

Update to Internet Message Format to Allow Group Syntax in
the "From:" and "Sender:" Header Fields

Abstract

The Internet Message Format ([RFC 5322](#)) allows "group" syntax in some email header fields, such as "To:" and "CC:", but not in "From:" or "Sender:". This document updates [RFC 5322](#) to relax that restriction, allowing group syntax in those latter fields, as well as in "Resent-From:" and "Resent-Sender:", in certain situations.

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1. Introduction

The Internet Message Format, as far back as RFC 822 [RFC0822], has always required a usable address to appear in the "From:" header field of messages in order to allow replies to be sent. To this end, the syntax of messages, up to and including the current specification [RFC5322], has required the use of the mailbox address form in the originator ("From:" and "Sender:") fields of messages and has specifically forbidden the use of the group address form, which permits an empty list of addresses (that is, an address list with no address included that might be used for a reply).

However, the use cases for the "From:" field have evolved. There are numerous instances of automated systems that wish to send email but cannot handle replies, and a "From:" field with no usable addresses would be extremely useful for that purpose. More recently, work with internationalized email addresses [RFC6530] creates a real need to take a message with an internationalized email address and hand it to an older client that would have no ability to reply to such an address but might still wish to display the contents of the message. The group construct provides an existing syntax for unusable addresses (using the empty list of addresses) and also allows for a text label that describes the originator. For example:

```
From: Automated System;
```

A review of many current email programs finds that all reviewed clients will properly display a message with group syntax in the "From:" field. At worst, such programs generate an error message when an attempt is made to reply to such a message. No other interoperability problems have been discovered.

This document therefore updates the Internet Message Format specification [RFC5322] to relax that restriction, allowing group syntax to be used in the originator ("From:" and "Sender:") fields, as well as in their corresponding resent ("Resent-From:" and "Resent-Sender:") fields. This change permits empty groups, as described above, and also permits named groups of mailboxes (groups with non-empty lists of addresses; see [Section 4](#)). Nevertheless, this document recommends against the general use of group syntax in these fields at this time (see [Section 3](#)).

1.1. Notational Conventions

The notational conventions here are the same as those in [RFC 5322](#), and the following two subsections are copied directly from that document.

1.1.1. Requirements Notation

This document occasionally uses terms that appear in capital letters. When the terms "MUST", "SHOULD", "RECOMMENDED", "MUST NOT", "SHOULD NOT", and "MAY" appear capitalized, they are being used to indicate particular requirements of this specification. A discussion of the meanings of these terms appears in the Key Words document [RFC2119].

1.1.2. Syntactic Notation

This specification uses the Augmented Backus-Naur Form (ABNF) [RFC5234] notation for the formal definitions of the syntax of messages. Characters will be specified either by a decimal value (e.g., the value %d65 for uppercase A and %d97 for lowercase A) or by a case-insensitive literal value enclosed in quotation marks (e.g., "A" for either uppercase or lowercase A).

2. Allowing Group Syntax in "From:" and "Sender:"

[Section 3.6.2 of RFC 5322](#) defines the "From:" header field as containing a <mailbox-list> syntax element. This specification changes that definition to use the <address-list> syntax element, as is used in other fields, such as "To:", "CC:", and "Reply-To:". This specification also changes the definition of the "Sender:" header field from the <mailbox> syntax element to the <address> syntax element. While the <address> element includes the <mailbox> element already, we have chosen to specify both in the updated syntax as a way of highlighting the limited use intended for the change (see [Section 3](#)).

Section 2.1 below is a full replacement for Section 3.6.2 of RFC 5322, containing the new syntax as well as a new description of the semantics for the "From:" and "Sender:" fields. Section 2.2 below is a replacement of only the ABNF syntax for the "Resent-From:" and "Resent-Sender:" fields in Section 3.6.6 of RFC 5322; the rest of the syntax as well as the descriptive text of Section 3.6.6 of RFC 5322 remains unchanged.

