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## **Displaying Downgraded Messages for Email Address Internationalization draft-ietf-eai-downgraded-display-02.txt**

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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

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The Email Address Internationalization (UTF8SMTP) extension document set [\[RFC4952\]](#) (Klensin, J. and Y. Ko, "Overview and Framework for Internationalized Email," July 2007.) [\[RFC5336\]](#) (Yao, J. and W. Mao, "SMTP Extension for Internationalized Email Addresses," September 2008.) [\[RFC5335\]](#) (Abel, Y., "Internationalized Email Headers," September 2008.) [\[RFC5337\]](#) (Newman, C. and A. Melnikov, "Internationalized Delivery Status and Disposition Notifications," September 2008.) expands Email address structure, syntax and Email header format. To avoid rejection of internationalized Email messages, the downgrading mechanism [\[RFC5504\]](#) (Fujiwara, K. and Y. Yoneya, "Downgrading Mechanism for Email Address Internationalization," March 2009.) 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 [\[RFC2047\]](#) (Moore, K., "MIME (Multipurpose Internet Mail Extensions) Part Three: Message Header Extensions for Non-ASCII Text," November 1996.) 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 as displaying downgraded messages in MUAs.

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## 2. Terminology

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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 [\[RFC2119\]](#) ([Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels," March 1997.](#)).

Specialized terms used in this specification are defined in the EAI overview [\[RFC4952\]](#) ([Klensin, J. and Y. Ko, "Overview and Framework for Internationalized Email," July 2007.](#)) or in [\[RFC5321\]](#) ([Klensin, J., "Simple Mail Transfer Protocol," October 2008.](#))[\[RFC5322\]](#) ([Resnick, P., Ed., "Internet Message Format," October 2008.](#)), MIME documents [\[RFC2045\]](#) ([Freed, N. and N. Borenstein, "Multipurpose Internet Mail Extensions \(MIME\) Part One: Format of Internet Message Bodies," November 1996.](#)) [\[RFC2047\]](#) ([Moore, K., "MIME \(Multipurpose Internet Mail Extensions\) Part Three: Message Header Extensions for Non-ASCII Text," November 1996.](#)) [\[RFC2183\]](#) ([Troost, R., Dorner, S., and K. Moore, "Communicating Presentation Information in Internet Messages: The Content-Disposition Header Field," August 1997.](#)) [\[RFC2231\]](#) ([Freed, N. and K. Moore, "MIME Parameter Value and Encoded Word Extensions: Character Sets, Languages, and Continuations," November 1997.](#)).

This document depends on [\[RFC5335\]](#) ([Abel, Y., "Internationalized Email Headers," September 2008.](#)) and [\[RFC5504\]](#) ([Fujiwara, K. and Y. Yoneya, "Downgrading Mechanism for Email Address Internationalization," March 2009.](#)). Key words used in these document are used in this document, too.

The term "non-ASCII" is an UTF-8 string which contains at least one non-ASCII character.

The term "address header field" is used for a header field which contains <mailbox> elements which is defined in [\[RFC5322\]](#) ([Resnick, P., Ed., "Internet Message Format," October 2008.](#)). "Address header fields" contain "From", "Sender", "Reply-To", "To", "Cc", "Bcc", "Resent-From", "Resent-Sender", "Resent-To", "Resent-Cc", "Return-Path" header fields. An "UTF8SMTP message" is an Email messages expanded by [\[RFC5335\]](#) ([Abel, Y., "Internationalized Email Headers," September 2008.](#)).

The term "MIME decode" is used for both "encoded-word" decoding defined by [\[RFC2047\]](#) ([Moore, K., "MIME \(Multipurpose Internet Mail Extensions\) Part Three: Message Header Extensions for Non-ASCII Text," November 1996.](#)) and MIME parameter value decoding defined by [\[RFC2231\]](#) ([Freed, N. and K. Moore, "MIME Parameter Value and Encoded Word Extensions: Character Sets, Languages, and Continuations," November 1997.](#)).

