Abstract
This memo specifies a URI (Universal Resource Identifier) scheme "sms" for specifying a recipient (and optionally a gateway) for an SMS message. SMS messages are two-way paging messages that can be sent from and received by a mobile phone or a suitably equipped computer.
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1. Introduction

Compliant software MUST follow this specification. The capitalized 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 RFC 2119 [RFC2119].

1.1 The Short Message Service

The Short Message Service (SMS) [SMS] is a rather simple service for sending messages between SMS clients or, using so-called "Telematic Interworking", from an SMS client through a gateway to a receiver using a different service, such as fax or email. The SMS service is described in more detail in the SMS service registration memo [draft-wilde-sms-service-06].

1.2 Universal Resource Identifiers

One of the core specifications for identifying resources on the Internet is RFC 2396 [RFC2396], specifying the syntax and semantics of a Universal Resource Identifier (URI). The most important notion of URIs are "schemes", which define a framework within which resources can be identified (and possibly accessed). URIs enable users to identify resources, and are used for very diverse schemes such as access protocols (HTTP, FTP), broadcast media (TV channels [RFC2838]), messaging (email [RFC2368]), or even telephone numbers (voice [RFC2806]).

URIs often are mentioned together with Universal Resource Names (URNs) and/or Uniform Resource Locators (URLs), and it often is unclear how to separate these concepts. For the purpose of this memo, only the term URI will be used, referring to the most fundamental concept. The World Wide Web Consortium (W3C) has issued a note [uri-clarification] discussing the topic of URIs, URNs, and URLs in detail.

1.3 SMS Messages and the Internet

One of the important reasons for the universal access of the Web is the ability to access all information through a unique interface. This kind of integration makes it easy to provide information as well as to consume it. One aspect of this integration is the support of user agents (in the case of the Web, commonly referred to as browsers) for multiple content formats (such as HTML, GIF, JPEG) and access schemes (such as HTTP, HTTP-S, FTP).

The "mailto" scheme has proven to be very useful and popular, because most user agents support it by providing an email composition...
facility when the user activates (e.g., clicks on) the URI. Accordingly, the "sms" scheme could be supported by user agents by providing an SMS message composition facility when the user activates the URI. Alternatively, in cases where the user agent does not provide a built-in SMS message composition facility, the scheme could still be supported by opening a Web page which provides such a service. The specific Web page to be used could be configured by the user, so that each user could use the SMS message composition service of his choice.

The goal of this memo is to specify the "sms" URI scheme, so that user agents (such as Web browsers and email clients) could start to support it. The "sms" URI scheme identifies SMS message endpoints as resources. When "sms" URIs are dereferenced, implementations MAY create a message and present it to be edited before being sent, or they MAY use additional services to provide the functionality necessary for composing a message and sending it to the SMS message endpoint.

1.3.1 SMS Messages and the Web

SMS messages can provide an alternative to a "mailto" URI [RFC2368], or "tel" or "fax" URIs [RFC2806]. When a "sms" URI is activated, the user agent MAY start a program for sending an SMS message, just as "mailto" may open a mail client. Unfortunately, most browsers do not support the external handling of internally unsupported URI schemes in the same generalized way as most of them support external handling of additional MIME type content for types which they do not support internally. Ideally, user agents should implement generic URI parsers and provide a way to associate unsupported schemes with external applications (or Web services).

The recipient of an SMS message need not be a mobile phone. It can be a server that can process SMS messages, either by gatewaysing them to another messaging system (such as regular electronic mail), or by parsing them for supplementary services.