[The text in the following section is not consistent within itself nor with the rest of this document in how it refers to message header fields, sometimes putting the field name in quotation marks and sometimes not, sometimes capitalizing the field name and sometimes not, and sometimes including the final colon and sometimes not. Because minimizing changes to the original text is more important, in this case, than attaining consistency, the text in Section 2.1, as well as that in Sections 1.1.1 and 1.1.2 above, is left as it was in RFC 5322.]

2.1. Replacement of RFC 5322, Section 3.6.2. Originator Fields

The originator fields of a message consist of the from field, the sender field (when applicable), and optionally the reply-to field. The from field consists of the field name "From" and a comma-separated list of one or more addresses (either mailbox or group syntax). If the from field contains more than one mailbox specification (including all mailboxes included in any groups), then the sender field, containing the field name "Sender" and a single address, MUST appear in the message. The from field and the sender field SHOULD NOT use group syntax; rather, the from field SHOULD use only the mailbox-list syntax and the sender field SHOULD use only mailbox syntax (see RFC 6854, Section 3). If the sender field uses group syntax, the group MUST NOT contain more than one mailbox. In either case, an optional reply-to field MAY also be included, which contains the field name "Reply-To" and a comma-separated list of one or more addresses.

from = "From:" (mailbox-list / address-list) CRLF

sender = "Sender:" (mailbox / address) CRLF

reply-to = "Reply-To:" address-list CRLF

The originator fields indicate the mailbox(es) of the source of the message. The "From:" field specifies the author(s) of the message, that is, the mailbox(es) of the person(s) or system(s) responsible for the writing of the message. The "Sender:" field specifies the mailbox of the agent responsible for the actual transmission of the message. For example, if a secretary were to send a message for

another person, the mailbox of the secretary would appear in the "Sender:" field and the mailbox of the actual author would appear in the "From:" field. If the originator of the message can be indicated by a single mailbox and the author and transmitter are identical, the "Sender:" field SHOULD NOT be used. Otherwise, both fields SHOULD appear.

Note: The transmitter information is always present. The absence of the "Sender:" field is sometimes mistakenly taken to mean that the agent responsible for transmission of the message has not been specified. This absence merely means that the transmitter is identical to the author and is therefore not redundantly placed into the "Sender:" field.

The originator fields also provide the information required when replying to a message. When the "Reply-To:" field is present, it indicates the address(es) to which the author of the message suggests that replies be sent. In the absence of the "Reply-To:" field, replies SHOULD by default be sent to the mailbox(es) specified in the "From:" field unless otherwise specified by the person composing the reply.

In all cases, the "From:" field SHOULD NOT contain any mailbox that does not belong to the author(s) of the message. See also [Section 3.6.3](#) of [RFC 5322](#) [[RFC5322](#)] for more information on forming the destination addresses for a reply.

2.2. Update to [RFC 5322](#), [Section 3.6.6](#). Resent Fields

This section updates [RFC 5322](#), [Section 3.6.6](#), to allow groups (via the address-list ABNF production) in the "Resent-From:" and "Resent-Sender:" fields, to parallel the change to "From:" and "Sender:" above. The ABNF for these fields is changed as follows:

```
resent-from = "Resent-From:" (mailbox-list / address-list) CRLF
```

```
resent-sender = "Resent-Sender:" (mailbox / address) CRLF
```

3. Applicability Statement

Mailbox syntax is the normal syntax to use in the "From:" and "Sender:" header fields; the address syntax defined in [Section 2.1](#), which allows the specification of a group, is only for Limited Use (see [RFC 2026 \[RFC2026\]](#), [Section 3.3](#), item (d)) for the reasons described below.

Many Internet email procedures and much software assumes that the addresses in the "From:" and "Sender:" fields can be replied to and are suitable for use in organizing and filtering mail. The use of groups instead of mailboxes can disrupt these uses. Consequently, while this specification legitimizes the use of groups, it does so only to enable circumstances when that use is necessary. Because the use of this mechanism is new, it is important that its use be limited to these circumstances and that it be used with caution. In particular, user agents SHOULD NOT permit the use of groups in those fields in outgoing messages.

