Host option. The Uri-Port option SHOULD not be sent, as it is not used for SMS transport.

### 2.4. Interaction with the Block option

It is RECOMMENDED that SMS is not used to transfer very large resource data using Blocks.

## 3. Security Considerations

Security mechanisms defined in 3GPP-23.888 are used to guarantee transport security.

It is possible that a malicious CoAP Client sends repeated requests, and it may cost money for the CoAP Server to use SMS to send back associated responses. To avoid this situation, the CoAP Server implementation can authenticate the CoAP Client before responding to the requests. For example, the CoAP Server can maintain a MSISDN white list. Only the MSISDN specified in the white list will be allowed to send requests. The requests from others will be ignored or rejected.

## 4. IANA Considerations

N/A.

## 5. Acknowledgements

The authors of this draft would like to thank Bert Greevenbosch for the discussion.

## 6. Normative References

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