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Displaying Downgraded Messages for Email Address Internationalization
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Abstract

This document describes a method for displaying downgraded messages which originally contained internationalized E-mail addresses or internationalized header fields.

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1. Introduction

The Email Address Internationalization (UTF8SMTP) extension document set [[RFC4952](#)] [[RFC5336](#)] [[RFC5335](#)] [[RFC5337](#)] expands Email address structure, syntax and Email header format. To avoid rejection of internationalized Email messages, the downgrading mechanism [[RFC5504](#)] converts an internationalized message to a traditional Email message when a server in the delivery path does not support the UTF8SMTP extension. The downgraded message is a traditional Email message, except the message has "Downgraded-" header fields.

A perfect reverse-function of the downgrading does not exist because the encoding defined in [[RFC2047](#)] is not exactly reversible and Received header field downgrading may remove FOR clause information. The restoration of the downgrading should be done once at the final destination of the downgraded message such as MUAs or IMAP servers. This document describes the restoration methods for displaying downgraded messages in MUAs.

2. Terminology

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](#) [[RFC2119](#)].

Specialized terms used in this specification are defined in the EAI overview [[RFC4952](#)] or in [[RFC5321](#)][[RFC5322](#)], MIME documents [[RFC2045](#)] [[RFC2047](#)] [[RFC2183](#)] [[RFC2231](#)].

This document depends on [[RFC5335](#)] and [[RFC5504](#)]. Key words used in these document are used in this document, too.

The term "MIME decode" is used for both "encoded-word" decoding defined by [[RFC2047](#)] and MIME parameter value decoding defined by [[RFC2231](#)].

[3.](#) Converting downgraded message headers for display

[3.1.](#) Considerations

The order of some header fields (such as "Resent-*" fields) is significant. The process of regenerating the original fields from the downgraded ones MUST NOT reorder the fields.

In order to regenerate a field from a specific downgraded header field, it's necessary to find the corresponding replacement in the

current message. If the corresponding field can not be found, the downgraded header field in question can not be regenerated and used.

[3.2.](#) The process

A MUA MAY decode and re-generate the original header fields of the message (MTAs and MDAs SHOULD NOT attempt to do this; it SHOULD be left to the MUA). This procedure can be used to approximately reverse the Downgrade process, but it will not always construct the original header fields exactly.

Three types of Downgraded header fields are described in [section 3 of \[RFC5504\]](#):

1. "Envelope Information Preservation Header Fields", described in [RFC5504 section 3.1](#) and in [Section 3.2.1](#), below.
2. "Address Header Fields' Preservation Header Fields", described in [RFC5504 section 3.2](#) and in [Section 3.2.2](#), below.
3. "Unknown Header Fields' Preservation Header Fields", described in [RFC5504 section 3.3](#) and in [Section 3.2.3](#), below.

After processing Downgraded header fields, decode all header fields, as described in [\[RFC2047\]](#) and [\[RFC2231\]](#).

[3.2.1.](#) No reconstruction of the Envelope Information Preservation Header Fields

Envelope Information Preservation Header Fields are new fields that might have been added by the downgrade process. Because they do not represent fields that appeared in the original message, this process

is not applicable to them.

3.2.2. Reconstructing the Address Header Fields' Preservation Header Fields

Reconstructing Address Header Fields' Preservation Header Fields is OPTIONAL, and a decision MAY be made on each field, individually. In particular, it might be less important to process the Resent-* header fields, so an implementation MAY choose to skip those.

To construct a displayable copy of a header field from one of these downgraded header fields, follow this procedure:

1. In an edit buffer, create a new header field:
 - 1a. For the field name, remove the "Downgraded-" prefix from the downgraded field name. For example, "Downgraded-From" becomes "From", and "Downgraded-Resent-To" becomes "Resent-To".