SMS messages can be used to transport almost any kind of data (even though there is a very tight size limit), but the only standardized data formats are character-based messages in different character encodings. SMS messages have a maximum length of 160 characters (when using 7-bit characters from the SMS character set), or 140 octets. However, SMS messages can be concatenated to form longer messages. It is up to the user agent to decide whether to limit the length of the message, and how to indicate this limit in its user interface, if necessary. There is one exception to this, see Section 2.5.
1.3.2 SMS Messages and Forms

The Hypertext Markup Language (HTML) [HTML401] provides a way to collect information from a user and pass it to a server for processing. This functionality is known as "HTML forms". A filled-in form is usually sent to the destination using the Hypertext Transfer Protocol (HTTP) or email. However, SMS messages can also be used as the transport mechanism for these forms. As SMS transport is "out-of-band" as far as normal HTTP over TCP/IP is concerned, this provides a way to fill in forms offline, and send the data without making a TCP connection to the server, as the set-up time, cost, and overhead for a TCP connection are large compared to an SMS message. Also, depending on the network configuration, the sender's telephone number may be included in the SMS message, thus providing a weak form of authentication.

2. The "sms" URI Scheme

Syntax definitions are given using the Augmented BNF for Syntax Specifications [RFC2234].

2.1 Applicability

This URI scheme is intended for sending an SMS message to a certain recipient(s). The functionality is quite similar to that of the "mailto" URL, which (as per RFC 2368 [RFC2368]) can also be used with a comma-separated list of email addresses.

In some situations, it may be necessary to guide the sender to send the SMS message via a certain SMSC. For this purpose, the URI may specify the number of the SMSC.

SMS messages may be sent through gateways to other services. These gateways are operated inside SMS centers. An "SMS" URI may specify that a certain gateway should be used.

The notation for phone numbers is taken from [RFC3601]. Refer to this document for information on why this particular format was chosen.

How the SMS message is sent to the SMSC is outside the scope of this specification. SMS messages can be sent over the GSM air interface, by using a modem and a suitable protocol, or by accessing services over other protocols, such as a Web service for sending SMS messages. Also, SMS message service options like deferred delivery and delivery notification requests are not in the scope of this document. Such services MAY be requested from the network by the user agent if necessary.
SMS messages sent as a result of this URI MUST be sent as class 1 SMS messages, if the user agent is able to specify the message class.

2.2 Formal Definition

The URI scheme’s keywords specified in the following syntax description are case-insensitive. The syntax of an "sms" URI is formally described as follows, where the base syntax is taken from RFC 2396 [RFC2396]:

```
sms-uri               =  scheme "::" scheme-specific-part
scheme                =  "sms"
scheme-specific-part  =  1*( sms-recipient ) [ sms-body ]
sms-recipient         =  gstn-phone sms-qualifier
                        [ "," sms-recipient ]
sms-qualifier         =  *( smsc-qualifier / pid-qualifier )
smsc-qualifier        =  ";smsc=" SMSC-sub-addr
pid-qualifier         =  ";pid=" PID-sub-addr
sms-body              =  ";body=" *urlc
```

The syntax definition for "gstn-phone" is taken from [RFC3601], allowing global as well as local telephone numbers.

The syntax definition for "SMSC-sub-addr" and "PID-sub-addr" is derived from [draft-wilde-sms-service-06], please refer to that document for the syntax of the qualifier values.

The "sms-body" is used to define the body of the SMS message to be composed. It consists of URL-encoded UTF-8 characters. Implementations MUST make sure that the sms-body characters are converted to a suitable character encoding before sending, the most popular being the 7-bit SMS character encoding, another variant (though not as universally supported as 7-bit SMS) is the UCS-2 character encoding (both specified in [SMS-CHAR]). Implementations MAY choose to silently discard (or convert) characters in the sms-body that are not supported by the SMS character set they are using to send the SMS message.

It should be noted that both the SMSC as well as the PID qualifier may appear only once per sms-recipient. If multiple qualifiers are present, conforming software MUST interpret the first occurrence and ignore all other occurrences.

2.3 Parsing an "sms" URI

The following list describes the steps for processing an "sms" URI:

...
1. The "gstin-phone" of the first "sms-recipient" is extracted. It is the phone number of the final recipient and it MUST be written in international form with country code, unless the number only works from inside a certain geographical area or a network. Note that some numbers may work from several networks but not from the whole world - these SHOULD be written in international form. According to [RFC3601], all international numbers MUST begin with a "+" character. Hyphens and dots are only to aid readability. They MUST NOT have any other meaning.

