                  Minimal GSTN address format in Internet Mail

Status of this Memo

   This document specifies an Internet standards track protocol for the
   Internet community, and requests discussion and suggestions for
   improvements. Please refer to the current edition of the "Internet
   Official Protocol Standards" (STD 1) for the standardization state
   and status of this protocol. Distribution of this memo is unlimited.

Abstract

   This memo describes a simple method of encoding Global Switched
   Telephone Network (GSTN) addresses (commonly called "telephone
   numbers") in the local-part of Internet email addresses, along with
   an extension mechanism to allow encoding of additional standard
   attributes needed for email gateways to GSTN-based services.

1. Introduction

   As with all Internet mail addresses, the left-hand-side (local-part)
   of an address generated according to this specification, is not to be
   interpreted except by an MTA that handles messages for the domain
   given in the right-hand-side.

   Since the very first e-mail to GSTN services gateway appeared, a
   number of different methods to specify a GSTN address as an e-mail
   address have been used by implementors. Several objectives for this
   methods have been identified, like to enable an e-mail user to access
   GSTN services from his/her e-mail interface, to allow some kind of
   "GSTN over e-mail service" transport (possibly reducing the costs of
   GSTN long distance transmissions) while using the existing e-mail
   infrastructure.

This memo describes the MINIMAL addressing method to encode GSTN addresses into e-mail addresses and the standard extension mechanism to allow definition of further standard elements. The opposite problem, i.e., to allow a traditional numeric-only GSTN device user to access the e-mail transport service, is not discussed here.

The IANA registration templates which MUST be used to register any standard element defined according to this specification are given in the "IANA Considerations" chapter (section 7 of this document).

All implementations supporting this GSTN over e-mail service MUST support as a minimum the specification described in this document. The generic complex case of converting the entirety of GTSN addressing into e-mail is out of scope in this minimal specification.

1.1 Terminology and Syntax conventions

In this document the formal definitions are described using ABNF syntax, as defined into [7]. This memo also uses some of the "CORE DEFINITIONS" defined in "APPENDIX A - CORE" of that document. The exact meaning of the capitalized words

   "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", "OPTIONAL"

is defined in reference [6].

In this document the following new terms are also defined:

   I-pstn device:
      a device which has an Internet domain name and it is able to communicate either directly or indirectly with the GSTN network;

   mta-I-pstn:
      the Internet domain name which identifies uniquely an I-pstn device over the Internet;

   pstn-email:
      the complete Internet e-mail address structure which is used to transport a GSTN address over the Internet e-mail service.

2. Minimal GSTN address

The minimal specification of a GSTN address within an e-mail address is as follows:

```
      pstn-address = pstn-mbox  [ qualif-type1 ]

      pstn-mbox = service-selector "=" global-phone

      service-selector = 1*( DIGIT / ALPHA / "-" )
                         ; note that SP (space) is not allowed in
                         ; service-selector.
                         ; service-selector MUST be handled as a case
                         ; INSENSITIVE string by implementations.
```

   Other specifications adopting the "pstn-address" definition MUST
   define and register with IANA a unique case insensitive
   "service-selector" element to identify the specific messaging service
   involved.

   These specifications and registrations MUST also define which minimal
   "qualif-type1" extensions, if any, MUST be supported for the
   specified messaging service.

   Implementations confirming to this minimal requirements specification
   are allowed to ignore any other non-minimal extensions address
   element which is present in the "pstn-address". However, conforming
   implementations MUST preserve all "qualif-type1" address elements
   they receive.

   The generic "qualif-type1" element is defined as:

```
      qualif-type1 = "/" keyword "=" string

      keyword = 1*( DIGIT / ALPHA / "-" )
                ; note that SP (space) is not allowed in keyword

      string = PCHAR
               ; note that printable characters are %x20-7E
```

   As such, all "pstn-address" extension elements MUST be defined in the
   "qualif-type1" form at the time of registration with IANA.

2.1 Minimal "global-phone" definition

   The purpose of global-phone element is to represent standard E.164
   numeric addresses [10] within a syntax for electronic mail addressing
   that is compliant with standard e-mail specifications given in [1]
   and [2].