- 1b. For the field value, decode the MIME-encoded value of the downgraded field according to [\[RFC2047\]](#).
2. If the header field is one that can only appear once, according to the table in [\[RFC5322\] section 3.6](#) ("From", "Sender", "To", "CC", "BCC", "Reply-To"), locate the corresponding field in the message's headers, and skip to step 9. Otherwise, continue with step 3.
3. Apply "Email Header Fields Downgrading", defined in [section 5 of \[RFC5504\]](#), to the field in the edit buffer, but do not prepend the "Downgraded-" prefix. Put the result into comparison buffer 1.
4. Canonicalize the header fields in the comparison buffer:
 1. Unfold all header field continuation lines as described in [\[RFC5322\]](#).
 2. Ensure that there is one space character before and one after the <mailbox-list> separator ",". If a space character is missing, insert one.
 3. Ensure that there is one space character before and one after each <comment>. If a space character is missing, insert one.
 4. Decode each <encoded-word> whose charset is "UTF-8".
 5. Convert all sequences of one or more WSP characters to a single space character. WSP characters here include those before and after a line-folding boundary.

6. Delete all WSP characters at the end of each unfolded header field value.
7. Delete any WSP characters remaining before and after the colon separating the header field name from the header field value, retaining the colon separator.
5. Locate the first instance of the corresponding field in the message's headers.
6. Canonicalize the located field as in step 4, and put the result into comparison buffer 2.
7. Compare the header field in comparison buffer 1 with the header field in comparison buffer 2. If they match, go to step 9.
8. Locate the next instance of the corresponding field in the message's headers. If one is found, go to step 6. If none is found, stop: you can not use this downgraded field because you can't find its replacement in the message.
9. Replace the located header field with the one in the edit buffer. You MUST NOT reorder the header fields when you do this; it's important to replace the field in place.

[3.2.3.](#) The Unknown Header Fields' Preservation Header Fields

The Unknown Header Fields' Preservation Header Fields SHOULD be left as they are unless the MUA has special knowledge of a particular field. An MUA with such knowledge MAY use the procedure in [Section 3.2.2](#), above, for those fields that it knows about.

[4.](#) Security considerations

While information in any email header should usually be treated with some suspicion, current email systems commonly employ various mechanisms and protocols to make the information more trustworthy. For example, an organization's boundary MTA can modify "From:" lines so that messages arriving from outside the organization are easily distinguishable from internal emails. As a result of that rewriting, it might not be possible to reconstruct the "Downgraded-From" header field.

A MUA MAY emphasize bogus or broken Address Header Fields' Preservation Header Fields found in step 8 of [Section 3.2.2](#).

Hiding the information from the actual header fields when using the

"Downgraded-" header fields does not cause loss of information if generating MIME decoded header fields in step 1 of [Section 3.2.2](#) and the comparison done in step 8 are successful. To ensure that no information is lost, a MUA SHOULD have a function that uses the actual message that was received (with/without MIME decoding) to render the message.

See "Security considerations" section in [\[RFC5504\]](#) and [\[RFC4952\]](#) for more discussion.

[5.](#) IANA Considerations

This document makes no requests for IANA action. This section can be removed by the RFC Editor before publication.

[6.](#) Acknowledgements

This document was separated from [\[RFC5504\]](#). Both documents were developed in the EAI WG. Significant comments and suggestions were received from John Klensin, Harald Alvestrand, Chris Newman, Randall Gellens, Charles Lindsey, Marcos Sanz, Alexey Melnikov, Pasi Eronen, Frank Ellermann, Edward Lewis, S. Moonesamy and JET members.

[7.](#) Change History

This section is used for tracking the update of this document. Will be removed after finalize.

[7.1.](#) [draft-fujiwara-eai-downgraded-display](#): Version 00

- o Initial version
- o It is separated from [Appendix A](#) of [draft-ietf-eai-downgrade-05.txt](#)

[7.2.](#) [draft-ietf-eai-downgraded-display](#): Version 00

- o Submitted as a working group draft

[7.3. draft-ietf-eai-downgraded-display](#): Version 01

- o Prohibited and removed Displaying Technique 1
- o Added new texts to Security Considerations

[7.4. draft-ietf-eai-downgraded-display](#): Version 02

- o updated by comments from Chair's review and AD's review
- o Fixed references
- o Rewrote [section 4](#) to be more comprehensible
- o Added bogus or broken "Downgraded-" header fields
- o Added sentences in Security considerations

[7.5. draft-ietf-eai-downgraded-display](#): Version 03

- o [Section 3](#) (formerly 3 and 4) was rewritten by Barry Leiba.

