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A. Melnikov
Isode Ltd
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Simple Mail Transfer Protocol extension for Alternate Recipient Delivery
Option
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Abstract

This document describes an SMTP extension for allowing the submitter to specify an alternate message recipient to be used in case where there is an error or delay delivering the message to a primary recipient.

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1. Introduction

This document describes an SMTP extension for allowing the submitter to specify for each primary recipient an alternate message recipient to be used in case where there is an error or delay delivering the message to the corresponding primary recipient. The submitter can also optionally specify a controlling time. If the message is delivered normally to the primary recipient, the alternate recipient is never used. However if there is a problem delivering to the primary recipient, such as a permanent failure (5xx) reply-code from the next hop MTA/MDA, connection timeout to the next hop MTA/MDA, timer expiration or continuous transient failure (4xx) reply-codes, then the message is forwarded to the alternate recipient and the controlling time (if specified) is used as the new timer for the forwarded message.

The motivation behind this extension is to allow automatic handling of a critical message, as bouncing back to the submitter may add too much (human or transport) delay to processing of the message. For example the sender might be offline when an relay/delivery error occurs and thus might not be able to remedy the situation.

The extension also designates a single recipient (among one primary and one alternate recipient) to be the intended recipient of the message at any given time. Additional trace information added to the message allows the alternate recipient to discover why the primary recipient was not reachable.

This extension might be useful for emergency services, aviation/military, and sales/support types of environments.

2. 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 [[RFC2119](#)].

The formal syntax use the Augmented Backus-Naur Form (ABNF) [[RFC5234](#)] notation including the core rules defined in [Appendix B of RFC 5234](#) [[RFC5234](#)].

[3.](#) Definition

The following service extension is defined:

1. The name of the SMTP service extension is "Alternate Recipient on delivery failure".

2. The EHLO keyword value associated with this extension is "ALTRECIPI".
3. No parameter values are defined for this EHLO keyword value. In order to permit future (although unanticipated) extensions, the EHLO response MUST NOT contain any parameters for that keyword. Clients MUST ignore any parameters; that is, clients MUST behave as if the parameters do not appear. If a server includes ALTRECIPI in its EHLO response, it MUST be fully compliant with this version of this specification.
4. No additional SMTP verbs are defined by this extension.
5. One optional parameter ("ABY") is added to the MAIL command. The ABY parameter specifies an alternate BY parameter [[RFC2852](#)] value that will be used if the message can't be delivered to one of the recipients (possibly within the time period specified in the BY parameter, if it is also present). The ABY parameter includes the by-time field (see [Section 6](#)) and some processing flags. The by-time field specifies the a decimal representation of the number of seconds within which the message should be delivered and has the range -999,999,999 seconds <= by-time <= +999,999,999 seconds.
6. One optional parameter ("ARCPT") is added to the RCPT command. The ARCPT parameter specifies an alternate email address to deliver this message to in case the corresponding original recipient is unreachable or unreachable within the specified period of time as specified in the MAIL FROM BY parameter.

7. The maximum length of a MAIL command line is increased by up to 18 octets by the possible addition of the ABY keyword and value. The maximum length of a RCPT command line is increased by up to 501 octets by the possible addition of the ARCPT keyword and value.
8. Servers offering this extension MUST provide support for, and announce, the DSN [\[RFC3461\]](#) extension and the DELIVERBY [\[RFC2852\]](#) extension.
9. The ALTRECIP extension is valid for the submission service [\[RFC4409\]](#). The ALTRECIP extension is not valid for LMTP [\[RFC2033\]](#).