The minimal supported syntax for global-phone element is as follows:

    global-phone = "+" 1*(DIGIT / written-sep)

    written-sep = ("-" / ".")

The use of other dialing schemes for GSTN numbers (like private
numbering plans or local dialing conventions) is also allowed.
However, this does not preclude nor remove the mandatory requirement
for support to the "global-phone" syntax within the minimal GSTN
address format.

Any other dialing schemes MUST NOT use the leading "+" defined here
between the "=" sign and the dialing string. The "+" sign is
strictly reserved for the standard "global-phone" syntax.

Note:

    The specification of alternate dialing schemas is out of scope for
    this minimal specification.

This document also permits the use of written-sep elements in order
to improve human readability of GSTN e-mail addresses. The
written-sep are elements which can be placed between dial elements
such as digits etc.

Implementors' note:

    Use of the written-sep elements is allowed, but not recommended
    for transmission. Any occurrences of written-sep elements in a
    pstn-mbox MUST be ignored by all conformant implementations.

2.2 The minimal "pstn-address" examples

    Some examples of minimal pstn-address are:

        VOICE=+3940226338

        FAX=+12027653000/T33S=6377

        SMS=+33-1-88335215

    Note:

        these examples are given as illustrations only; they do not
        necessarily represent valid pstn-addresses.

3. The e-mail address of the I-pstn device: mta-I-pstn

   An "I-pstn device" has, among its characteristics, a unique Internet
   domain name which identifies it on the Internet. Within Internet
   mail, this is the Right Hand Side (RHS) part of the address, i.e.,
   the part on the right of the "@" sign. For purposes of this document
   we will call this "mta-I-pstn"

      mta-I-pstn = domain

   For "domain" strings used in SMTP transmissions, the string MUST
   conform to the requirements of that standards <domain> specifications
   [1], [3]. For "domain" strings used in message content headers, the
   string MUST conform to the requirements of the relevant standards
   [2], [3].

      Note:

         the use of "domain names" or "domain literals" is permitted in
         addresses in both the SMTP envelope and message header fields.

4. The pstn-email

   The complete structure used to transfer a minimal GSTN address over
   the Internet e-mail transport system is called "pstn-email". This
   object is a an e-mail address which conforms to [2] and [3]
   "addr-spec" syntax, with structure refinements which allows the GSTN
   number to be identified.

      pstn-email = [""""] ["/"] pstn-address ["/"] [""""] "@" mta-I-pstn

   Implementors' note:

      The optional "/" characters can result from translations from
      other transport gateways (such as some X.400 gateways) which have
      included the "/" as an optional element. Implementations MUST
      accept the optional slashes but SHOULD NOT generate them.
      Gateways are allowed to strip them off when converting to Internet
      mail addressing. The relevant standard [2], [3] define exactly
      when the optional "quotes" characters surrounding the entire local
      part (i.e., the part on the left of the "@" character into the
      pstn-email) MUST be added.

4.1 Multiple subaddresses

   There are some instances in GSTN applications where multiple
   subaddresses are used. On the other hand in e-mail practice a
   separate and unique e-mail address is always used for each recipient.

In the event a particular GSTN service requires multiple subaddresses (in any form defined by the standard specification for that GSTN service) that are associated with the same "pstn-mbox", then the use of multiple "pstn-email" elements is REQUIRED.

Implementors' note:

   The UA may accept multiple subaddress elements for the same global-phone, but it MUST generate multiple "pstn-mbox" elements when submitting the message to the MTA.

4.2 Some examples of minimal "pstn-email" addresses

   Some examples of minimal pstn-email addresses follows:

        VOICE=+3940226338@worldvoice.com

        FAX=+1.202.7653000/T33S=6377@faxserv.org

        /SMS=+33-1-88335215/@telecom.com

   Note:

      these examples are given as illustrations only; they do not necessarily represent valid pstn-addresses.

5. Conclusions

   This proposal creates a minimal standard encoding for GSTN addresses within the global e-mail transport system. It also defines the standard extension mechanism to be used to introduce new elements for GSTN addresses.

   The proposal is consistent with existing e-mail standards. Each specific GSTN service using this proposal MUST define and register with IANA its own "service-selector" specification and MUST define and register the eventual other "qualif-type1" elements needed for its specific application. An example of such an application is contained in reference [13].