[8. References](#)

[8.1. Normative References](#)

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- [RFC5504] Fujiwara, K. and Y. Yoneya, "Downgrading Mechanism for Email Address Internationalization", [RFC 5504](#), March 2009.

[8.2.](#) Informative References

- [RFC5321] Klensin, J., "Simple Mail Transfer Protocol", [RFC 5321](#), October 2008.
- [RFC5336] Yao, J. and W. Mao, "SMTP Extension for Internationalized Email Addresses", [RFC 5336](#), September 2008.
- [RFC5337] Newman, C. and A. Melnikov, "Internationalized Delivery Status and Disposition Notifications", [RFC 5337](#), September 2008.

[Appendix A.](#) Examples

This section shows an example of displaying a downgraded message. First, an example of the original UTF8SMTP message and its downgraded message are shown. The example comes from "Example 1" of [\[RFC5504\]](#) and three header fields, "Unknown-Field", "Resent-From", and "Resent-To", are added. The example UTF8SMTP message is shown in Figure 1.

```
Message-Id: MESSAGE_ID
Mime-Version: 1.0
Content-Type: text/plain; charset="UTF-8"
Content-Transfer-Encoding: 8bit
Subject: NON-ASCII-SUBJECT
Unknown-Field: NON-ASCII-Unknown
From: DISPLAY-local <NON-ASCII-local@example.com
  <ASCII-local@example.com>>
To: DISPLAY-remote1 <NON-ASCII-remote1@example.net
  <ASCII-remote1@example.net>>
Cc: DISPLAY-remote2 <NON-ASCII-remote2@example.org>
Resent-From: DISPLAY-remote1 <NON-ASCII-remote1@example.net
  <ASCII-remote1@example.net>>
Resent-To: DISPLAY-reto <NON-ASCII-reto@example.net
  <ASCII-reto@example.net>>
Date: DATE

MAIL_BODY
```

Figure 1: Original message

Delivered downgraded message is shown in Figure 2. Return-Path header will be added by the final destination MTA. Some of Received: header fields may be added.

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```
Return-Path: <ASCII-local@example.com>
Received: ...
Downgraded-Mail-From: =?UTF-8?Q?<NON-ASCII-local@example.com_?=
=?UTF-8?Q?<ASCII-local@example.com>>?=
Downgraded-Rcpt-To: =?UTF-8?Q?<NON-ASCII-remote1@example.net_?=
=?UTF-8?Q?<ASCII-remote1@example.net>>?=
Message-Id: MESSAGE_ID
Mime-Version: 1.0
Content-Type: text/plain; charset="UTF-8"
Content-Transfer-Encoding: 8bit
Subject: =?UTF-8?Q?NON-ASCII-SUBJECT?=
Downgraded-Unknown-Field: =?UTF-8?Q?NON-ASCII-Unknown?=
From: =?UTF-8?Q?DISPLAY-local?= <ASCII-local@example.com>
Downgraded-From: =?UTF-8?Q?DISPLAY-local_<NON-ASCII-local@example.com_?=
=?UTF-8?Q?<ASCII-local@example.com>>?=
To: =?UTF-8?Q?DISPLAY-remote1?= <ASCII-remote1@example.net>
Downgraded-To: =?UTF-8?Q?DISPLAY-remote1_?=
=?UTF-8?Q?<NON-ASCII-remote1@example.net_<ASCII-remote1@example.net>>?=
Cc: =?UTF-8?Q?DISPLAY-remote2?= Internationalized address
=?UTF-8?Q?NON-ASCII-remote2@example.org?= removed;;
Downgraded-Cc: =?UTF-8?Q?DISPLAY-remote2_?=
=?UTF-8?Q?<NON-ASCII-remote2@example.org>?=
Resent-From: =?UTF-8?Q?DISPLAY-remote1?= <ASCII-remote1@example.net>
Downgraded-Resent-From: =?UTF-8?Q?DISPLAY-remote1_?=
=?UTF-8?Q?<NON-ASCII-remote1@example.net_<ASCII-remote1@example.net>>?=
Resent-To: =?UTF-8?Q?DISPLAY-reto?= <ASCII-reto@example.net>
Downgraded-Resent-To: =?UTF-8?Q?DISPLAY-reto_?=
=?UTF-8?Q?<NON-ASCII-reto@example.net_<ASCII-reto@example.net>>?=
Date: DATE

