IANA Registrations of Enumservice
"sms:smpp" and URI Scheme "smpp"
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Abstract

This document updates RFC 4355 by registering a new enumservice subtype "smpp" under the existing type "sms" using the URI scheme "smpp" as per the IANA registration process defined in RFC 3761 and draft-ietf-enum-enumservices-guide-07 and registers a new URI scheme "smpp" according to the URI registration procedure in RFC 4395.

This enumservice subtype indicates that the remote resource identified by the URI can receive short messages using the Short Message Peer-to-Peer Protocol (SMPP).
1. Conventions Used in this Document

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 BCP 14, RFC 2119 [1].

2. Abbreviations

3GPP 3rd Generation Partnership Project
BNF Backus-Naur Form
DNS Domain Name System
GPRS General Packet Radio Service
GSM Global System for Mobile communications
GW Gateway
HLR Home Location Register
ID Identifier; Identity
IM Immediate Messaging; Instant Messaging
ITU-T International Telecommunication Union-Telecommunication
MNP Mobile Number Portability
MSC Mobile-services Switching Center
NAPTR Naming Authority Pointer
RR Resource Record
SC Service Center
SGSN Serving GPRS Support Node
SMPP Short Message Peer-to-Peer Protocol
SMS Short Message Service
SMS-GMSC Gateway MSC for SMS
SMS-IVMSC Interworking MSC for SMS
SMSC Short Message Service Center
SRV Service
SS7 Signaling System Number 7
URI Uniform Resource Identifier
VPN Virtual Private Network

3. Introduction

ENUM (E.164 Number Mapping) [2] is a system that transforms E.164 [10] telephone numbers into domain names and then uses the Domain Name System (DNS) [11] and Naming Authority Pointer (NAPTR) [3] resource records (RRs) to query for the services
This document updates RFC 4355 [4] by registering a new enumservice subtype "smpp" under the existing type "sms" using the URI scheme "smpp" as per the IANA registration process defined in RFC 3761 [2] and draft-ietf-enum-enumservices-guide-07 [12] and registers a new URI scheme "smpp" according to the URI registration procedure in RFC 4395 [5].

This enumservice subtype indicates that the remote resource identified by the URI can receive short messages using the Short Message Peer-to-Peer Protocol (SMPP) [13].

The purpose of the registered enumservice subtype and URI scheme is to enable service providers to exchange the short message traffic over IP using the widely supported SMPP.

SMPP sessions can be established over TCP/IP or X.25 [14] connections. This document discusses only the TCP/IP case. Several radio access technologies are used by the mobile networks worldwide, the way the Global system for Mobile Communications (GSM) systems handle the short message delivery [15,16] is used in this document to simplify the discussions.

For a mobile-originated short message, the Mobile-services Switching Center (MSC) or Serving GPRS Support Node (SGSN) that serves the sender submits the short message to the Service Center (SC) in the sender’s home network via the Interworking MSC for Short Message Service (SMS-IWMSC). A successful short message delivery to a mobile user involves the SC and Gateway MSC for Short Message Service (SMS-GMSC) in the sender’s home network that queries the Home Location Register (HLR) in the receiver’s home network via Signaling System Number 7 (SS7) to retrieve information about the MSC and/or SGSN that currently serve(s) the receiver followed by the short message delivery to the MSC or SGSN via SS7. This document uses the Short Message Service Center (SMSC) to avoid mentioning the SMS-GMSC, SMS-IWMSC and SC to simplify the discussions.

4. Formal Syntax

RFC 4355 [4] allows subtypes be defined under the type "sms". This document proposes a new subtype "smpp" so the enumservice is "sms:smpp".

The syntax specification using the augmented Backus-Naur Form (BNF) as described in RFC 5234 [6] for the "smpp" URI can be found in Section 8.2.

5. Use Cases

There are at least five use cases where some network entities in
the mobile networks that deal with short message submission or delivery may want to retrieve the "smpp" URI via ENUM queries so as to deliver the short messages via SMPP/IP instead of SS7.

a. An SMS hub provider that receives a short message from the originating network can send an ENUM query to retrieve the "smpp" URI for the destination mobile telephone number. If the destination mobile telephone number is served by a mobile operator (identified by the information in the host part of the URI) that uses this SMS hub provider's service, the SMS hub provider can use the information in the "smpp" URI to terminate the short message via SMPP/IP. If the destination mobile telephone number is served by a mobile operator that does not use this SMS hub provider’s service, the SMS hub provider simply forwards the short message to the SMS hub provider that can reach the destination mobile operator.

b. The SMSC in the sender’s home network that receives a short message from the sender can send an ENUM query to see if the home operator that serves the destination mobile telephone number has an SMS Gateway (GW) (e.g., SMS Router [17] or IP-SM-GW in [18,19,20]) that can receive all the mobile-terminated short messages via SMPP/IP. If the "smpp" URI is found and SMPP sessions with the remote resource are allowed, the short message is delivered to the SMS Gateway via SMPP/IP. Otherwise, the SMSC handles the short message as is done today except that it may send the ENUM query as is described in case #c after it receives the positive response from the HLR.

