

Network Working Group  
Request for Comments: 3191  
Obsoletes: 2303  
Updates: 2846  
Category: Standards Track

C. Allocchio  
GARR-Italy  
October 2001

## 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.

### Copyright Notice

Copyright (C) The Internet Society (2001). All Rights Reserved.

### 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 GSTN 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 conforming 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 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

Claudio Allocchio  
INFN-GARR  
c/o Sincrotrone Trieste  
SS 14 Km 163.5 Basovizza  
I 34012 Trieste  
Italy

RFC2822: Claudio.Allocchio@garr.it  
X.400:    C=it;A=garr;P=garr;S=Allocchio;G=Claudio;  
Phone:    +39 040 3758523  
Fax:       +39 040 3758565

## 10. References

- [1] Postel, J., "Simple Mail Transfer Protocol", STD 10, RFC 821, August 1982.
- [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.

## Full Copyright Statement

Copyright (C) The Internet Society (2001). All Rights Reserved.

This document and translations of it may be copied and furnished to others, and derivative works that comment on or otherwise explain it or assist in its implementation may be prepared, copied, published and distributed, in whole or in part, without restriction of any kind, provided that the above copyright notice and this paragraph are included on all such copies and derivative works. However, this document itself may not be modified in any way, such as by removing the copyright notice or references to the Internet Society or other Internet organizations, except as needed for the purpose of developing Internet standards in which case the procedures for copyrights defined in the Internet Standards process must be followed, or as required to translate it into languages other than English.

The limited permissions granted above are perpetual and will not be revoked by the Internet Society or its successors or assigns.

This document and the information contained herein is provided on an "AS IS" basis and THE INTERNET SOCIETY AND THE INTERNET ENGINEERING TASK FORCE DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTY THAT THE USE OF THE INFORMATION HEREIN WILL NOT INFRINGE ANY RIGHTS OR ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

## Acknowledgement

Funding for the RFC Editor function is currently provided by the Internet Society.