[4.](#) SMTP protocol interactions

The following rules apply to SMTP transactions in which any of the ABY or ARCPT keywords are used:

1. If an SMTP client issues a MAIL command containing a valid ABY parameter and associated <esmtpl-value> ([\[RFC5321\] Section 4.1.2](#)), a conforming SMTP server MUST return the same reply-code (and Enhanced Status Code) as it would to the same MAIL command without the ABY parameter. A conforming SMTP server MUST NOT refuse a MAIL command based on the absence or presence of a syntactically valid ABY, or on their associated <esmtpl-values>. However, if the associated <esmtpl-value> is not valid (i.e., contains illegal characters), or if there is more than one ABY parameter in a particular MAIL command, the server MUST issue the reply-code 501 (with 5.5.2 Enhanced Status Code) with an appropriate message (e.g., "syntax error in parameter").
2. If an SMTP client issues a RCPT command containing any valid ARCPT parameter, a conforming SMTP server MUST return the same response (and Enhanced Status Code) as it would to the same RCPT command without those ARCPT parameter. A conforming SMTP server

MUST NOT refuse a RCPT command based on the presence or absence of this parameter. However, if the associated <esmtplib-values> is not valid, or if there is more than one ARCPT parameter in a particular RCPT command, the server SHOULD issue the response "501 syntax error in parameter" (with 5.5.2 Enhanced Status Code). The validity check MUST include verification for syntactic validity, and MAY include verification of the validity of the domain part of the address using DNS or verification of the validity of the whole address (e.g. using SMTP VRFY command, etc.).

The entire ARCPT parameter MAY be up to 500 characters in length.

[5.](#) Handling of messages received via SMTP

This section describes how a conforming MTA should handle any messages received via SMTP.

[5.1.](#) Receipt of a messages by a conforming SMTP servers

Messages received by an MTA/MSA compliant with this specification are processed as specified by [\[RFC5321\]](#). Additionally, when inserting a Received header field as specified in [Section 4.4 of \[RFC5321\]](#), the compliant MTA/MSA SHOULD include the ALTRECIP clause, if any of the RCPT commands contained an ARCPT parameter (see [Section 6](#)). After that processing continues as specified in subsequent sections of this

document.

[5.2.](#) Relay of messages to other conforming SMTP servers

The following rules govern the behavior of a conforming MTA, when relaying a message which was received via the SMTP protocol, to an SMTP server that supports the ALTRECIP SMTP extension. (Note that this section doesn't apply to Mediators, which are covered in [Section 5.4](#)).

1. If the ABY parameter was supplied for a message when the message was received, the MAIL command issued when the message is relayed MUST also contain the ABY parameter along with its associated <esmtplib-value>. If the ABY parameter was not supplied when the message was received, the ABY parameter MUST NOT be supplied for

that message when the message is relayed.

2. If any ARCPT parameter was present in the RCPT command for a recipient when the message was received, an ARCPT parameter with the identical <alt-recipient-address> MUST appear in the RCPT command issued for that recipient when relaying the message. (For example, the MTA acting as a relay therefore MUST NOT change the case of any alphabetic characters in an ARCPT parameter.) If no ARCPT parameter was present in the RCPT command when the message was received, an ARCPT parameter MUST NOT be added to the RCPT command when the message is relayed, unless the receiving MTA is a Mail Submission Agent (MSA).
3. The client MUST act as specified in [Section 5.6](#), if the ARCPT parameter was supplied for a recipient and any of these conditions apply:
 - * the SMTP server returns a permanent failure (5xx) reply-code in response to the RCPT command
 - * the sending MTA is unable to deliver or relay the message to the recipients for an extended length of time (to be determined by the MTA, see [\[RFC5321\]](#)), e.g. due to continuous transient failures (4xx), or inability to find (due to DNS resolution failures) or contact the next hop MTA.
 - * the sending MTA is unable to deliver or relay the message before deliver-by-time (the BY timer expires) and the by-mode of "R" was specified [\[RFC2852\]](#).

[5.3](#). Relay of messages to non-conforming SMTP servers

The following rules govern the behavior of a conforming MTA (in the role of an SMTP client), when relaying a message which was received via the SMTP protocol, to an SMTP server that does not support the ALTRECIPT SMTP extension:

1. ABY or ARCPT parameters MUST NOT be issued when relaying the

message.