c. The SMSC in the sender’s home network that has queried the HLR associated with the destination mobile telephone number and received the E.164 number associated with the MSC and/or SGSN that currently serve(s) the destination mobile telephone number can send an ENUM query to see if the MSC or SGSN can receive the short messages via SMPP/IP. If the "smpp" URI is found and SMPP sessions with the remote resource are allowed, the short message is delivered via SMPP/IP. Otherwise, the short message is delivered via SS7.

d. The SMS GW mentioned in case #b above that receives an incoming short message via SS7 or IP and wants to send the short message to the MSC or SGSN that currently serves the destination mobile telephone number can send an ENUM query to see if that MSC or SGSN can receive the short messages via SMPP/IP. If the "smpp" URI is found and SMPP sessions with the remote resource are allowed, the short message is delivered via SMPP/IP. Otherwise, the short message is delivered via SS7. Certainly, the SMS GW can deliver the message via IP if the terminating device supports the capabilities specified in [18,19,20].

e. The MSC or SGSN serving the sender can use the E.164 number associated with the sender’s home SMSC to send an ENUM query to see if that SMSC can receive short messages via SMPP/IP. If the "smpp" URI is found and SMPP sessions with the remote resource are allowed, the short message is delivered via SMPP/IP. Otherwise, the short message is delivered via SS7.
ENUM queries may not be needed for countries that do not support mobile number portability (MNP) because the prefix of the destination mobile telephone number or the E.164 numbers associated with the MSC, SGSN and SMSC and locally provisioned data together may be sufficient to identify the remote entity/resource and whether the remote entity/resource supports SMPP/IP. When the destination mobile telephone number is subject to MNP and ENUM provides MNP-corrected responses, the querier can use an ENUM query to see if the response contains the "smpp" URI.

For the five cases above, case #a is the most likely case to happen because the SMS hub providers currently use SMPP to communicate with the originating SMSC, with each other, and/or with the destination SMS GW. But they currently use local or remote databases and/or other operator-specific information to identify the destination operator and the destination SMS GW.

More and more operators may deploy SMS GWs to receive all incoming mobile-terminated short messages for reasons stated in [17] or for delivering the messages over IP [18,19,20]. When that happens, more SMSCs may send ENUM queries to see if they can retrieve the "smpp" URI in the ENUM responses so as to deliver the short messages via SMPP/IP without querying the HLR and delivering the short messages via SS7. [18,19,20] discuss and specify how short messages can be delivered to the terminating devices over IP when the terminating devices support SMS over IP or Immediate Messaging (IM) after the SMS GW (e.g., IP-SM-GW) receives the short messages from the SMSCs over SS7. Since the SMSCs are more likely to support SMPP rather than Session Initiation Protocol (SIP) [7], the SMS GW can advertise its ability to receive short messages over SMPP/IP via ENUM. Using SIP to receive the short messages from the SMSCs at the SMS GW that can deliver the messages to the terminating devices via SIP is outside the scope of this document.

Cases #c, #d and #e may happen when many MSCs and SGSNs support SMPP/IP.

An SMPP message is acknowledged immediately when received; therefore, the SMPP mechanism that requests for notification on actual message delivery should be used so as not to impact the message delivery status reporting mechanism that is available when the short message is delivered via SS7.

6. Example

$ORIGIN 4.3.2.1.4.3.4.1.7.5.1.example.net.
NAPTR 10 100 "u" "E2U+sms:smpp"
"^.*!smpp:smsgw.mnoX.example.com!" .

In this example, an "smpp" URI is returned in the ENUM response. The querying node, if supporting SMPP and having established business relationship and prior exchange of security information (e.g., system ID and password for SMPP session setup) with the
remote domain for sending the short messages via SMPP, can first query to see if any Service (SRV) RR [21] can be retrieved via DNS for

_smpp._tcp.smsgw.mnoX.example.com.

The querying node selects an SRV RR based on [21] if more than one SRV RRs are retrieved and uses the host name in the "Target" field of the SRV RR to retrieve the IP address via DNS. If no SRV RR can be found, it retrieves the IP address of "smsgw.mnoX.example.com" via DNS. It then establishes the SMPP session over TCP/IP, if not yet established, and sends the short message via SMPP to that IP address. If an SRV RR is retrieved and selected, the port number in the SRV RR is used for the TCP connection. Otherwise, the default port number of 2775 is used.

7. Security Considerations

Please see the discussions on security considerations for the registrations of Enumservice "sms:smpp" and URI scheme "smpp" in Sections 8.1 and 8.2 respectively.