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### 3. Consideration of displaying downgraded message

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Displaying downgraded message is mostly performed by MIME decoding according to [\[RFC2047\] \(Moore, K., "MIME \(Multipurpose Internet Mail Extensions\) Part Three: Message Header Extensions for Non-ASCII Text," November 1996.\)](#) and [\[RFC2231\] \(Freed, N. and K. Moore, "MIME Parameter Value and Encoded Word Extensions: Character Sets, Languages, and Continuations," November 1997.\)](#). As a result of MIME decoding, the header of the message still contains "Downgraded-" header fields, but the header field bodies are MIME decoded. These decoded "Downgraded-" header fields contain the original header field name and the original header field values. The recipient can read them. But the recipient's MUA cannot use the original header fields automatically.

Additionally, A MUA can process "Downgraded-" header fields.

The easiest way to process "Downgraded-" header fields is to remove "Downgraded-" from the decoded "Downgraded-" header fields' names. Then, the "address header fields" may be displayed twice, one is from downgraded header field and the other is from decoded "Downgraded-" header field. Although it is very easy, it MUST NOT be used because of the following reasons.

\*[\[RFC5322\] \(Resnick, P., Ed., "Internet Message Format," October 2008.\)](#) section 3.6 defines number of times each field may occur in the header section of a message and the maximum number for "From", "Sender", "To", "Cc", "Bcc" header fields is 1. It violates [\[RFC5322\] \(Resnick, P., Ed., "Internet Message Format," October 2008.\)](#).

\*Users cannot distinguish which is the original downgraded header field and which is the generated header field.

\*The "Downgraded-" header field and corresponding header field may not have relations.

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### 4. Displaying downgraded message

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A MUA MAY decode and re-generate the original header fields of the message. This procedure can be used to reverse the Downgrade process but will not construct exactly the original header fields in all cases. Displaying downgraded message is implemented by the following steps.

**Input:**

The input to this procedure is the header of the message as received. Copy the entire header into an edit space.

**Step 1:** Select the "Address Header Fields' Preservation Header Fields" described in Section 3.2 of [\[RFC5504\] \(Fujiwara, K. and Y. Yoneya, "Downgrading Mechanism for Email Address Internationalization," March 2009.\)](#) in the edit space. These header fields are "Downgraded-From", "Downgraded-Sender", "Downgraded-To", "Downgraded-Cc", "Downgraded-Bcc", "Downgraded-Reply-To", "Downgraded-Resent-From", "Downgraded-Resent-Sender", "Downgraded-Resent-To", "Downgraded-Resent-Cc", "Downgraded-Resent-Bcc", "Downgraded-Resent-Reply-To", "Downgraded-Return-Path" and "Downgraded-Disposition-Notification-To" header fields.

**Step 2:** For each header field from the output of Step 1, generate a new header field where the field name is the original header field name and the field value is the result of MIME decoding header field value.

**Step 3:** Apply "Email Header Fields Downgrading" defined in section 5 of [\[RFC5504\] \(Fujiwara, K. and Y. Yoneya, "Downgrading Mechanism for Email Address Internationalization," March 2009.\)](#) to the output of Step 2 without re-generating "Downgraded-" header fields and copy the output into a new space (hereafter, call it as a "comparison space").

**Step 4:** Compare the header fields in the comparison space with the header fields of the same name in the edit space. Before this comparison, canonicalize each header field described below.

1. Unfold all header field continuation lines as described in [\[RFC5322\] \(Resnick, P., Ed., "Internet Message Format," October 2008.\)](#).
2. Insert a space character before and after <mailbox-list> separator ",", if there is no space character.
3. Insert a space character before and after <comment> if there is no space character.
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. The colon separator MUST be retained.

For each header field, if the same header fields exist in the comparison space and in the edit space, remove the original header field in the edit space and the generated header field in the comparison space.

Remaining header fields in the comparison space may be bogus or broken "Address Header Fields' Preservation Header Fields" origin.