MAIL_BODY
```

Figure 2: Downgraded message

Figure 3 shows MIME decoded message of Figure 2. The recipient can read the original From, To, Cc and Unknown-Field header fields as Downgraded-From, Downgraded-To, Downgraded-Cc and Downgraded-Unknown-Field header fields.

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Return-Path: <ASCII-local@example.com>
Received: ...
Downgraded-Mail-From: <NON-ASCII-local@example.com
<ASCII-local@example.com>>
Downgraded-Rcpt-To: <NON-ASCII-remote1@example.net
<ASCII-remote1@example.net>>
Message-Id: MESSAGE_ID
Mime-Version: 1.0
Content-Type: text/plain; charset="UTF-8"
Content-Transfer-Encoding: 8bit
Subject: NON-ASCII-SUBJECT
Downgraded-Unknown-Field: NON-ASCII-Unknown
From: DISPLAY-local <ASCII-local@example.com>
Downgraded-From: DISPLAY-local <NON-ASCII-local@example.com
<ASCII-local@example.com>>
To: DISPLAY-remote1 <ASCII-remote1@example.net>
Downgraded-To: DISPLAY-remote1 <NON-ASCII-remote1@example.net
<ASCII-remote1@example.net>>
Cc: DISPLAY-remote2 Internationalized address
NON-ASCII-remote2@example.org removed;;
Downgraded-Cc: DISPLAY-remote2 <NON-ASCII-remote2@example.org>
Resent-From: DISPLAY-remote1 <ASCII-remote1@example.net>
Downgraded-Resent-From: DISPLAY-remote1
<NON-ASCII-remote1@example.net <ASCII-remote1@example.net>>
Resent-To: DISPLAY-remote1 <ASCII-remote1@example.net>
Downgraded-Resent-To: DISPLAY-remote1
<NON-ASCII-remote1@example.net <ASCII-remote1@example.net>>
Date: DATE

MAIL_BODY

Figure 3: MIME decoded message

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[A.1.](#) Displaying example

This example shows how to display the message in Figure 2, above, using the process defined in [Section 3](#). For simplicity, we will show the reconstruction of all the applicable fields at once.

Selecting all Downgraded-* fields gives this:

```
Downgraded-Mail-From: =?UTF-8?Q?<NON-ASCII-local@example.com_?=
=?UTF-8?Q?<ASCII-local@example.com>>?=
Downgraded-Rcpt-To: =?UTF-8?Q?<NON-ASCII-remote1@example.net_?=
=?UTF-8?Q?<ASCII-remote1@example.net>>?=
Downgraded-Unknown-Field: =?UTF-8?Q?NON-ASCII-Unknown?=
Downgraded-From: =?UTF-8?Q?DISPLAY-local_<NON-ASCII-local@example.com_?=
=?UTF-8?Q?<ASCII-local@example.com>>?=
Downgraded-To: =?UTF-8?Q?DISPLAY-remote1_?=
=?UTF-8?Q?<NON-ASCII-remote1@example.net_<ASCII-remote1@example.net>>?=
Downgraded-Cc: =?UTF-8?Q?DISPLAY-remote2_?=
=?UTF-8?Q?<NON-ASCII-remote2@example.org>?=
Downgraded-Resent-From: =?UTF-8?Q?DISPLAY-remote1_?=
=?UTF-8?Q?<NON-ASCII-remote1@example.net_<ASCII-remote1@example.net>>?=
Downgraded-Resent-To: =?UTF-8?Q?DISPLAY-reto_?=
=?UTF-8?Q?<NON-ASCII-reto@example.net_<ASCII-reto@example.net>>?=
```

Figure 4: Downgraded header fields

Two of the fields, Downgraded-Mail-From and Downgraded-Rcpt-To, are Envelope Information Preservation Header Fields, and will not be reconstructed. One field, Downgraded-Unknown-Field, is an Unknown Header Fields' Preservation Header Field, and will also not be reconstructed. That leaves these to be reconstructed, the Address Header Fields' Preservation Header Fields:

