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Abstract

The protocols specified in current EAI documents such as RFC5335, RFC5336 and RFC5504 are in experimental category. Many organizations have implemented and tested the internationalized email systems. Recently, many discussions focus on the issues of downgrading implementation and testing. This memo provides some analysis in depth about downgrade testing, which will help us deploy the EAI system and the re-charter work of the working group in the near future.
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1. Introduction

The IETF has published five RFCs [RFC4952] [RFC5335] [RFC5336]
[RFC5337] [RFC5504] about internationalized email addresses. CNNIC
and many organizations have implemented these RFCs, do some tests.
This document will mainly focus on the downgrade tests and analysis.

1.1. Role of this specification

The framework document specifies the requirements for, and describes
components of, full internationalization of email address. The EAI
SMTP extension document [RFC5336] specifies the SMTP extension to use
the internationalized email address. The EAI header document
[RFC5335] allows the internationalized email address headers. The
EAI downgrade document [RFC5504] addresses how to downgrade to be
compatible with the current non-EAI-system. The document reports
some downgrading test result, summarizes the discussion in the
IMA@ietf.org list, will help us understand the downgrade issue, and
help the re-charter work.

1.2. Terminology

All the specialized terms used in this specification are defined in
the framework document [RFC4952], the EAI SMTP extension document
[RFC5336], the EAI header document [RFC5335] and the base Internet
email specifications [RFC5321] [RFC5322]. In particular, the terms
"ASCII user", and "i18n mail user" are used in this document according
to the definitions in the framework one.

[[anchor3: NOTE TO RFC EDITOR: Please remove the following text
before publication.]]
Some ideas of this specification is being discussed on the EAI
mailing list. See https://www1.ietf.org/mailman/listinfo/ima for
information about subscribing. The list’s archive is at

2. Problem statement

The EAI WG is moving to re-charter work. The tests and analysis of
EAI downgrade will help to decide our work in the next step. For
downgrading, the WG has discussed 3 options: full downgrade, simple
downgrade and no downgrade. Whether the alt-address in the form of
"prefix+algorithm" SHOULD be used is also discussed. Clear
definition of the problem and good analysis will give some help to
the WG’s future work.
3. Initial Implementation and Downgrade Test

As far as we know, CNNIC, TWNIC, AFILIAS, JPRS and NIDA have implemented the [RFC5335], [RFC5336], [RFC5504]. CNNIC updates the Postfix source code to support EAI. Both TWNIC and AFILIAS update Sendmail. JPRS uses C language to implement EAI. NIDA uses python to implement it. CNNIC and AFILIAS have published some downgrade test results in ima@ietf.org list.

3.1. One i18mail user sends to one ASCII user

We use the UTF8SMTP address via alt-address to send the message to the following address:

- echo@generic-nic.net
- echo@nic.fr
- Echo@TU-Berlin.DE
- echo@tu-chemnitz.de
- echo@ouain.com
- repondsмоi@crdp.ac-versailles.fr
- echo@cnam.fr
- ping@stamper.itconsult.co.uk
- ping@oleane.net
- check-auth@verifier.port25.com

These ten addresses are echo addresses. CNNIC tests these addresses several times. Last time, **ALL get nice echo, meaning that the downgrading sending gets the success**. AFILIAS tests these addresses too. The messages to echo@cnam.fr is bounced on all tests AFILIAS ran. The return message from this test is:

5.1.0 – Unknown address error 550-‘<echo@copernic.cnam.fr>: 
Recipient address rejected: User unknown in local recipient table’

**All tests on other addresses got successful echo**.

3.2. An i18mail user sends to one ASCII user and one i18mail user

We use the UTF8SMTP address via alt-address to send the message to both the ASCII address and the UTF8SMTP address with alt-address. The UTF8SMTP address via alt-address going to the ASCII address will do the downgrade and the receiver receives it successfully. The receiver of the UTF8SMTP address with alt-address will get the message without the downgrading.

3.3. Downgrade Headers

In the current test, all the downgrade header fields can have the possibility to survive the test. In some rare cases, the message with the downgrade headers may be regarded as the rubbish by the spam
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filters and be discarded. But without other interference such as the spam filters, the header with the downgrade works well.

4. Downgrade Options

There are 3 options for downgrading: Full downgrade, Simple downgrade and No downgrade at all. Every downgrade option has its own advantages and disadvantages. Which method is used in the future Standard track document depends on the alt-address selection and downgrade scenarios.