2. The "smsc-qualifier" of the first "sms-recipient" is extracted, if present.

3. The "pid-qualifier" of the first "sms-recipient" is extracted, if present.

4. The "sms-body" is extracted, if present.

5. The user agent should provide some means for message composition, either by implementing this itself, or by accessing a service providing it. Message composition SHOULD start with the body extracted from the "sms-body", if present. If the "pid-qualifier" is set to "pid=SMTP:...", then the user agents must make sure that the email address is correctly set (as defined by the SMS specification [SMS]) in the message being composed.

6. After message composition, a user agent SHOULD try to send the message first using the SMSC set in the "smsc-qualifier" (if present). If that fails, the user agent MAY try another SMSC.

7. If the URI consists of a comma-separated list of recipients (ie, contains multiple "sms-recipient" parts), all of them are processed in this manner. Exactly the same message SHOULD be sent to all of the listed recipients.

2.4 Examples of Use

sms:+41796431851

This indicates an SMS message capable recipient at the given telephone number. The message is sent using the user agent’s default SMSC.

sms:+41796431851;smsc=+41794999000

This indicates that the SMS message should be sent using the SMSC at
the given number.

sms:+41796431851,+4116321035;pid=fax

This URI should result in two SMS messages being sent, one to the recipient number as shown in the example above, the other one being sent as a fax to the second number (the fax is sent by the SMSC performing the gatewaying, not by the user agent).

sms:+41796431851;pid=smtp:erik.wilde@dret.net?body=hello%20there

In this case, a message (initially being set to "hello there", which may have been modified by the user before sending) will be sent via SMS using the SMS to email functionality in the SMSC, so that it will eventually result in an email being sent to the specified email address. In this case, the phone number will not be interpreted.

2.5 Using "sms" URIs in HTML Forms

When using a "sms" type URI as an action URI for HTML form submission [HTML401], the form contents MUST be packaged in the SMS message just as they are packaged when using a "mailto" URL [RFC2368], using the "application/x-www-form-urlencoded" MIME type, effectively packaging all form data into URI compliant syntax [RFC2396]. The SMS message MUST NOT contain any HTTP headers, only the form data. The MIME type is implicit. It MUST NOT be transferred in the SMS message.

The character encoding used for form submissions MUST be UTF-8 [RFC2279]. It should be noted, however, that user agents MUST URL-encode form submissions before sending them.

The user agent SHOULD inform the user about the possible security hazards involved when submitting the form (it is probably being sent as plain text over an air interface).

If the form submission is longer than the maximum SMS message size, the user agent MAY either concatenate SMS messages, if it is able to do so, or it MAY refuse to send the message. The user agent MUST NOT send out partial form submissions.

Form submission via an "sms" URI can be combined with Telematic Interworking to result in form submissions being submitted via an SMS message and finally being sent to an email account. In this case, all provisions for using the email "pid-qualifier" and using "sms" URIs with HTML forms must be followed.
3. "sms" URIs and SMS Web Services

In many cases, user agents will not be able to directly compose and send SMS messages (because this requires that such a service is accessible to the system the user agent is running on). However, it is likely that the user has access to a Web service that provides an SMS service, such as a Web site offering form-based SMS composition. Ideally, the user agent should access this Web service when activating an "sms" URI, thus enabling the user to use the Web service.

One problem with this approach is that the Web service should somehow get the "sms" URI, in order to interpret it and set the required parameters (such as the receiver’s phone number). The easiest way to implement this is for the user agent to add the "sms" URI as query string to the Web service’s URI. Consequently, user agents supporting SMS Web services identified by URIs SHOULD append the "sms" URI as query string to the Web services URI when accessing the Web service. Web services providing SMS composition facilities SHOULD expect to receive an "sms" URI as query string and should process it as described by this memo. This method only can be applied for Web service URIs which permit query strings (such as "http" and "https" URIs). For other Web service URIs (such as "ftp" and "mailto"), user agents as well as Web services MUST NOT use the query string.

It should be noted that RFC 2396 [RFC2396] defines that within query strings, the characters ";", ";", ";", ";", ";", ";", ";", ";", ";", ";", ";", ";", ";", ";", ";", ";", and ";" are reserved. It is therefore necessary to encode the "sms" URI accordingly before appending it as query string.