**Step 5:** Decode all MIME encoded header fields according to [\[RFC2047\] \(Moore, K., "MIME \(Multipurpose Internet Mail Extensions\) Part Three: Message Header Extensions for Non-ASCII Text," November 1996.\)](#) and [\[RFC2231\] \(Freed, N. and K. Moore, "MIME Parameter Value and Encoded Word Extensions: Character Sets, Languages, and Continuations," November 1997.\)](#) in the edit space.

**Step 6:** For each "Unknown Header Fields' Preservation Header Fields" described in section 3.3 of [\[RFC5504\] \(Fujiwara, K. and Y. Yoneya, "Downgrading Mechanism for Email Address Internationalization," March 2009.\)](#) and "Address Header Fields' Preservation Header Fields", generate a new header field where the field name is the original header field name and the field value is the result of MIME decoding header field value, then replace the original "Downgraded-" header field by the generated header field in the edit space. "Envelope Information Preservation Header Fields" are not targets of this step.

The output of this procedure is an UTF8SMTP header in the edit space. It will closely resemble the original header.

After this procedure, the MUA may decode MIME body part header fields according to [\[RFC2047\] \(Moore, K., "MIME \(Multipurpose Internet Mail Extensions\) Part Three: Message Header Extensions for Non-ASCII Text," November 1996.\)](#) and [\[RFC2231\] \(Freed, N. and K. Moore, "MIME Parameter](#)

[Value and Encoded Word Extensions: Character Sets, Languages, and Continuations," November 1997.](#)

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## 5. Security considerations

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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 rewriting, the "Downgraded-From" header field may not be decoded.

A MUA may emphasize bogus or broken "Downgraded-" header fields in step 4 of [Section 4 \(Displaying downgraded message\)](#).

Hiding the information from the actual header fields when using the "Downgraded-" header fields does not cause loss of information if the comparison done in step 4 of [Section 4 \(Displaying downgraded message\)](#) is 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 [\[RFC5504\] \(Fujiwara, K. and Y. Yoneya, "Downgrading Mechanism for Email Address Internationalization," March 2009.\)](#) and [\[RFC4952\] \(Klensin, J. and Y. Ko, "Overview and Framework for Internationalized Email," July 2007.\)](#) for more discussion.

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## 6. IANA Considerations

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

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## 7. Acknowledgements

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This document was separated from [\[RFC5504\] \(Fujiwara, K. and Y. Yoneya, "Downgrading Mechanism for Email Address Internationalization," March 2009.\)](#). 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, Frank Ellermann, Edward Lewis, S. Moonesamy and JET members.

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## 8. Change History

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

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### 8.1. draft-fujiwara-eai-downgraded-display: Version 00

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\*Initial version

\*It is separated from Appendix A of draft-ietf-eai-downgrade-05.txt

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### 8.2. draft-ietf-eai-downgraded-display: Version 00

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\*Submitted as a working group draft

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### 8.3. draft-ietf-eai-downgraded-display: Version 01

[TOC](#)

\*Prohibited and removed Displaying Technique 1

\*Added new texts to Security Considerations

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### 8.4. draft-ietf-eai-downgraded-display: Version 02

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\*updated by comments from Chair's review and AD's review

\*Fixed references

\*Rewrote section 4 to be more comprehensible

\*Added bogus or broken "Downgraded-" header fields

\*Added sentences in Security considerations

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## 9. References

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### 9.1. Normative References