6. Security Considerations

   This document specifies a means by which GSTN addresses can be encoded into e-mail addresses. Since e-mail routing is determined by Domain Name System (DNS) data, a successful attack to DNS could disseminate tampered information, which causes e-mail messages to be diverted via some MTA or Gateway where the security of the software has been compromised.

There are several means by which an attacker might be able to deliver
incorrect mail routing information to a client. These include: (a)
compromise of a DNS server, (b) generating a counterfeit response to
a client's DNS query, (c) returning incorrect "additional
information" in response to an unrelated query. Clients SHOULD
ensure that mail routing is based only on authoritative answers.
Once DNS Security mechanisms [5] become more widely deployed, clients
SHOULD employ those mechanisms to verify the authenticity and
integrity of mail routing records.

7. IANA Considerations

   As the service-selector and qualif-type1 elements values are
   extensible, they MUST be registered with IANA.

   To register a service-selector or a qualif-type1 element, the
   registration form templates given in 7.1 and 7.2 MUST be used. Any
   new registration MUST fulfill the "Specification Required" criteria,
   as defined in RFC 2434, section 2 [16]:

      "Specification Required - Values and their meaning MUST be
       documented in an RFC or other permanent and readily available
       reference, in sufficient detail so that interoperability between
       independent implementations is possible."

   IANA MUST NOT accept registrations which are not supplemented by a
   Specification as defined above and which are not fully specified
   according to the template forms given in 7.1 and 7.2. In case of
   need for further consultation about accepting a new registration,
   IANA SHOULD refer to the Application Area Director to be directed to
   the appropriate "expert" individual or IETF Working Group.

   After successful registration, IANA should publish the registered new
   element in the appropriate on-line IANA WEB site, and include it into
   the updates of the "Assigned Numbers" RFC series.

   This section (including 7.1 and 7.2) updates the ones contained in
   [15].

7.1 IANA Registration form template for new values of GSTN
     address service-selector

   To: IANA@iana.org
   Subject: Registration of new values for the GSTN address
   service-selector specifier "foo"

   service-selector name:

      foo

   Description of Use:

      foo - ("foo" is a fictional new service-selector used in this
      template as an example, it is to be replaced with the new value
      being registered. Include a short description of the use of the
      new value here. This MUST include reference to Standard Track
      RFCs and eventually to other Standard Bodies documents for the
      complete description; the use of the value must be defined
      completely enough for independent implementation).

   Security Considerations:

     (Any additional security considerations that may be introduced by
      use of the new service-selector parameter should be defined here
      or in the reference Standards Track RFCs)

   Person & email address to contact for further information:

      (fill in contact information)

   INFORMATION TO THE SUBMITTER:

      The accepted registrations will be listed in the "Assigned
      Numbers" series of RFCs. The information in the registration form
      is freely distributable.

7.2 IANA Registration form template for new values of GSTN
    address qualif-type1 keyword and value

   To: IANA@iana.org
   Subject: Registration of new values for the GSTN address
   qualif-type1 element "bar"

   qualif-type1 "keyword" name:

      bar

   qualif-type1 "value" ABNF definition:

      abnf - ("abnf" MUST define the ABNF form of the qualif-type1
      value. The ABNF specification MUST be self-contained, using as
      basic elements the tokens given in specification [4]. To avoid
      any duplication (when appropriate), it MUST also use any already

registered non-basic token from other qualif-type1 elements, i.e.,
it MUST use the same non-basic token name and then repeat its
identical ABNF definition from basic tokens.

Description of Use:

bar - ("bar" is a fictional description for a new qualif-type1
element used in this template as an example. It is to be replaced
by the real description of qualif-type1 element being registered.
Include a short description of the use of the new qualif-type1
here. This MUST include reference to Standards Track RFCs and
eventually to other Standard Bodies documents for the complete
description; the use of the value MUST be defined completely
enough for independent implementation.)