2. Parameters to MAIL and RCPT commands specified in [[RFC3461](#)] and [[RFC2852](#)] cause actions as specified in the respective documents, with the following exception: if the the message is not delivered or relayed before deliver-by-time (the BY timer expires) and the by-mode of "R" was specified, the client MUST act as specified [Section 5.6](#).
3. If the ARCPT parameter was supplied for a recipient, and the SMTP server returns a permanent failure (5xx) reply-code in response to the RCPT command, the client MUST act as specified [Section 5.6](#).
4. If the ARCPT parameter was supplied for a recipient, and the SMTP server returns a transient failure (4xx) reply-code in response to the RCPT command, and the sending MTA is unable to deliver or relay the message to the recipients for an extended length of time (to be determined by the MTA, see [[RFC5321](#)]), the client MUST act as specified [Section 5.6](#).
5. If the ARCPT parameter was supplied for a recipient and no NOTIFY parameter [[RFC3461](#)] was supplied, and the SMTP server returns a success (2xx) reply-code in response to the RCPT command, the client MUST issue a "relayed" DSN for that recipient, as if the recipient included NOTIFY=SUCCESS value [[RFC3461](#)]. If both the ARCPT and the NOTIFY parameters were supplied for a recipient, then processing rules regarding generation and non generation of DSNs as specified in [[RFC3461](#)] apply.

Note: relaying to non-conformant MTAs is on the "best effort" basis. While this is not ideal, one of the motivations behind this extension is to avoid the need for the submitter to take explicit action in case a delivery to a primary recipient fails. So this document is recommending an attempt to deliver the message to the primary recipient when ALTRECIP is not supported by the next hop, in favor of bouncing the message or forwarding it to the corresponding alternative recipient.

Upon successful delivery of a message that was received via the SMTP protocol, to a local recipient's mailbox, a conforming MTA MUST ignore the ARCPT and the ABY parameters. This extension doesn't require the MTA to perform any additional actions.

"Delivery" means that the message has been handed to the recipient's mailbox. For messages which are transmitted to a mailbox for later retrieval via [[RFC3501](#)], [[RFC1939](#)] or a similar message access protocol, "delivery" occurs when the message is made available to the IMAP (POP, etc.) service, rather than when the message is retrieved by the recipient's user agent.

Similarly, for a recipient address which corresponds to a Mediator (as defined in [[RFC5598](#)]), such as a mailing list exploder, an alias or a ReSender, "delivery" occurs when the message is made available to that mediator, even though the mediator might refuse to deliver that message to its recipient(s).

[5.5.](#) Gatewaying a message into a foreign environment

The following rules govern the behavior of a conforming MTA, when gatewaying a message that was received via the SMTP protocol, into a foreign (non-SMTP) environment:

1. If the destination environment is unable to provide an equivalent of ABY and ARCPT parameters, the conforming MTA SHOULD behave as if it is relaying to a non-conformant SMTP ([Section 5.3](#)). In particular note the requirement to generate a "relayed" DSN on successful gatewaying for a recipient.
2. If the destination environment is capable of providing an equivalent of ABY and ARCPT parameters, the conforming MTA SHOULD behave as if it is relaying to a conformant SMTP ([Section 5.2](#)). Note that gateways to such environments can map ABY/ARCPT parameters as required.

[5.6.](#) Delivery to an alternate recipient on delivery failure

When delivery to an original recipient fails (or doesn't succeed within the specified time period as described by the BY parameter (with the by-mode of "R") to the MAIL command), then relaying is attempted to the alternate recipient specified in the ARCPT parameter.

Before an attempt to relay the message to the alternate recipient is made the message MUST be prepended with a new Delivery-Error header

field (see [Section 6](#)) which records the reason for the failure to deliver the message to the original recipient. This header field should be considered a part of the Trace Information [[RFC5321](#)]. Note that comments in this header field can be used to report a human readable version of the error cause.

