
Stream: Internet Engineering Task Force (IETF)
RFC: [9078](#)
Category: Experimental
Published: August 2021
ISSN: 2070-1721
Authors: D. Crocker R. Signes N. Freed
Brandenburg InternetWorking Fastmail Oracle

RFC 9078

Reaction: Indicating Summary Reaction to a Message

Abstract

The popularity of social media has led to user comfort with easily signaling basic reactions to an author's posting, such as with a 'thumbs up' or 'smiley' graphic. This specification permits a similar facility for Internet Mail.

Status of This Memo

This document is not an Internet Standards Track specification; it is published for examination, experimental implementation, and evaluation.

This document defines an Experimental Protocol for the Internet community. This document is a product of the Internet Engineering Task Force (IETF). It represents the consensus of the IETF community. It has received public review and has been approved for publication by the Internet Engineering Steering Group (IESG). Not all documents approved by the IESG are candidates for any level of Internet Standard; see Section 2 of RFC 7841.

Information about the current status of this document, any errata, and how to provide feedback on it may be obtained at <https://www.rfc-editor.org/info/rfc9078>.

Copyright Notice

Copyright (c) 2021 IETF Trust and the persons identified as the document authors. All rights reserved.

This document is subject to BCP 78 and the IETF Trust's Legal Provisions Relating to IETF Documents (<https://trustee.ietf.org/license-info>) in effect on the date of publication of this document. Please review these documents carefully, as they describe your rights and restrictions with respect to this document. Code Components extracted from this document must include Simplified BSD License text as described in Section 4.e of the Trust Legal Provisions and are provided without warranty as described in the Simplified BSD License.

Table of Contents

- 1. Introduction
- 2. Terminology
- 3. Reaction Content-Disposition
- 4. Reaction Message Processing
- 5. Usability Considerations
 - 5.1. Example Message
 - 5.2. Example Display
- 6. Security Considerations
- 7. IANA Considerations
- 8. Experimental Goals
- 9. Normative References
- Acknowledgements
- Authors' Addresses

1. Introduction

The popularity of social media has led to user comfort with easily signaling summary reactions to an author's posting, by using emoji graphics, such as with a 'thumbs up', 'heart', or 'smiley' indication. Sometimes the permitted repertoire is constrained to a small set, and sometimes a more extensive range of indicators is supported.

This specification extends this existing practice in social media and instant messaging into Internet Mail.

While it is already possible to include symbols and graphics as part of an email reply's content, there has not been an established means of signaling the semantic substance that such data are to be taken as a summary 'reaction' to the original message -- that is, a mechanism to identify symbols as specifically providing a summary reaction to the cited message rather than merely being part of the free text in the body of a response. Such a structured use of the symbol(s) allows recipient Mail User Agents (MUAs) to correlate this reaction to the original message and possibly to display the information distinctively.

This facility defines a new MIME Content-Disposition, to be used in conjunction with the In-Reply-To header field, to specify that a part of a message containing one or more emojis can be treated as a summary reaction to a previous message.

2. Terminology

Unless provided here, terminology, architecture, and specification notation used in this document are incorporated from:

- [\[Mail-Arch\]](#)
- [\[Mail-Fmt\]](#)
- [\[MIME\]](#)

Syntax is specified with

- [\[ABNF\]](#)

The ABNF rule emoji-sequence is inherited from [\[Emoji-Seq\]](#); details are in [Section 3](#).

Normative language, per [\[RFC2119\]](#) and [\[RFC8174\]](#):

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14 [\[RFC2119\]](#) [\[RFC8174\]](#) when, and only when, they appear in all capitals, as shown here.

3. Reaction Content-Disposition

A message sent as a reply **MAY** include a part containing:

```
Content-Disposition: reaction
```

If such a field is specified, the Content-Type of the part **MUST** be:

```
Content-Type: text/plain; charset=utf-8
```

The content of this part is restricted to a single line of emoji. The [ABNF] is:

```
part-content      = emoji *(WSP emoji) CRLF
emoji             = emoji-sequence
emoji-sequence    = { defined in [Emoji-Seq] }

base-emojis      = thumbs-up / thumbs-down / grinning-face /
                  frowning-face / crying-face
                  ; Basic set of emojis, drawn from [Emoji-Seq]

; thumbs-up      = {U+1F44D}
; thumbs-down    = {U+1F44E}
; grinning-face  = {U+1F600}
; frowning-face  = {U+2639}
; crying-face    = {U+1F622}
```

The part-content is either the message's single MIME body or the content portion of the first MIME multipart body part.

The ABNF rule emoji-sequence is inherited from [Emoji-Seq]. It defines a set of Unicode code point sequences, which must then be encoded as UTF-8. Each sequence forms a single pictograph. The BNF syntax used in [Emoji-Seq] differs from [ABNF] and **MUST** be interpreted as used in Unicode documentation. The referenced document describes these as sequences of code points.

