

Network Working Group  
Request for Comments: 3886  
Updates: 3463  
Category: Standards Track

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September 2004

## An Extensible Message Format for Message Tracking Responses

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### Abstract

Message Tracking is expected to be used to determine the status of undelivered e-mail upon request. Tracking is used in conjunction with Delivery Status Notifications (DSN) and Message Disposition Notifications (MDN); generally, a message tracking request will be issued only when a DSN or MDN has not been received within a reasonable timeout period.

This memo defines a MIME content-type for message tracking status in the same spirit as RFC 3464, "An Extensible Message Format for Delivery Status Notifications". It is to be issued upon a request as described in "Message Tracking Query Protocol". This memo defines only the format of the status information. An extension to SMTP to label messages for further tracking and request tracking status is defined in a separate memo.

## 1. Introduction

Message Tracking is expected to be used to determine the status of undelivered e-mail upon request. Tracking is used in conjunction with Delivery Status Notifications (DSN) [RFC-DSN-SMTP] and Message Disposition Notifications (MDN) [RFC-MDN]; generally, a message tracking request will be issued only when a DSN or MDN has not been received within a reasonable timeout period.

This memo defines a MIME [RFC-MIME] content-type for message tracking status in the same spirit as RFC 3464, "An Extensible Message Format for Delivery Status Notifications" [RFC-DSN-STAT]. It is to be issued upon a request as described in "Message Tracking Query Protocol" [RFC-MTRK-MTQP]. This memo defines only the format of the status information. An extension to SMTP [RFC-ESMTP] to label messages for further tracking and request tracking status is defined in a separate memo [RFC-MTRK-SMTPEXT].

## 2. Other Documents and Conformance

The model used for Message Tracking is described in [RFC-MTRK-MODEL].

Message tracking is intended for use as a "last resort" mechanism. Normally, Delivery Status Notifications (DSNs) [RFC-DSN-SMTP] and Message Disposition Notifications (MDNs) [RFC-MDN] would provide the primary delivery status. Only if no response is received from either of these mechanisms would Message Tracking be used.

This document is based on [RFC-DSN-STAT]. Sections 1.3 (Terminology), 2.1.1 (General conventions for DSN fields), 2.1.2 ("\*-type" subfields), and 2.1.3 (Lexical tokens imported from RFC 822) of [RFC-DSN-STAT] are included into this document by reference. Other sections are further incorporated as described herein.

Syntax notation in this document conforms to [RFC-ABNF].

The following lexical tokens, defined in [RFC-MSGFMT], are used in the ABNF grammar for MTSNs: atom, CHAR, comment, CR, CRLF, DIGIT, LF, linear-white-space, SPACE, text. The date-time lexical token is defined in [RFC-HOSTREQ].

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 RFC 2119 [RFC-KEYWORDS].

### 3. Format of a Message Tracking Status Notification

A Message Tracking Status Notification (MTSN) is intended to be returned as the body of a Message Tracking request [RFC-MTRK-MTQP]. The actual body MUST be a multipart/related [RFC-RELATED] with type parameter of "message/tracking-status"; each subpart MUST be of type "message/tracking-status" as described herein. The multipart/related body can include multiple message/tracking-status parts if an MTQP server chains requests to the next server; see [RFC-MTRK-MODEL] and [RFC-MTRK-MTQP] for more information about chaining.

#### 3.1. The message/tracking-status content-type

The message/tracking-status content-type is defined as follows:

MIME type name:	message
MIME subtype name:	tracking-status
Optional parameters:	none
Encoding considerations:	"7bit" encoding is sufficient and MUST be used to maintain readability when viewed by non-MIME mail readers.
Security considerations:	discussed in section 4 of this memo.

The body of a message/tracking-status is modeled after [RFC-DSN-STAT]. That body consists of one or more "fields" formatted to according to the ABNF of RFC 2822 header "fields" (see [RFC-MSGFMT]). The per-message fields appear first, followed by a blank line. Following the per-message fields are one or more groups of per-recipient fields. Each group of per-recipient fields is preceded by a blank line. Note that there will be a blank line between the final per-recipient field and the MIME boundary, since one CRLF is necessary to terminate the field, and a second is necessary to introduce the MIME boundary. Formally, the syntax of the message/tracking-status content is as follows:

```
tracking-status-content =  
    per-message-fields 1*( CRLF per-recipient-fields )
```

The per-message fields are described in section 3.2. The per-recipient fields are described in section 3.3.