```
Downgraded-From: =?UTF-8?Q?DISPLAY-local_<NON-ASCII-local@example.com_?=
=?UTF-8?Q?<ASCII-local@example.com>>?=
Downgraded-To: =?UTF-8?Q?DISPLAY-remote1_?=
=?UTF-8?Q?<NON-ASCII-remote1@example.net_<ASCII-remote1@example.net>>?=
Downgraded-Cc: =?UTF-8?Q?DISPLAY-remote2_?=
=?UTF-8?Q?<NON-ASCII-remote2@example.org>?=
Downgraded-Resent-From: =?UTF-8?Q?DISPLAY-remote1_?=
=?UTF-8?Q?<NON-ASCII-remote1@example.net_<ASCII-remote1@example.net>>?=
Downgraded-Resent-To: =?UTF-8?Q?DISPLAY-reto_?=
=?UTF-8?Q?<NON-ASCII-reto@example.net_<ASCII-reto@example.net>>?=
```

Figure 5: Header fields for the reconstruction

Now, perform Step 1, creating temporary fields.

```
From: DISPLAY-local <NON-ASCII-local@example.com
<ASCII-local@example.com>>
To: DISPLAY-remote1 <NON-ASCII-remote1@example.net
<ASCII-remote1@example.net>>
Cc: DISPLAY-remote2 <NON-ASCII-remote2@example.org>
Resent-From: DISPLAY-remote1
<NON-ASCII-remote1@example.net <ASCII-remote1@example.net>>
Resent-To: DISPLAY-reto
<NON-ASCII-reto@example.net <ASCII-reto@example.net>>
```

Figure 6: Output of Step 1

In step 2, we set aside the "From", "To", and "Cc" fields, and continue to step 3 with just "Resent-From" and "Resent-To" (the fields that may appear more than once). The fields we set aside will be picked up again later, in step 9.

Perform Steps 3 and 4. The edit buffer contains re-generated ASCII header fields, canonicalized.

```
Resent-From: =?UTF-8?Q?DISPLAY-remote1?= <ASCII-remote1@example.net>
Resent-To: =?UTF-8?Q?DISPLAY-reto?= <ASCII-reto@example.net>
```

Figure 7: The edit buffer (output of Step 4)

Perform Steps 5 to 7, comparison, for each header field. Both the Resent-From and Resent-To fields will match, and we will proceed to step 9. (Step 8, iteration, does not apply in this example.

Perform step 9, replacing all applicable fields, without changing the order. Then do MIME decoding on everything, for display.

```
Return-Path: <ASCII-local@example.com>
Received: ...
Downgraded-Mail-From: <NON-ASCII-local@example.com
  <ASCII-local@example.com>>
Downgraded-Rcpt-To: <NON-ASCII-remote1@example.net>
  <ASCII-remote1@example.net>
Message-Id: MESSAGE_ID
Mime-Version: 1.0
Content-Type: text/plain; charset="UTF-8"
Content-Transfer-Encoding: 8bit
Subject: NON-ASCII-SUBJECT
```

Downgraded-Unknown-Field: NON-ASCII-Unknown
From: DISPLAY-local <NON-ASCII-local@example.com
<ASCII-local@example.com>>
To: DISPLAY-remote1 <NON-ASCII-remote1@example.net
<ASCII-remote1@example.net>>
Cc: DISPLAY-remote2 <NON-ASCII-remote2@example.org>
Resent-From: DISPLAY-remote1 <NON-ASCII-remote1@example.net
<ASCII-remote1@example.net>>
Resent-To: DISPLAY-reto <NON-ASCII-reto@example.net
<ASCII-reto@example.net>>
Date: DATE

Figure 8: The final result

As a result, in this simple example, some original header fields are now displayed in their original form. Differences between Figure 1 and Figure 8 are Return-Path, Downgraded-Mail-From, Downgraded-Rcpt-To, and Downgraded-Unknown-Field.

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