Use Restriction:

(If the new qualif-type1 elements is meaningful only for a
specific set of service-element, you MUST specify here the list of
allowed service-element types. If there is no restriction, then
specify the keyword "none")

Security Considerations:

(Any additional security considerations that may be introduced by
use of the new service-selector parameter should be defined here
or in the reference Standards Track RFCs)

Person & email address to contact for further information:

(fill in contact information)

INFORMATION TO THE SUBMITTER:

The accepted registrations will be listed in the "Assigned
Numbers" series of RFCs. The information in the registration form
is freely distributable.

8. Changes from RFC 2303 specification

Although there are no technical or major changes from RFC 2303
specification, this section briefly describes where updates and
clarifications were introduced:

     - considering the case that telephony systems do not conform any
        more to the "single/few" Public Operator paradigm, the old
        definition "PSTN - Public Switched Telephone Network" was changed
        into the more adequate "GSTN - Global Switched Telephone Network"
        one. However, in order to remain consistent with the previous
        specification, the ABNF variables names were not changed.

     - it was made clear that "GSTN addresses" correspond, in common
        language, to "telephone numbers" and that the "global-phone" is a
        representation of E.164 numeric addresses;

     - an explicit list of "new terms" with explanations was added to
        section 1.1;

     - the fact that any other specification adopting the "pstn-address"
        definition MUST register with IANA the new "service-selector" and
        "qualif-type1" elements was made explicit throughout the document;
        the relevant mechanism to be used was added in section 7 "IANA
        considerations" (including the IANA Registration form templates);
        this is also consistent with RFC 2846;

     - in section 2.1 the use and meaning of "written-sep" was clarified;

     - in section 4., the quoting rules of the "pstn-address" and their
        practical use was made explicit both in the definition of
        pstn-email" and in the Implementors' note;

     - section 4.1 was updated to clarify how to generate "pstn-email"
        when more than one subaddress is used;

     - the Author's Address was updated;

     - the References list was updated to include RFC 2846 and RFC 2434.

9. Author's Address

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     Fax: +39 040 3758565

10. References

   [1] Postel, J., "Simple Mail Transfer Protocol", STD 10, RFC 821,
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   [2] Crocker, D., "Standard for the Format of ARPA Internet Text
        Messages", STD 11, RFC 822, August 1982.

   [3] Braden, R., "Requirements for Internet hosts - application and
        support", STD 3, RFC 1123, October 1989.

   [4] Malamud, C. and M. Rose, "Principles of Operation for the
        TPC.INT Subdomain: Remote Printing -- Technical Procedures", RFC
        1528, October 1993.

   [5] Eastlake, D. and C. Kaufman, "Domain Name System Security
        Extensions", RFC 2065, January 1997.

   [6] Bradner, S., "Key words for use in RFCs to Indicate Requirement
        Levels", BCP 14, RFC 2119, March 1997.

   [7] Crocker, D. and P. Overell, "Augmented BNF for Syntax
        Specifications", RFC 2234, November 1997.

   [8] ITU F.401 - Message Handling Services: Naming and Addressing for
        Public Message Handling Service; recommendation F.401 (August
        1992).

   [9] ITU F.423 - Message Handling Services: Intercommunication
        Between the Interpersonal Messaging Service and the Telefax
        Service; recommendation F.423 (August 1992).

   [10] ITU E.164 - The International Public Telecommunication Numbering
        Plan E.164/I.331 (May 1997).

   [11] ITU T.33 - Facsimile routing utilizing the subaddress;
        recommendation T.33 (July 1996).

   [12] ETSI I-ETS 300,380 - Universal Personal Telecommunication (UPT):
        Access Devices Dual Tone Multi Frequency (DTMF) sender for
        acoustical coupling to the microphone of a handset telephone
        (March 1995).

   [13] Allocchio, C., "Minimal FAX address format in Internet Mail",
        RFC 3192, October 2001.

   [14] Kille, S., "MIXER (Mime Internet X.400 Enhanced Relay): Mapping
        between X.400 and RFC 822/MIME", RFC 2156, January 1998.

   [15] Allocchio, C. "GSTN address element extensions in e-mail
        services", RFC 2846, June 2000.

   [16] Narten, T. and H. Alvestrand, "Guidelines for Writing an IANA
        Considerations Section in RFCs", BCP 26, RFC 2434, October 1998.

Acknowledgement