##### 3.1.1. General conventions for MTSN fields

Section 2.1.1 (General conventions for DSN fields) of [RFC-DSN-STAT] is included herein by reference. Notably, the definition of xtext is identical to that of that document.

### 3.1.2. \*-type subfields

Section 2.1.2 (\*-type subfields) of [RFC-DSN-STAT] is included herein by reference. Notably, the definitions of address-type, diagnostic-type, and MTA-name type are identical to that of RFC 3464.

### 3.2. Per-Message MTSN Fields

Some fields of an MTSN apply to all of the addresses in a single envelope. These fields may appear at most once in any MTSN. These fields are used to correlate the MTSN with the original message transaction and to provide additional information which may be useful to gateways.

```
per-message-fields =  
    original-envelope-id-field CRLF  
    reporting-mta-field CRLF  
    arrival-date-field CRLF  
    *( extension-field CRLF )
```

#### 3.2.1. The Original-Envelope-Id field

The Original-Envelope-Id field is defined as in section 2.2.1 of [RFC-DSN-STAT]. This field is REQUIRED.

#### 3.2.2. The Reporting-MTA field

The Reporting-MTA field is defined as in section 2.2.2 of [RFC-DSN-STAT]. This field is REQUIRED.

#### 3.2.3. The Arrival-Date field

The Arrival-Date field is defined as in section 2.2.5 of [RFC-DSN-STAT]. This field is REQUIRED.

### 3.3. Per-Recipient MTSN fields

An MTSN contains information about attempts to deliver a message to one or more recipients. The delivery information for any particular recipient is contained in a group of contiguous per-recipient fields. Each group of per-recipient fields is preceded by a blank line.

The syntax for the group of per-recipient fields is as follows:

```
per-recipient-fields =  
    original-recipient-field CRLF  
    final-recipient-field CRLF  
    action-field CRLF  
    status-field CRLF  
    [ remote-mta-field CRLF ]  
    [ last-attempt-date-field CRLF ]  
    [ will-retry-until-field CRLF ]  
    *( extension-field CRLF )
```

### 3.3.1. Original-Recipient field

The Original-Recipient field is defined as in section 2.3.1 of [RFC-DSN-STAT]. This field is REQUIRED.

### 3.3.2. Final-Recipient field

The required Final-Recipient field is defined as in section 2.3.2 of [RFC-DSN-STAT]. This field is REQUIRED.

### 3.3.3. Action field

The required Action field indicates the action performed by the Reporting-MTA as a result of its attempt to deliver the message to this recipient address. This field MUST be present for each recipient named in the MTSN. The syntax is as defined in RFC 3464. This field is REQUIRED.

Valid actions are:

failed	The message could not be delivered. If DSNs have been enabled, a "failed" DSN should already have been returned.
delayed	The message is currently waiting in the MTA queue for future delivery. Essentially, this action means "the message is located, and it is here."
delivered	The message has been successfully delivered to the final recipient. This includes "delivery" to a mailing list exploder. It does not indicate that the message has been read. No further information is available; in particular, the tracking agent SHOULD NOT attempt further "downstream" tracking requests.

- expanded**      The message has been successfully delivered to the recipient address as specified by the sender, and forwarded by the Reporting-MTA beyond that destination to multiple additional recipient addresses. However, these additional addresses are not trackable, and the tracking agent SHOULD NOT attempt further "downstream" tracking requests.
- relayed**        The message has been delivered into an environment that does not support message tracking. No further information is available; in particular, the tracking agent SHOULD NOT attempt further "downstream" tracking requests.
- transferred**    The message has been transferred to another MTRK-compliant MTA. The tracking agent SHOULD attempt further "downstream" tracking requests unless that information is already given in a chaining response.
- opaque**         The message may or may not have been seen by this system. No further information is available or forthcoming.