Because the value of the BY parameter to the MAIL command is decreasing with each hop, it is not suitable for use in the new transaction to alternate recipients. The ABY ("Alternate BY") parameter is used to replace it in the new transaction. The new MAIL command includes all MAIL parameters originally specified (unless a future SMTP extension explicitly excludes one of the parameters), with the exception of ABY (if any) and BY (if any). The ABY parameter value (if specified) becomes the new BY parameter value.

The new RCPT command includes all RCPT parameters originally specified (unless a future SMTP extension explicitly excludes one of the parameters), with the exception of ARCPT and ORCPT (if any). The ARCPT parameter value becomes the new recipient address used in the RCPT command. If an ORCPT parameter was present when the message was received, the corresponding RCPT command SHOULD include an ORCPT parameter with the value of the ARCPT parameter.

The new SMTP transaction proceeds as specified in [[RFC3461](#)] and [[RFC2852](#)].

[5.7](#). Deployment considerations

Organizations often authorize multiple servers to accept mail addressed to them. For example, the organization may itself operate more than one server, and may also or instead have an agreement with other organizations to accept mail as a backup. Authorized servers are generally listed in MX records as described in [[RFC5321](#)]. When more than one server accepts mail for the domain-part of a mailbox, it is strongly advised that either all or none of them support the ALTRECIPI extension. Otherwise, unpredictable behavior and mail failures might occur.

For a given recipient an MTA can accept a message and generate a non delivery DSN later instead of just rejecting the recipient at the SMTP protocol level. The extension defined in this document can be defeated if the next hop on the route to a primary recipient is such an SMTP relay which doesn't conform to this document. The previous hop to such a relay would generate a "relayed" DSN (as per [Section 5.3](#)), so the sender should be able to discover such condition.

One possible way to address this problem would be to intercept DSNs

on the way to the MAIL FROM address and resend the original message to the alternate recipient. However this solution is going to be more complicated to implement (due to the need to parse DSNs and possibly include extra storage for the original message and/or some associated state) than just implementing the extension defined in this document. Additionally, such solution would require that the MAIL FROM address is to be hosted on a server which can intercept such DSNs, which is not always going to be the case.

For the reason stated above it is RECOMMENDED that, in a particular environment where the ALTRECIPI extension is to be used, all MTAs/MSAs/MDAs on a path to primary recipients support the ALTRECIPI SMTP extension.

[6.](#) Syntax

The following syntax specification uses the Augmented Backus-Naur Form (ABNF) as described in [\[RFC5234\]](#). Terms not defined here are taken from [\[RFC2852\]](#), [\[RFC3461\]](#) and [\[RFC5321\]](#).

alt-rcpt-parameter = "ARCPT=" alt-recipient-address

alt-recipient-address = addr-type ";" xtext
; <addr-type> and <xtext>
; are defined in [RFC 3461](#).

aby-parameter = "ABY=" by-value

by-value = by-time ";" by-mode [by-trace]
; <by-time>, <by-mode> and <by-trace>
; are defined in [RFC 2852](#).
;
; <by-time> is a decimal representation of
; the number of seconds within which the message
; should be delivered and has the range
; -999,999,999 seconds <= by-time <= +999,999,999 seconds

Opt-info = [Via] [With] [ID] [For] [AltRecip]
[Additional-Registered-Clauses]

; Updates the Opt-info defined in [RFC 5321](#)

AltRecip = CFWS "ALTRECIP" FWS AltRecip-Value
; Complies with the <Additional-Registered-Clauses>
; non-terminal syntax from [RFC 5321](#).