4.1. Full downgrade

Full downgrade is a downgrade of both senders and receivers. The full downgrade is specified in the current document [RFC5504]. If all ASCII addresses for the UTF8SMTP addresses are provided, the full downgrade can happen. According to the [RFC5336], if any alt-address for the UTF8SMTP address is not provided, downgrade operation will fail. In practice, the i18mail sender is unlikely to provide all the alt-addresses when sending the messages. If you know both the UTF8SMTP address and the ASCII address of the receiver, you may select either the UTF8SMTP address or the ASCII address as the receiver address, but not both. If you input two, it is inconvenient for you. Most likely, the i18mail sender will just provide his own alt-address and input either the UTF8SMTP address or the ASCII address as the receiver address. So in most cases, the full downgrade will become into the simple downgrade discussed below.

4.2. Simple downgrade

The simple downgrade is a downgrade which only downgrade the sender information or the "from" fields. The simple downgrade can be regarded as the special case of the full downgrade. If the alt-address of the sender UTF8SMTP address is provided, the downgrade can happen. The simple downgrade does not include the case that the sender is the ASCII sender while the receiver is the i18mail user. It is based on the following assumption: if the sender does not support EAI, the sender’s submission server or MUA can not recognize the UTF8SMTP address, the downgrade operation is unlikely to happen because the server or MUA will regard the UTF8SMTP address as illegal one and refuse to do any sending. In many cases, the full downgrade will turn into simple downgrade. So for most downgrade scenarios, the simple downgrade is most useful. According to the [RFC5336], if the alt-address for the sender UTF8SMTP address is not provided, downgrade operation will fail when the downgrade happens. From this view, the simple downgrade is also not fully reliable mechanism to transport every message to the receiver.
4.3. No downgrade

No downgrade will do nothing about the downgrade, rejecting or bouncing. No downgrade means that if any non-EAI-capability server is encountered, the sender will get a notification which says that "Sorry, we can not send the UTF8SMTP message, please try to use the ASCII address." No downgrade is based on the assumption that if the user gets too many failure sending messages, the user will push the email service providers or implementers to support EAI. No downgrade may cause too many email messages bouncing or jecting, which lead to the inconvenience of the email users.

5. ALT-ADDRESS

There are two kinds of alt-addresses, user preferred address and algorithmic address. The WG has already a lot of discussions about this issue.

5.1. User preferred address

If user preferred address is selected, the users have to input both the senders’ and receivers’ alt-address if there is one. It is necessary for the user to remember every alt-address for the relative UTF8SMTP address. The advantage is that user preferred address is often the user friendly address. If you have to input every alt-address, you may simply use the ASCII address or simple downgrading. After all, inputting both UTF8SMTP address and its alt-address is boring to users. So the user will choose the convenient way to send the email: just using the ASCII address or simple downgrading.

5.2. Algorithmic address

Algorithmic address is a raw ACE (ASCII Compatible Encoding) address plus some special prefix, which is the result of encoding of the non-ASCII local part. Since the current document [RFC5336] does not specify which kind of address can be regarded as the alt-address, many implementers will choose the algorithmic address as the alt-address. Algorithmic address may solve the message failure sending when full downgrade or simple downgrade is applied, but there are some significant problems and risks in some algorithmic addresses which have resulted in being rejected by earlier discussions in the working group.

5.2.1. Prefix

In order to distinguish the algorithmic address and the normal ASCII address, the good prefix for raw ACE is necessary. Many characters
of local part may have special use. The selection of local part should avoid such characters. It will be better if the prefix is never used in the local part of any normal email address. For the local parts of the special domain, we can check whether some specific prefix has been used as the prefix of the local part of this email domain. So we can find some specific string as the prefix, which has never been used as the the local part of this domain and will not be used in the future through some registration policy of the email accounts.

5.2.2. Algorithm

The good algorithm for the non-ASCII local part may help the use of UTF8SMTP address. The possible algorithms for ACE might be punycode [RFC3492], base64 [RFC4648] or any other algorithm. As far as we know, all the possible ACE of the non-ASCII local part with the algorithm are ugly. The ACE is not easily remembered by the user, and the user will hate to see it. The algorithm address may help the transition from ASCII email address world to EAI world to avoid the possible email bouncing or rejecting. The ugly ACE address may bring more phishing incidents because the internet users can not easily distinguish the ugly address from its similar ugly address, for example, xn--adqweradsasdfsdf VS xn--adqweradsdfsdf.

6. IANA Considerations

There is no IANA consideration.

7. Security Considerations

See the extended security considerations discussion in the framework document [RFC4952].

8. Acknowledgements

Many ideas are from the discussion in the list ima@ietf.org. Many friends and experts in the EAI WG help us to produce the valuable ideas. Many organizations including CNNIC, TWNIC, JPRS, NIDA, AND AFFLILIAS have implemented EAI systems. These organizations have already done a lot of inter-operating testing.

9. Change History

[[anchor19: RFC Editor: Please remove this section.]]
9.1. draft-yao-eai-downgrade-tests-analysis: Version 00

- downgrade tests and analysis

10. References

10.1. Normative References


10.2. Informative References


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