There may be some confusion between when to use "expanded" versus "delivered". Whenever possible, "expanded" should be used when the MTA knows that the message will be sent to multiple addresses. However, in some cases the delivery occurs to a program which, unknown to the MTA, causes mailing list expansion; in the extreme case, the delivery may be to a real mailbox that has the side effect of list expansion. If the MTA cannot ensure that this delivery will cause list expansion, it should set the action to "delivered".

#### 3.3.4. Status field

The Status field is defined as in RFC 3464. A new code is added to RFC 3463 [RFC-EMSSC], "Enhanced Mail System Status Codes",

##### X.1.9 Message relayed to non-compliant mailer"

The mailbox address specified was valid, but the message has been relayed to a system that does not speak this protocol; no further information can be provided.

A 2.1.9 Status field MUST be used exclusively with a "relayed" Action field. This field is REQUIRED.

### 3.3.5. Remote-MTA field

The Remote-MTA field is defined as in section Reference 2.3.5 of [RFC-DSN-STAT]. This field MUST NOT be included if no delivery attempts have been made or if the Action field has value "opaque". If delivery to some agent other than an MTA (for example, a Local Delivery Agent) then this field MAY be included, giving the name of the host on which that agent was contacted.

### 3.3.6. Last-Attempt-Date field

The Last-Attempt-Date field is defined as in section Reference 2.3.7 of [RFC-DSN-STAT]. This field is REQUIRED if any delivery attempt has been made and the Action field does not have value "opaque", in which case it will specify when it last attempted to deliver this message to another MTA or other Delivery Agent. This field MUST NOT be included if no delivery attempts have been made.

### 3.3.7. Will-Retry-Until field

The Will-Retry-Until field is defined as in section Reference 2.3.9 of [RFC-DSN-STAT]. If the message is not in the local queue or the Action field has the value "opaque" the Will-Retry-Until field MUST NOT be included; otherwise, this field SHOULD be included.

## 3.4. Extension fields

Future extension fields may be defined as defined in section 2.4 of [RFC-DSN-STAT].

## 3.5. Interaction Between MTAs and LDAs

A message that has been delivered to a Local Delivery Agent (LDA) that understands message tracking (in particular, an LDA speaking LMTP [RFC-LMTP] that supports the MTRK extension) SHOULD pass the tracking request to the LDA. In this case, the Action field for the MTA->LDA exchange will look the same as a transfer to a compliant MTA; that is, a "transferred" tracking status will be issued.

## 4. Security Considerations

### 4.1. Forgery

Malicious servers may attempt to subvert message tracking and return false information. This could result in misdirection or misinterpretation of results.

## 4.2. Confidentiality

Another dimension of security is confidentiality. There may be cases in which a message recipient is autoforwarding messages but does not wish to divulge the address to which the messages are autoforwarded. The desire for such confidentiality will probably be heightened as "wireless mailboxes", such as pagers, become more widely used as autoforward addresses.

MTA authors are encouraged to provide a mechanism which enables the end user to preserve the confidentiality of a forwarding address. Depending on the degree of confidentiality required, and the nature of the environment to which a message were being forwarded, this might be accomplished by one or more of:

- (a) respond with a "relayed" tracking status when a message is forwarded to a confidential forwarding address, and disabling further message tracking requests.
- (b) declaring the message to be delivered, issuing a "delivered" tracking status, re-sending the message to the confidential forwarding address, and disabling further message tracking requests.

The tracking algorithms MUST NOT allow tracking through list expansions. When a message is delivered to a list, a tracking request MUST respond with an "expanded" tracking status and MUST NOT display the contents of the list.

## 5. IANA Considerations

IANA has registered the SMTP extension defined in section 3.

## 6. Acknowledgements

Several individuals have commented on and enhanced this document, including Tony Hansen, Philip Hazel, Alexey Melnikov, Lyndon Nerenberg, Chris Newman, Gregory Neil Shapiro, and Dan Wing.

## 7. References

### 7.1. Normative References

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## 7.2. Informational References

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## Acknowledgement

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