4. Examples

First, consider an email message that is sent by an automated nightly monitor program, to which replies should not be sent. Such messages commonly include a valid, replyable address that will discard any replies that are sent to it, but recipients who do reply might be unaware that their replies will be discarded. If the message is instead presented as follows, the recipients' email clients will not allow them to reply in the first place:

```
From: Nightly Monitor Robot::
```

Second, consider an email message that is meant to be "from" the two managing partners of a business, Ben and Carol, and that is sent by their assistant, Dave. This message could always have been presented this way:

```
From: ben@example.com,carol@example.com  
Sender: dave@example.com
```

This change allows it to be represented this way:

```
From: Managing Partners:ben@example.com,carol@example.com;  
Sender: dave@example.com
```

5. Security Considerations

See the Internet Message Format specification [[RFC5322](#)] for general discussion of security considerations related to the formatting of email messages.

The "From:" address is special, in that most user agents display this address, or the "friendly" text associated with it, to the end user, and label it so as to identify it as the origin of the message (as implied in [Section 3.6.2 of RFC 5322](#)). Group syntax in the "From:" header field can be used to hide the identity of the message originator. It is just as easy to use a fabricated "From:" address to accomplish the same thing, so allowing groups in this field does not exacerbate the security problem.

Some protocols attempt to validate the originator address by matching the "From:" address to a particular verified domain (for one such protocol, see the Author Domain Signing Practices (ADSP) document [[RFC5617](#)]). Such protocols will not be applicable to messages that lack an actual email address (whether real or fake) in the "From:" field. Local policy will determine how such messages are handled, and senders, therefore, need to be aware that using groups in the "From:" might adversely affect deliverability of the message.

Because groups have previously not been allowed in the "From:" and "Sender:" header fields, it is possible that some implementations that conform to [RFC 5322](#) might not be prepared to handle the group syntax, and, indeed, might not even recognize that group syntax is being used. Of those implementations, some subset might, when presented with group syntax in those header fields, behave in a way that is exploitable by an attacker. It is deemed unlikely that this will be a serious problem in practice: address field parsing is generally an integral component of implementations, and address field parsers are required to understand group syntax. In addition, if any implementations should be exploitable through this mechanism, it is already possible for attackers to do it by violating [RFC 5322](#). Other violations of [RFC 5322](#) are commonly used by malefactors.

6. IANA Considerations

IANA has updated the "Permanent Message Header Field Names" registry to include this document as a reference as follows:

OLD

From	mail	standard	[RFC5322]
Sender	mail	standard	[RFC5322]
Resent-From	mail	standard	[RFC5322]
Resent-Sender	mail	standard	[RFC5322]

NEW

From	mail	standard	[RFC5322] [RFC6854]
Sender	mail	standard	[RFC5322] [RFC6854]
Resent-From	mail	standard	[RFC5322] [RFC6854]
Resent-Sender	mail	standard	[RFC5322] [RFC6854]

7. References

7.1. Normative References

- [RFC2026] Bradner, S., "The Internet Standards Process -- Revision 3", [BCP 9](#), [RFC 2026](#), October 1996.
- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.
- [RFC5234] Crocker, D. and P. Overell, "Augmented BNF for Syntax Specifications: ABNF", STD 68, [RFC 5234](#), January 2008.
- [RFC5322] Resnick, P., Ed., "Internet Message Format", [RFC 5322](#), October 2008.

7.2. Informative References

- [RFC0822] Crocker, D., "Standard for the format of ARPA Internet text messages", STD 11, [RFC 822](#), August 1982.
- [RFC5617] Allman, E., Fenton, J., Delany, M., and J. Levine, "DomainKeys Identified Mail (DKIM) Author Domain Signing Practices (ADSP)", [RFC 5617](#), August 2009.
- [RFC6530] Klensin, J. and Y. Ko, "Overview and Framework for Internationalized Email", [RFC 6530](#), February 2012.

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