Note: The part-content can first be parsed into candidate reactions, separated by WSP. Each candidate reaction that does not constitute a single emoji-sequence (as per [Emoji-Seq]) is invalid. Invalid candidates can be treated individually, rather than affecting the remainder of the part-content's processing. The remaining candidates form the set of reactions to be processed. This approach assumes use of a mechanism for emoji sequence validation that is not specified here.

The rule base-emojis is provided as a simple, common list, or 'vocabulary' of emojis. It was developed from some existing practice in social networking and is intended for similar use. However, support for it as a base vocabulary is not required. Having providers and consumers employ a common set will facilitate user interoperability, but different sets of users might want to have different, common (shared) sets.

The reaction emoji or emojis are linked to the current message's In-Reply-To field, which references an earlier message and provides a summary reaction to that earlier message [Mail-Fmt]. For processing details, see Section 4.

Reference to unallocated code points **SHOULD NOT** be treated as an error; the corresponding UTF-8-encoded code points **SHOULD** be processed using the system default method for denoting an unallocated or undisplayable code point.

Note: The "emoji" token looks simple. It isn't. Implementers are well advised not to assume that emoji sequences are trivial to parse or validate. Among other concerns, an implementation of the Unicode Character Database is required. An emoji is more than a stand-in for a simple alternation of characters. Similarly, one emoji sequence is not interchangeable with, or equivalent to, another one, and comparisons require detailed understanding of the relevant Unicode mechanisms. Use of an existing Unicode implementation will typically prove extremely helpful, as will an understanding of the error modes that may arise with a chosen implementation.

4. Reaction Message Processing

The presentation aspects of reaction processing are necessarily MUA specific and beyond the scope of this specification. In terms of the message itself, a recipient MUA that supports this mechanism operates as follows:

1. If a received message R's header contains an In-Reply-To field, check to see if it references a previous message that the MUA has sent or received.
2. If R's In-Reply-To: does reference one, then check R's message content for a part with a "reaction" Content-Disposition header field, at either the outermost level or as part of a multipart at the outermost level.
3. If such a part is found and the content of the part conforms to the restrictions outlined above, remove the part from the message and process the part as a reaction.

Note: A message's content might include other, nested messages. These can be analyzed for reactions, independently of the containing message, applying the above algorithm for each contained message, separately.

Again, the handling of a message that has been successfully processed is MUA specific and beyond the scope of this specification.

5. Usability Considerations

This specification defines a mechanism for the structuring and carriage of information. It does not define any user-level details of use. However, the design of the user-level mechanisms associated with this facility is paramount. This section discusses some issues to consider.

Creation: Because an email environment is different from a typical social media platform, there are significant -- and potentially challenging -- choices in the design of the user interface, to support indication of a reaction. Is the reaction to be sent only to the original author, or should it be sent to all recipients? Should the reaction always be sent in a discrete message containing only the reaction, or should the user also be able to include other message content? (Note that carriage of the reaction in a normal email message enables inclusion of this other content.)

Display: Reaction indications might be more useful when displayed in close visual proximity to the original message, rather than merely as part of an email response thread. The handling of multiple reactions, from the same person, is also an opportunity for making a user experience design choice that could be interesting.

Culture: The use of an image, intended to serve as a semantic signal, is determined and affected by cultural factors, which differ in complexity and nuance. It is important to remain aware that an author's intent when sending a particular emoji might not match how the recipient interprets it. Even simple, commonly used emojis can be subject to these cultural differences.

5.1. Example Message

A simple message exchange might be:

```
To: recipient@example.org
From: author@example.com
Date: Today, 29 February 2021 00:00:00 -800
Message-ID: 12345@example.com
Subject: Meeting

Can we chat at 1pm pacific, today?
```

with a thumbs-up, affirmative response of:

```
To: author@example.com
From: recipient@example.org
Date: Today, 29 February 2021 00:00:10 -800
Message-ID: 56789@example.org
In-Reply-To: 12345@example.com
Subject: Meeting
Mime-Version: 1.0 (1.0)
Content-Type: text/plain; charset=utf-8
Content-Disposition: reaction

{U+1F44D}
```

The Unicode character, represented here as "{U+1F44D}" for readability, would actually be sent as the UTF-8-encoded character.

The example could, of course, be more elaborate, such as the first of a MIME multipart sequence.

5.2. Example Display

Repeating the caution that actual use of this capability requires careful usability design and testing, this section describes simple examples -- which have not been tested -- of how the reaction response might be displayed in a summary list of messages:

Summary: Summary listings of messages in a folder include columns such as Subject, From, and Date. Another might be added to show common reactions and a count of how many of them have been received.