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[RFC2045]	<a href="#">Freed, N. and N. Borenstein, "Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies," RFC 2045, November 1996 (TXT).</a>
[RFC2047]	<a href="#">Moore, K., "MIME (Multipurpose Internet Mail Extensions) Part Three: Message Header Extensions for Non-ASCII Text," RFC 2047, November 1996 (TXT, HTML, XML).</a>
[RFC2119]	<a href="#">Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels," BCP 14, RFC 2119, March 1997 (TXT, HTML, XML).</a>
[RFC2183]	<a href="#">Troost, R., Dorner, S., and K. Moore, "Communicating Presentation Information in Internet Messages: The Content-Disposition Header Field," RFC 2183, August 1997 (TXT, HTML, XML).</a>
[RFC2231]	<a href="#">Freed, N. and K. Moore, "MIME Parameter Value and Encoded Word Extensions: Character Sets, Languages, and Continuations," RFC 2231, November 1997 (TXT, HTML, XML).</a>
[RFC4952]	<a href="#">Klensin, J. and Y. Ko, "Overview and Framework for Internationalized Email," RFC 4952, July 2007 (TXT).</a>
[RFC5322]	<a href="#">Resnick, P., Ed., "Internet Message Format," RFC 5322, October 2008 (TXT, HTML, XML).</a>
[RFC5335]	<a href="#">Abel, Y., "Internationalized Email Headers," RFC 5335, September 2008 (TXT).</a>
[RFC5504]	<a href="#">Fujiwara, K. and Y. Yoneya, "Downgrading Mechanism for Email Address Internationalization," RFC 5504, March 2009 (TXT).</a>

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### 9.2. Informative References

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

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This section shows an example of displaying a downgraded message. First, an example of the original UTF8SMTP message and its downgraded message are shown. They are the same as "Example 1" of [\[RFC5504\] \(Fujiwara, K. and Y. Yoneya, "Downgrading Mechanism for Email Address Internationalization," March 2009.\)](#). The example UTF8SMTP message is shown in [Figure 1 \(Original message\)](#).

---

```
Message-Id: MESSAGE_ID
Mime-Version: 1.0
Content-Type: text/plain; charset="UTF-8"
Content-Transfer-Encoding: 8bit
Subject: NON-ASCII-SUBJECT
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>
Date: DATE

MAIL_BODY
```

**Figure 1: Original message**

---

Delivered downgraded message is shown in [Figure 2 \(Downgraded message\)](#). Return-Path header will be added by the final destination MTA.

---

Return-Path: <ASCII-local@example.com>  
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?=  
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>?=  
Date: DATE

MAIL\_BODY

**Figure 2: Downgraded message**

---

[Figure 3 \(MIME decoded message\)](#) shows MIME decoded message of [Figure 2 \(Downgraded message\)](#). The recipient can read the original From, To, Cc header fields as Downgraded-From, Downgraded-To, Downgraded-Cc header fields.

---

```
Return-Path: <ASCII-local@example.com>
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
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>
Date: DATE

MAIL_BODY
```

**Figure 3: MIME decoded message**

---

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### A.1. Displaying example

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This example shows processes of 'Displaying downgraded message' for [Figure 2 \(Downgraded message\)](#).

First, perform Step 1.

---

```
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?=?
```

---

**Figure 4: Displaying: Output of Step 1**

---

Then, perform Step 2.

---

```
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>
```

---

**Figure 5: Displaying: Output of Step 2**

---

Perform Step 3.

---

```
From: =?UTF-8?Q?DISPLAY-local?= <ASCII-local@example.com>  
To: =?UTF-8?Q?DISPLAY-remote1?= <ASCII-remote1@example.net>  
Cc: =?UTF-8?Q?DISPLAY-remote2?= Internationalized address  
=?UTF-8?Q?NON-ASCII-remote2@example.org?= removed;;
```

---

**Figure 6: Displaying: Output of Step 3**

---

Perform Step 4. "From", "To", "Cc" header fields are removed in [Figure 7 \(Displaying: Output of Step 4\)](#).

---

Return-Path: <ASCII-local@example.com>  
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-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>?=  
Date: DATE  
  
MAIL\_BODY

**Figure 7: Displaying: Output of Step 4**

---

Perform Step 5 and 6.

---

```
Return-Path: <ASCII-local@example.com>
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
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>
Date: DATE
```

MAIL\_BODY

**Figure 8: Decoded message**

---

As a result, in this simple example, all original header fields are displayed in the original form. Differences between [Figure 1 \(Original message\)](#) and [Figure 8 \(Decoded message\)](#) are Return-Path, Downgraded-Mail-From, Downgraded-Rcpt-To header fields only.

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#### Author's Address

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