8. IANA Considerations

This document registers the "smpp" Enumservice using the subtype "smpp" under the existing type "sms" in the Enumservice registry described in the IANA considerations in RFC 3761 [2] and draft-ietf-enum-enumservices-guide-07 [12]. This document also registers with the IANA the "smpp" URI scheme per RFC 4395 [5]. Details of the two registrations can be found in Sections 8.1 and 8.2 below.

8.1. IANA Registration for Enumservice "sms:smpp"

Enumservice Name: smpp
Enumservice Class: Common Application
Enumservice Type: sms
Enumservice subtype: smpp
URI scheme: smpp

Functional Specification: This Enumservice indicates that the resource identified by the associated URI is capable of receiving short messages using the SMPP protocol [13].

Security Considerations: Use of the "sms:smpp" Enumservice shall either be within a service provider’s internal network, or on a private basis between one or more parties. It is assumed that this Enumservice is used in an environment where entities are
trusted and general public or attackers are not supposed to have access to the DNS RRs containing the "smpp" URI.

The initial purpose of this Enumservice and the "smpp" URI is to indicate that the remote resource can receive short messages using SMPP. It is recommended that only the <hostport> appears in the URI. If the <userinfo> is present, it is recommended that it contains the international telephone number with the leading "+", so as not to convey user-specific information in the "smpp" URI.

Intended Usage: COMMON

Registration Document: This document contains all the information needed for the registration of this enumservice subtype.

Author: James Yu (see Author’s Address Section for author contact detail)

Further Information: See Section 5 of this document.

8.2. IANA Registration for URI Scheme "smpp"

URI scheme name: smpp

Status: Permanent

SMPP is used by network entities operated by the carriers/operators, inter-carrier vendors and service providers. Use of this URI should be either be within a service provider’s or carrier’s/operator’s internal network, or on a private basis between one or more parties using a variety of security mechanisms to prevent general public access. The DNS RRs that contain this URI and are to be returned in ENUM responses should not be part of the e164.arpa zone or any other portion of the Internet DNS tree.

URI scheme syntax:

```
smpp-uri = "smpp:" [userinfo "@"] hostport
*(";" uri-param) [headers]
userinfo = user / telephone-subscriber
uri-param = user-param / other-param
user-param = "user=" ( "phone" / other-user )
```

<hostport>, <headers>, <user>, <other-param> and <other-user> are imported from RFC 3261 [7]. <telephone-subscriber> is imported from RFC 3966 [8].

URI scheme semantics: "user=phone" must be present when <telephone-subscriber> appears in the <userinfo> of the URI. The default TCP port number for SMPP is 2775. If a port number appears in the <hostport>, that port number should be used.

The initial purpose of an "smpp" URI is to return the host information in the "smpp" URI in an ENUM response to identify the remote resource that can receive short messages via SMPP/IP.
This URI is not intended to be used in other protocols (e.g., SIP Request-URI) for addressing and routing purposes, at least for the purpose of this document. The URI scheme syntax provides an extension mechanism to add parameters and header fields in the future for other uses of this URI.

Encoding considerations: US-ASCII characters are included in the URI without any conversion. Non-US-ASCII characters MUST be percent-encoded as described in Section 2.1 of RFC 3986 [9].

Intended usage: An "smpp" URI identifies a remote resource that can receive short messages using the SMPP protocol. The <hostport> of the URI can be used to locate the IP address of that remote resource. Please see Section 6 of this document for an example on how the host name in the <hostport> of the URI is used to locate the IP address.

Applications/protocols that use this URL scheme name: The "smpp" URI is intended to be used by entities that communicate with each other using the SMPP protocol. An entity that has a short message to deliver and wants to find out if the remote entity that deals with the destination telephone number or associated with a telephone number can be reached via SMPP/IP, can make an ENUM query to see if such a URI is returned in the ENUM response.

Interoperability considerations: The URI is designed to be used specifically for nodes in trusted systems that query private ENUM implementations (e.g., Carrier ENUM).

Security considerations: The initial use of the "smpp" URI is for Enumservice "sms:smpp" where the <"hostport" in the "smpp" URI identifies the remote resource that can receive short messages over SMPP/IP. It is recommended that only the <hostport> appears in the URI. If the <userinfo> is present, it is recommended that it contains the international telephone number with the leading "+" so as not to convey user-specific information in the "smpp" URI.

Frame Relay and Virtual Private Network (VPN) connections are usually used to establish the SMPP sessions and each SMPP session is authorized by verifying the System ID and password at session setup time. Those security related measures should be used.

Contact: See the Author’s Address Section of this document for author’s contact information.

Author/change controller: This URI scheme is registered under the IETF tree. As such, the IETF maintains change control.

9. References

9.1. Normative References


9.2. Informative References


for terminals operating in the packet mode and connected to public data networks by dedicated circuit", October 1996.


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