Message: A complete message is often displayed with a tailored section for header fields, enhancing the format and showing only selected header fields. A pseudo-field might be added for reactions, again showing the symbol and a count.

6. Security Considerations

This specification employs message content that is a strict subset of existing possible content and thus introduces no new content-specific security considerations. The fact that this content is structured might seem to make it a new threat surface, but there is no analysis demonstrating that it does.

This specification defines a distinct Content-Disposition value for specialized message content. Processing that handles the content differently from other content in the message body might introduce vulnerabilities. Since this capability is likely to produce new user interaction features, that might also produce new social engineering vulnerabilities.

7. IANA Considerations

IANA has registered the Reaction MIME Content-Disposition parameter, per [\[RFC2183\]](#).

Content-Disposition parameter name: reaction

Allowable values for this parameter: (none)

Description: Permit a recipient to respond by signaling basic reactions to an author's posting, such as with a 'thumbs up' or 'smiley' graphic

8. Experimental Goals

The basic, email-specific mechanics for this capability are well established and well understood. Points of concern, therefore, are:

- Technical issues in using emojis within a message body
- Market interest
- Usability

So the questions to answer for this Experimental specification are:

- Is there demonstrated interest by MUA developers?
- If MUA developers add this capability, is it used by authors?
- Does the presence of the Reaction capability create any operational problems for recipients?
- Does the presence of the Reaction capability demonstrate additional security issues?
- What specific changes to the specification are needed?
- What other comments will aid in use of this mechanism?

Please send comments to ietf-822@ietf.org.

9. Normative References

- [ABNF]** Crocker, D., Ed. and P. Overell, "Augmented BNF for Syntax Specifications: ABNF", STD 68, RFC 5234, DOI 10.17487/RFC5234, January 2008, <<https://www.rfc-editor.org/info/rfc5234>>.
- [Emoji-Seq]** Davis, M., Ed. and P. Edberg, Ed., "Unicode Technical Standard #51: Unicode Emoji", September 2020, <https://www.unicode.org/reports/tr51/#def_emoji_sequence>.
- [Mail-Arch]** Crocker, D., "Internet Mail Architecture", RFC 5598, DOI 10.17487/RFC5598, July 2009, <<https://www.rfc-editor.org/info/rfc5598>>.
- [Mail-Fmt]** Resnick, P., Ed., "Internet Message Format", RFC 5322, DOI 10.17487/RFC5322, October 2008, <<https://www.rfc-editor.org/info/rfc5322>>.
- [MIME]** Freed, N. and N. Borenstein, "Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies", RFC 2045, DOI 10.17487/RFC2045, November 1996, <<https://www.rfc-editor.org/info/rfc2045>>.
- [RFC2119]** Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, DOI 10.17487/RFC2119, March 1997, <<https://www.rfc-editor.org/info/rfc2119>>.
- [RFC2183]** Troost, R., Dorner, S., and K. Moore, Ed., "Communicating Presentation Information in Internet Messages: The Content-Disposition Header Field", RFC 2183, DOI 10.17487/RFC2183, August 1997, <<https://www.rfc-editor.org/info/rfc2183>>.
- [RFC8174]** Leiba, B., "Ambiguity of Uppercase vs Lowercase in RFC 2119 Key Words", BCP 14, RFC 8174, DOI 10.17487/RFC8174, May 2017, <<https://www.rfc-editor.org/info/rfc8174>>.

Acknowledgements

This specification had substantive commentary on three IETF mailing lists.

This work began as a private exercise, in July 2020, with private discussion, for draft-crocker-reply-emoji. It morphed into draft-crocker-inreply-react, with significant discussion on the ietf-822 mailing list <<https://www.ietf.org/mailman/listinfo/ietf-822>>, September through November 2020. The discussion produced a fundamental change from proposing a new header field to instead defining a new Content-Disposition type, as well as significantly enhancing its text concerning Unicode. It also produced two additional coauthors.

In November 2020, the Dispatch mailing list <<https://www.ietf.org/mailman/listinfo/dispatch>> was queried about the draft, but it produced no discussion, though it did garner one statement of interest.

A 4-week Last Call was issued on this document, January 2021, resulting in quite a bit of fresh discussion on the last-call mailing list <<https://www.ietf.org/mailman/listinfo/last-call>> and producing further changes to this document. After Last Call completed, additional concerns regarding the Unicode-related details surfaced, producing yet more changes to the document. It also produced a challenge that prompted the current version of this Acknowledgements section.

Readers who are interested in the details of the document's history are encouraged to peruse the archives for the three lists, searching Subject fields for "react".

Authors' Addresses

Dave Crocker

Brandenburg InternetWorking
Email: dcrocker@bbiw.net

Ricardo Signes

Fastmail
Email: rjbs@semiotic.systems

Ned Freed

Oracle
Email: ned.freed@mrochek.com