AltRecip-Value = "yes"

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addr-type = <defined in [RFC 3461](#)>

xtext = <defined in [RFC 3461](#)>

by-time = <defined in [RFC 2852](#)>

by-mode = <defined in [RFC 2852](#)>

by-trace = <defined in [RFC 2852](#)>

Via = <defined in [RFC 5321](#)>

With = <defined in [RFC 5321](#)>

ID = <defined in [RFC 5321](#)>

For = <defined in [RFC 5321](#)>

Additional-Registered-Clauses = <defined in [RFC 5321](#)>

CFWS = <defined in [RFC 5321](#)>

Delivery-Error-header-field = "Delivery-Error:" [CFWS] status-code [CFWS] CR

status-code = <defined in [RFC 3464](#)>

7. Example

An original SMTP transaction with 2 recipients:

```
S: 220 example.net SMTP server here
C: EHLO example.com
S: 250-example.net
S: 250-DSN
S: 250-DELIVERBY
S: 250-ALTRECIPI
C: MAIL FROM:<eljefe@example.com> BY=120;R ENVID=QQ314159 ABY=60;R
S: 250 <eljefe@example.com> sender ok
C: RCPT TO:<topbanana@example.net> ARCPT=rfc822;bottom-apple@loc2.example.
S: 250 <topbanana@example.net> recipient ok
C: RCPT TO:<Dana@Ivory.example.net> NOTIFY=SUCCESS,FAILURE
   ORCPT=rfc822;Dana@Ivory.example.net
S: 250 <Dana@Ivory.example.net> recipient ok
C: DATA
S: 354 okay, send message
C: (message goes here)
C: .
S: 250 message accepted
C: QUIT
S: 221 goodbye
```

The receiving MTA then tries to deliver the message to the next hop. If delivery to the first recipient fails (e.g. due to timer expiration or receipt of a 5XX status code), the message will be forwarded to an alternate recipient for the first message. The new

SMTP transaction would look like:

```
S: 220 loc2.example.org SMTP server here
C: EHLO example.net
S: 250-loc2.example.org
S: 250-DSN
S: 250-DELIVERBY
S: 250-ALTRECIP
C: MAIL FROM:<eljefe@example.com> ENVID=QQ314159 BY=60;R
S: 250 <eljefe@example.com> sender ok
C: RCPT TO:<bottom-apple@loc2.example.org>
S: 250 <bottom-apple@loc2.example.org> is welcomed here
C: DATA
S: 354 okay, send message
C: (message goes here)
C: .
S: 250 message accepted
C: QUIT
S: 221 goodbye
```

[8.](#) IANA Considerations

This specification requests IANA to add the following SMTP extension to the list of registered SMTP Extensions: ALTRECIP.

This specification also requests IANA to add the following new Received header field clause to help with tracing email messages delivered using the ALTRECIP SMTP extension:

Clause name: ALTRECIP

Description: Signals whether an ARCPT parameter was specified for any of the recipients of the message

Syntax of the value: See [Section 6](#) of RFCXXXX

Reference: [[anchor11: RFCXXXX]]

IANA is also requested to add the following header field to the list of Permanent Message Header Fields to be used by the "mail" protocol:

Header field: Delivery-Error
Applicable protocol: mail
Status: standard
Author/change controller: Alexey Melnikov / IETF (iesg@ietf.org)
Specification document(s): [[anchor12: this document]]

9. Security Considerations

Use of this extension can advertise to an attacker criticality or urgency of a message. In addition to this, the use of ARCPT parameter to RCPT command can advertise relationship of a primary recipient to the corresponding alternate recipient. If such information is confidential, use of a SMTP extension that can provide connection confidentiality such as [[RFC3207](#)] is recommended.

Also see Security Considerations of [[RFC3461](#)] and [[RFC2852](#)] for information of security considerations related to SMTP DSN and SMTP DELIVERBY extensions respectively.

10. References

10.1. Normative References

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[10.2.](#) Informative References

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[Appendix A.](#) Acknowledgements

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The author of this document copied lots of text from [RFC 3461](#) and [RFC 2852](#).

5 Castle Business Village
36 Station Road
Hampton, Middlesex TW12 2BX
UK

E-Mail: Alexey.Melnikov@isode.com