3.1 Example

A document contains this piece of (X)HTML:

```html
<a href="sms:+41796431851">Send me an SMS!</a>
```

The user agent interpreting this document does not internally support SMS message composition, but has been configured to access a Web service for handling "sms" URIs. This Web service has the following URI:

http://sms.example.com/sms-form

When the user activates the "sms" URI (eg, by clicking on the text "Send me an SMS!"), the user agent acts as if the activated URI had been:
The Web service is then responsible for parsing the query string and providing an appropriate interface, for example by already filling in the recipient address with the number provided in the "sms" URI.

4. Security Considerations

The "Security Considerations" section of the SMS service registration memo [draft-wilde-sms-service-06] MUST be consulted.

A user agent SHOULD NOT send out SMS messages without the knowledge of the user, because of associated risks, which include sending masses of SMS messages to a subscriber without his consent, and the costs involved in sending an SMS message.

The user agent SHOULD have some mechanism that the user can use to filter out unwanted destinations for SMS messages. The user agent SHOULD also have some means of restricting the number of SMS messages being sent as the result of activating one "sms" URI.

If an "sms" URI contains a pid-qualifier and the user agent supports the qualifier and its value, then the user agent MUST set the SMS message's PID as specified by the qualifier. User agents MAY inform users about the value and the functional consequences of PID qualifiers (eg, by notifying users that sending the SMS effectively will result in a fax message being delivered, rather than an SMS message).

The method described in section Section 3 adds another level of indirection to the handling of "sms" URIs. If this method is combined with the pid-qualifier gateway functionality, SMS composition and reception will probably be distributed over three different protocols (the Web service, SMS transport itself, and the service selected by the pid-qualifier). User agent SHOULD make this clear to users (either when the Web service is being configured, or when it is accessed).

The Telematic Interworking functionality of the SMSC addressed by the pid-qualifier is not necessarily implemented by the SMSC being used, and SMSC providers are known for not or not correctly supporting some or all pid-qualifier values. User agents SHOULD take into account that the success rate of SMS messages being sent using pid-qualifiers is lower than that of "plain" SMS messages.

5. Change Log
5.1 From -00 to -01
   o Added the "sms-body" field and its processing rules.
   o Added Section Section 3 about using "sms" URIs as query strings for SMS Web services.
   o Fixed typo in ABNF (said "global-phone" instead of "gstn-phone").
   o Added some explanatory text about form submissions using email Telematic Interworking.
   o Added some text about character encoding in form submissions.

5.2 From -01 to -02
   o Changed the sms-body field to URL encoded UTF-8 characters.

5.3 From -02 to -03
   o Changed ordering of "change Log" section (descending to ascending).
   o Clarified the wording at the beginning of Section Section 2.2 about only the keywords of the scheme being case-insensitive.
   o Changed "sms-body" to be a URI query string.
   o Added some text describing "sms" URIs as addressing resources.

5.4 From -03 to -04
   o Updated reference to draft-allocchio-gstn (to revision -05).

5.5 From -04 to -05
   o Updated reference to SMS spec to the version referenced in the SMS service draft.

5.6 From -05 to -06
   o Updated reference from draft-allocchio-gstn to RFC 3601.
6. References

6.1 Normative References


6.2 Non-Normative References


[RFC2629] Rose, M., "Writing I-Ds and RFCs using XML", RFC 2629,
June 1999.


[uri-clarification]

Authors’ Addresses

Erik Wilde
Swiss Federal Institute of Technology
ETH-Zentrum
8092 Zurich
Switzerland

Phone: +41-1-6325132
EMail: erik.wilde@dret.net
URI:  http://dret.net/netdret/

Antti Vaha-Sipila
Nokia

EMail: antti.vaha-sipila@nokia.com

Appendix A.  Where to send Comments

Please send all comments and questions concerning this document to
Erik Wilde.

Appendix B.  Acknowledgements

This document has been prepared using the IETF document DTD described in RFC 2629 [RFC2629].

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