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J. Levine
Taughannock Networks

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E-mail Authentication for Internationalized Mail
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Abstract

SPF, DKIM, and DMARC enable a domain owner to publish e-mail authentication and policy information in the DNS. In internationalized e-mail, domain names can occur both as U-labels and A-labels. This specification clarifies when to use which form of a domain names when using SPF, DKIM, and DMARC.

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

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This Internet-Draft will expire on January 5, 2016.

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1. Introduction

SPF, DKIM, and DMARC enable a domain owner to publish e-mail authentication and policy information in the DNS. SPF primarily publishes information about what host addresses are authorized to send mail for a domain. DKIM places cryptographic signatures on e-mail messages, with the validation keys published in the DNS. DMARC publishes policy information related to the domain in the From: header of e-mail messages.

In conventional e-mail, all domain names are ASCII in all contexts so there is no question about the representation of the domain names. All internationalized domain names are represented as A-labels [RFC5890] in message bodies, in SMTP sessions, and in the DNS. Internationalized mail [RFC6530] allows U-labels in SMTP sessions [RFC6531] and in message headers [RFC6532].

Every U-label is equivalent to an A-label, so in principle the choice of label format should not cause any ambiguities. But in practice, consistent use of label formats will make it more likely that mail senders' and receivers' code interoperates.

2. Definitions

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 [RFC2119].

The term IDN, for Internationalized Domain Name, refers to either a U-label or an A-label.

Since DMARC is not currently a standards track protocol, this specification offers advice rather than requirements for DMARC.

3. SPF and internationalized mail

SPF [RFC7208] uses two identities from the SMTP session, the host name in the EHLO command, and the domain in the address in the MAIL FROM command. Since the EHLO command precedes the server response that identifies the SMTPUTF8 extension, an IDN domain name argument SHOULD be represented as an A-label. An IDN domain name in MAIL FROM can be either a U-label or an A-label.

All U-labels MUST be converted to A-labels before being used for an SPF validation. This includes both the original DNS lookup, described in Section 3 of [RFC7208] and the macro expansion of domain-spec described in section 7. Section 4.3 of [RFC7208] states that all IDNs in an SPF DNS record MUST be A-labels; this rule is unchanged since any SPF record may be used to authorize either internationalized or conventional mail.

4. DKIM and internationalized mail

DKIM [RFC6376] specifies a message header that contains a cryptographic message signature and a DNS record that contains the validation key.

Section 3.5 of [RFC6376] states that IDNs in the d=, i=, and s= tags of a DKIM-Signature header MUST be encoded as A-labels. This rule is relaxed only for headers in internationalized messages [RFC6532] so IDNs MAY be represented either as A-labels or U-labels. This provides improved consistency with other headers, particularly since the local-part of the i= tag is likely to be UTF-8 rather than ASCII. When computing or verifying the hash used a DKIM signature as described in section 3.7, the hash MUST use the domain name in the format it occurs in the header. When retrieving or processing a DKIM key record from the DNS, all U-labels must first be converted into A-labels before creating the domain name to be looked up.

DKIM key records, described in section 3.6.1, do not contain domain names, so there is no change to their specification.

5. DMARC and internationalized mail

DMARC [RFC7489] defines a policy language that domain owners can specify for the domain of the address in a RFC5322.From header.

Section 6.6.1 specifies, somewhat imprecisely, how IDNs in the RFC5322.From address domain are to be handled. That section is updated to say that all U-labels in the domain are converted to A-labels before further processing. Sections 6.7 and 7.1 are

similarly updated to say that all U-labels in domains being handled are converted to A-labels before further processing.

DMARC policy records, described in section 6.3, can contain e-mail addresses in the rua and ruf tags. Since a policy record can be used for both internationalized and conventional mail, those addresses have to be conventional addresses, not internationalized addresses.

6. IANA Considerations

This document makes no request of IANA.

7. Security Considerations

Nothing new.

8. Normative References

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Author's Address

John Levine
Taughannock Networks
PO Box 727
Trumansburg, NY 14886

Phone: +1 831 480 2300
Email: standards@taugh.com
URI: http://jl.ly